

# INFORMATION AND RECORDS MANAGEMENT

Document-Based Information Systems



Robek Brown Stephens  
Fourth Edition

# Information and Records Management

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DOCUMENT-BASED INFORMATION SYSTEMS

Fourth Edition

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Dataplex Corporation

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## Information and Records Management

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## Preface

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Since the publication of the first edition of *Information and Records Management* in 1974, this book has been generally regarded as the standard reference book in the field of records and information management. This status will be further enhanced by this fourth edition, which has been completely revised to include the many changes that have revolutionized the field of records and information management since the publication of the third edition in 1987. The fourth edition is, largely, a new work.

Major changes and new features of this edition include:

- A new two-chapter section on *electronic records management*. The chapters cover managing electronic records media and automating records management systems and functions. No other records management textbook contains chapter-length material on these topics.
- A new three-chapter section on *image technology for records management*. The chapters include updated information on micrographics systems and new coverage of electronic imaging technology for records management.
- The addition of new automation-related material in all relevant chapters.
- Added focus on new topics and de-emphasis of tangential topics. For example, summarized material on correspondence management and directive management has been moved to appropriate chapters.
- A new co-author, David O. Stephens, CRM, CMC, to replace the late Dr. Wilmer O. Maedke. Mr. Stephens is a leading records management consultant. The authors believe that the resulting combination of educational and practitioner/consultant authors provides the best mix of writing talent.

The problem-solving activities that were introduced in the previous editions continue. At the end of each chapter, the student is given suggested projects, many of which require research in current records management literature, and a case problem for application of the material in the chapters to realistic situations. Teaching suggestions and answers to the case problems and discussion questions are available in the accompanying Instructor's Manual.



viii *Preface*

The authors wish to thank many member of the Institute of Certified Records Managers and the Association of Records Managers and Administrators, International, who contributed directly or indirectly to the text. Among those individuals are Earnestine Baucham, William Benedon, Fred Boecker, Tyrone Butler, M. Liisa Fagerlund, Jan Graham, Mary Gregoire-Lyons, Rosemarie McCauley, John T. Phillips, William Saffady, Heather Sherman, David S. Skupsky, Roderick Wallace, Harriett Welch, and Eileen Weston.

Mary F. Robek  
Gerald F. Brown  
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## Chapter 6

### Filing System Maintenance

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#### Learning Objectives

1. To identify factors which help reduce the area and time of a records search.
  2. To identify basic record types.
  3. To explain the primary tools used for identifying records.
  4. To explain the use of color in records management.
  5. To describe files maintenance procedures.
  6. To describe the records identification systems used in records management.
  7. To list standards for filing.
  8. To recommend solutions for common filing problems.
  9. To make recommendations for safeguarding the security and confidentiality of records.
  10. To describe the process for file reorganization.
  11. To make recommendations for small business filing systems.
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#### ISOLATING THE BASIC TYPES OF RECORDS

File systems consist of documents, file folders, and files dispersed throughout an organization. These systems usually incorporate incoming and outgoing correspondence, internal and external supporting materials, working papers, and office-related records. Records managers long ago discovered breaking, or subdividing, to be the secret of finding the needle of information in an office's haystack of papers. Subdividing within file groups was discussed in the previous chapter, but the first consideration of organizing records is consideration of the basic types of records.

##### Reducing the Area and Time of a Records Search

Separating papers into basic types aids the finding of material by immediately reducing the area of

search. Other factors which will aid in reducing the area and time of search are disposal, identification, volume, and completeness.

**Disposal.** Separation into basic groups keeps essential documents apart from short-lived papers, which may be disposed of earlier than essential documents. For example, case working papers are kept separate from essential case papers to facilitate disposal of the working papers. Transitory and convenience files also have a shorter life span than the general correspondence records. Differing retention periods are therefore a good reason for filing these types of records separately.

**Identification.** The inability to readily recognize the papers of each type may affect the file-type decision. If it is difficult to distinguish technical



reference and transitory materials from general correspondence, it may be better to keep them together to avoid filing errors.

**Volume.** The quantity of papers involved is important. If less than a file drawer of case records or technical reference material is involved, separating the material from the general correspondence will be of little value. On the other hand, it does not take many transitory, working, or convenience papers to justify separation. While no set volume figure can apply to separating file types in every office, this chapter attempts to give some guidance for common file types.

**Completeness.** The needs of files users for complete information (telling the whole story of transactions) should not be overlooked in organizing files. If photographs and correspondence are separated, either both files may have to be searched when records are requested, or the user runs the risk of taking action without the complete facts. Usually, it is the physical characteristics of papers, such as the size of engineering drawings, which require materials to be filed separately, even though filing materials together would be preferable.

### Basic Record Types

Basic record types include general correspondence; transitory correspondence; case records; case working papers; technical reference materials; extra convenience copies; film, tape, and disk records; cartographic materials and drawings, and cards. Other types of records which may be maintained are ledger books, suspense files, and perhaps other categories.

**General Correspondence.** The general correspondence file consists of letters, memorandums, telegrams, enclosures, reports, and miscellaneous materials, arranged by subject. This file may also be known as the *central file*, the *subject file*, or the *correspondence file*. Almost every office requires a file of this type for those papers that are most

often requested by subject. The general correspondence file often includes papers belonging to other basic types for ready access or if the volume of such papers is small.

**Transitory Correspondence.** Transitory correspondence consists of easily used routine materials, e.g., short-lived papers involved in answering routine requests for information or publications, in requesting or transmitting routine data to other offices, in making hotel reservations or arranging for conferences, and the like. Transitory correspondence often may be authorized for disposal within six months or less. Every office has such papers and needs to segregate them. They should be kept in folders separate from general correspondence if they amount to 5 percent or more of the papers.

**Case Records.** A case file relates to a specific person, company, client, project, event, geographic area, or other unique entity. Case files commonly refer to purchase orders, contracts, investigations, requisitions, loans, research projects, construction projects, or personnel transactions. The papers may cover one or many subjects concerning a case or project and will always be filed by a name or a number. Another distinguishing feature of case records is the similarity in the nature of the papers within each case folder which make up the total file. This procedure aids in distinguishing case records from the general correspondence, which is filed by subject. Since a case file is first identified by its functional classification, case files may be integrated into the filing system either alphabetically by the name of the case or numerically by its number.

It is possible to have many files classifications in a single case file. For example, if several major projects are underway, the decision needs to be made as to whether accounts payable and accounts receivable should both be included in each case file, or whether they should be maintained as separate files. If they are separated by project and filed with other records about the project, the result is the project case file incorpo-



rating multiple files classifications. Accounts payable and accounts receivable use the same files classifications regardless of whether they are arranged in a case file or not. A rule of thumb for case files is that they should be arranged by function in order to avoid obsolescence of the classification scheme.

**Case Working Papers.** Reference materials and other data collected for the project, materials involved in summarizing or analyzing the data, and drafts or other preliminary papers leading to a finding can be classified as working papers. If working papers can be easily distinguished from important case papers, they should always be segregated. These papers should be viewed as a segment of a case history file segregated to aid disposition of short-lived specific classes of material. To avoid screening for disposal, such papers are placed in separate folders, side by side, distinguished one from the other by the color of the label or the position of the folder tab. Case working papers are usually disposed of after a period dating from the close of the case.

**Technical Reference Materials.** Offices involved in research, product development, statistical reports, and information gathering and dissemination typically have duplicate materials of publications already available in library facilities. This reference material may be received from government agencies, colleges and universities, private research organizations, trade associations, and other sources. As a broad rule of thumb, if more than one drawer of the general file consists of reference materials, separate filing is warranted.

**Extra Convenience Copies.** Extra copies of documents created or received that are retained solely for ease of use make up the convenience file group. The day file of letters written by an office, arranged in date order, is a typical example of a convenience file.

**Film, Tape, and Disk Records.** Electronic or other mechanical reproductions of sound or coded

information are usually kept separate because of their physical characteristics. Still pictures are used in many instances to record individuals, activities, or progress and must be treated as records. Still picture negatives, as well as motion pictures and videotapes, demand separate housing and special care for preservation.

Sound recordings from some office dictating machines may be transcribed to paper records so that the recording media can be discarded or reused. Other recordings are not transcribed and must be preserved, as in some grievance hearings. Even a small volume of cassette tapes, disks, or off-size recordings requires a separate file.

Word processing storage media have also added to the diversity of records storage. While many organizations use hard disks for the storage media, many others are faced with storing hundreds of full floppy disks that are maintained for periods of time.

Long-time storage of electronic media for audio, text, and graphics leads to the problem of having equipment to read the media as technology progresses.

Other items in this basic type are magnetic and paper tapes, Xray films, and micrographics.

**Cartographic Materials and Drawings.** Maps, charts, aerial photographs, physiographic diagrams, and engineering drawings have a variety of formats and sizes. This variety normally separates them from other records. Field survey notes, geodetic surveys, astronomic readings, and similar computations usually are considered cartographic in nature. The term *charts* (hydrographic, nautical, weather, aeronautical, etc.) includes graphic presentations (bar, pie, tabular, line, etc.). Aerial photographs include the negative and positive (print) film and other items such as flight line indexes, mosaics, and graphic indexes. Engineering drawings may be blueprints, diazo prints, pencil sketches, or tracings on vellum. These drawings require special reproduction equipment and special storage systems. Some oversize maps and drawings can be folded and interfiled among related subject or case files. However, if more than



10 percent of the maps, charts, or drawings are oversize, separate filing is necessary. Too many bulky, folded papers will seriously handicap filing and searching in standard-size records.

**Cards.** The variety of card files is almost as great as the variety of case files. However, their size and format make them a logically separate file group. Common sizes used as indexes, catalogs, or summaries are 3 by 5 or 5 by 8 inches. The Hollerith punched card and the microfilm aperture card are variations of card files.

Once records have been separated into types, it is possible to select a system for arranging the records of each separate file type.

#### PRIMARY TOOLS FOR LOCATING RECORDS

Personnel and organizations may change, but a well-designed and well-maintained filing system remains constant, and anyone using the file arrangement documentation should be able to retrieve the desired record. As changes occur in departments, and files concerning research and development become manufacturing files or operations files, standard filing systems simplify the transfer process. The primary tools for locating records are arrangement of documents, labeling, indexing, use of color, and automation.

#### Arrangement of Documents

The basic file arrangement is either alphabetic or numeric, and one or a combination of these arrangements is used in the design of a file system. For a full discussion of filing arrangements, see Chapter 5.

Table 6.1 is a summary of file arrangements for documents having a variety of filing features. Filing features of documents are used to assist in indexing.

#### Indexing

Indexes facilitate the locating of files. In some offices, records can be found more rapidly by

maintenance of a separate name index to the subject file. The index is arranged alphabetically by the name of the person or organization referred to in the correspondence or document. If a large file is organized by developing a uniform files classification system, the UFCS provides a listing, or database, of all created information and can be used as an index. It is then also possible to flag a records series for retention and at the same time flag duplicate copies for destruction. The listing of records also aids in the development of a retention schedule and permits identification of vital records. The UFCS also provides continuity since only trained records personnel can modify the file plan.

The index is used as a finding tool for indirect access files and in refreshing the memory of possible locations in a large alphabetic subject file. The index is usually not required for small subject files. The index can be maintained in a card file or in a computer listing.

**Preparing Cards for Indexing.** A uniform style should be followed for all cards in a card index file. A typical style is to type the name in index form at the top of the card, about three spaces from the left margin and three lines from the top. Parentheses are used to show nonindexing units, for example, (*the*). The Association of Records Managers and Administrators suggests that the diagonal [ / ] be used to show indexing units. Other methods are to type the first indexing unit in all capital letters with other units in upper- and lowercase; to type all indexing units in capital letters; and to type all indexing units in upper- and lowercase without the diagonals.

A cross-reference card lists another title or name by which material may be requested and notes the name under which the material will be found. Three lines below the indexed name, the cross-reference name is typed in the usual envelope style, in all caps. If the cards are to be used in a numerical system, a code number is usually typed in the upper right-hand corner. See Figure 6.1.



TABLE 6.1 File Arrangement for Different Filing Features

Filing Feature of Document	Usual Filing Sequence	Most Suitable File Groups	Need for Index File (by Second Filing Feature)	Need for Cross-Referencing a Document within the File	Likelihood That Document Description Used in Request Will Pinpoint File Location	Likelihood of File Designation Being Shown on Document When Original	Likelihood of File Designation Being Expressed the Same on Documents to Be Filed Together	Ease and Accuracy in Marking a Document for Filing	Ease and Accuracy in Sorting and Filing
Names of people, organizations, or firms.	Alphabetic by name.	Case, Case working, Technical reference.	Normally not needed, except for precedent cases.	If more than one name or title involved.	Usually, Foreign, organization, and unusual names may be troublesome. The larger the file, the greater the problem.	Nearly always.	Usually, except for misspellings. Exchanging personal and organization names causes inconsistency.	Fast and easy, if names can be underlined. Fairly slow if names must be written. Spelling errors may occur in unfamiliar names. Adherence to filing rules required.	Slow and difficult. Eye must scan each letter of each word to determine sequence. Words and titles vary widely in length. The larger the file, the greater the problem. Adherence to filing rules required.
Names or titles of projects, publications, products, or things.	Alphabetic by name.	Case, Case working, Technical reference.	Normally not needed, except for precedent cases.	If more than one name or title involved.	Sometimes, Project titles may be troublesome. The longer the name or title, the less chance of finding the file, the larger the problem.	Usually.	Usually. Difficulties may occur with project and other long titles.	Fairly slow. Key words to be underlined may be buried in long titles. Incomplete titles may be overlooked by handwriting. Adherence to filing rules required.	Slow and difficult. Eye must scan each letter of each word to determine sequence. Words and titles vary widely in length. The larger the file, the greater the problem. Adherence to filing rules required.
Geographic areas or location.	Alphabetic by area (often subarranged by people, things, etc.).	Case, Case working, Technical reference.	Frequently needed, as location is not always known.	If more than one location involved.	Sometimes. Record may be filed by state, or may be requested by people, organizations, or things without the location given. The larger the file, the greater the problem.	Usually. Location is shown, but not subarrangement file designation.	Depends on choice of locational level for each paper.	Fast, if location can be underlined. Subarrangement often requires handwritten designations.	Fairly difficult, depending on subarrangement. Precise filing required. The larger the file, the greater the problem.
Numbers or symbols.	By number or symbol.	Case, Case working, Technical reference.	Name index needed to obtain number or symbol, not known or incorrectly shown.	If more than one number or symbol involved.	Depends upon widespread use of the numbers or symbols within the office and extent of use on documents received from the outside.	Nearly always—sometimes omitted.	Nearly always.	Fast, if numbers or symbols are short or segmented. Numbers or symbols susceptible to transposition and other errors.	Easy, if numbers or symbols are short or segmented. Transposition and other errors likely.
Dates.	By date prepared or used.	Convenience, Transitory, Suspense.	Not needed, unless large volume filed only by date.	Not needed.	Usually for suspense. For convenience or transitory files, exact date often not known.	Always.	Always.	Fast and accurate. Marking rarely needed.	Easy and accurate.
Subject topics.	Alphabetic by subject topic, or by subject and alphanumeric file code.	General correspondence may include names of people, firms, and organizations (names or numbers), Technical reference.	Occasionally an index by names of people, firms, and organizations needed.	If more than one subject involved, subject index is brought forward.	Unlikely. Request may be vague, and differing terms may be used to describe same subject. Relative index may be needed to determine proper subject topic.	Unlikely, since subject, if shown, rarely matches subject outline topics.	Unlikely.	Slow, as content must be read. Use of file code speeds filing. More complex require outline or subject outline or relative index. Faulty decisions and errors in writing may occur.	Difficult, if alphabetically filed by word topics. Either if filed by subject or by file code. The more complex the code the more difficult the accuracy.

Source: NARS File Operations.



<p>George/Josiah/R./Jr. 91</p> <p>Mr. Josiah R. George, Jr. 1255 North Sandburg Terrace Chicago, IL 60610</p> <p>See Red Baron</p>	<p>HUMAN RESOURCES</p> <p>Retirement and Pensions See Also: HUMAN RESOURCES Policies and Procedures</p>
(a)	(a)
<p>(The) Red/Baron 91</p> <p>1255 North Sandburg Terrace Chicago, IL 60610</p> <p>SEE Joseph R. George, Jr.</p>	<p>RETIREMENT AND PENSIONS See: HUMAN RESOURCES</p>
(b)	(b)
	<p>RETIREMENT PARTY See: HUMAN RESOURCES</p>
	(c)

**FIGURE 6.1** Index Card Formats. (a) Original Card; (b) Cross-Reference Card

After the proper caption is chosen, all synonymous terms should be cross-referenced, as should all subheadings of the main classification. Figure 6.2 illustrates the use of cards in showing subdivisions and cross-referencing in a card index. All major headings are typed in all caps. Different-colored cards are used for major classification cards (white), subdivisions cards (blue), and cross-reference cards (pink).

All three colored cards should be interfiled to form the index. The white cards represent the captions to be found in the file drawers. In revising files, a cross-reference to the old subject heading that will not be used will help users become accustomed to the new terms. An example appears in Figure 6.3. Card files other than index card files can be maintained using the same procedures.

**FIGURE 6.2** Sample Index Cards. (a) White Card—Major Classification; (b) Blue Card—Subdivision; (c) Pink Card—Cross-Reference

### Labeling

Once the filing arrangement has been determined, it is possible to plan the labeling of the drawers, folders, guides, and shelves. Labels are used to identify the contents of drawers, shelves, trays, bins, binders, boxes, and folders. They come in strips, rolls, fanfolds, pads, and in various colors

PERSONNEL  
See: HUMAN RESOURCES

FIGURE 6.3 Cross-Reference to New Caption—Pink Card

or with color stripes. Labels reinforce and strengthen, as well as accent, the area to which they are applied. *Labeling* is marking records or containers with identification information. Labels may also be identified with a bar code that can be scanned into the computer.

**Folder Labels.** File folder labels identify the contents of the folder. The information on the label is used to find the file's place in the arrangement. The more dependent one is on arrangement for locating records, the more important labeling

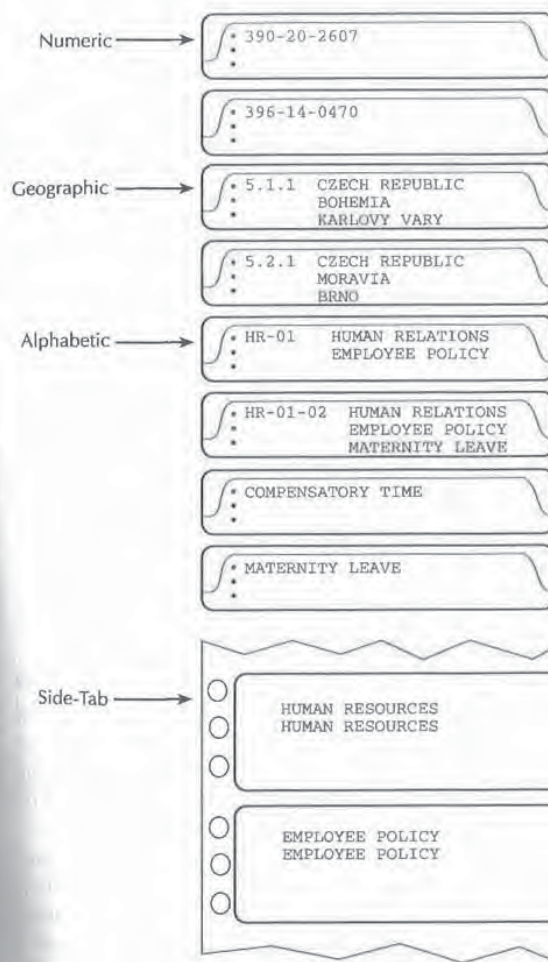


FIGURE 6.4 Computer-Generated Labels

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awers,  
used to  
trays,  
ome in  
colors



becomes. Labeling is particularly critical in direct access files. Figure 6.4 is an illustration of computer-generated labels for top-tab folders.

The folder labels may be gummed or self-adhesive and are affixed to the tab at the back of the folders. Since the tabs may be either at the top or at the side, it is necessary to prepare labels accordingly. Folder labels may have color strips or may be one color only. For preparation on the typewriter, folder labels come in rolls, fanfolds, or pads. Continuous-form labels are available for computer preparation. Hanging folder labels are inserted into plastic tabs which are inserted into the slots of the front flap of the folder. This is a variation from the regular file folder where the label is attached to the tab at the back of the folder.

When files are transferred to inactive status on a regular basis, it is common practice to generate a complete set of labels for the new time period.

**Typing Labels.** To keep labels neat and uniform, the following rules should be observed:

1. Start typing labels two spaces from the left edge, directly below scoring.
2. Capitalize the headings. The major heading may be typed in all caps. The label caption should be complete. Invert the name where necessary.
3. Omit punctuation. Use two spaces where a period or comma normally would be.
4. Position the year and month on the label so as not to interfere with the main caption.
5. Spell out subject names and titles in full. Use cuts of tabs to fit headings.
6. Avoid misspellings, erasures, and strikeovers.

Labels should be applied in a uniform position on the folders. To do this, a handful of folders can be spread out on the desk with the edges even. A pencil mark can be drawn along a ruler placed vertically against the folders at the extreme left edge of the tabs. This pencil mark at the upper left corner of each folder is the guide for placement of the label. The labels should not overhang the curved corners of the folder tabs.

Labels on folder tabs and guide tabs may also be of the insert type and used with plastic or metal label protectors.

**Drawer Labels.** Label information identifies the contents of a drawer and corresponds with the coding system. Drawer label information is inclusive and concise. The labels are usually available in card stock paper, in perforated sheets, and in a variety of colors, and can be slipped into the holders of the file drawers.

Numeric labels simply list the first and last folder in the drawer, such as 1-99. The alphabetic range of the drawer may be indicated by single, double, or multiple notations. Single or open notation simply shows the first letter of the contents of the drawer, such as A. Double notation shows the range; that is, the first and last letter of the alphabet for the material contained in the drawer, such as A-As. Multiple notation is similar to double notation, but it lists combinations within the range, such as A-As and Al-An. Labels for file drawers should correspond in color with the labels used in the file unit. The information is usually centered and printed (by typewriter or computer printer) in capital letters without punctuation. An example of a label for a file drawer appears in Figure 6.5.

**Guide Labels.** Guide labels may be affixed to guide tabs or inserted into plastic or metal holders to identify a section of records and information. Guide labels are prepared similarly to folder labels.

FIGURE 6.5 File Drawer Label





**Shelf Labels.** Shelf labels may appear at the end or front edge of a shelf unit to identify the contents of the entire shelf unit or an entire range of shelf units. The labels may be affixed to the shelf unit itself or inserted into metal holders on the ends or front edges of the shelf units. Color and printing formats are similar to those used for folder and guide labels.

### Use of Color

In records management, color is used in coding equipment; in supplies such as folders, labels, tabs, signals, guides; in stripping for microfiche, film, and storage media; and in commercially prepared systems.

**Color in Supplies.** Color is used to identify records and to make filing and retrieval easier and faster. Bars of color can be imprinted, or they can be added to file folders in a uniform location for identification. The numbers appear on backgrounds of different colors on blocks of labels that may be attached to the folder tab. Twelve colors can identify a year's cycle, and in alphabetic filing, groups of letters are assigned specific colors. Major divisions of a company's file can also be assigned different colors. Both conventional file folders and hanging file folders are available in a variety of colors.

Color may show the hierarchical structure of the file. Main headings may appear on colored guide tabs, for example, yellow. All subheadings, in the second position, may appear in the same color, for example, on green guide tabs. Further breakdowns may continue with blue or violet. It has been recommended that color selection for tabs should follow the colors of the rainbow—red, orange, yellow, green, blue, indigo, violet—to further assist in a predictable plan.

In shelf filing, color permits misfiles to be spotted with a minimum of effort. Color and bar codes are also used on labels of magnetic tape, on cartridges and reels of microforms, and on the boxes in which they are stored. Thus, identification, filing, and referencing are made easier.

Color is used, too, in visible files to identify different functions, time periods, and departments. For example, computer disks can be color-coded by department, project, type of work, or any other special feature.

Color can be used in the form of ink highlighters to mark text that should be called to someone's attention, or to ease recall. Color can assist in decision making. For example, a person reading a report that requires a decision can underline positive points in green and negative points in red. The predominant color probably points to the correct decision.

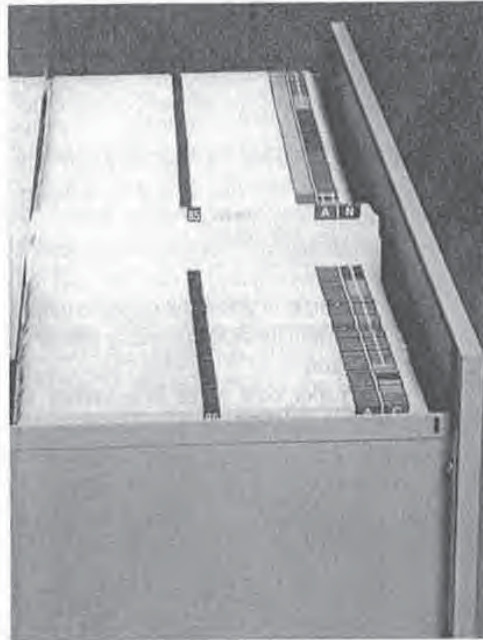
Trays for paper now come in a variety of colors. Paperwork that is passed on to other employees can be sorted into different color trays; for example, red, for reading; black for filing; and almond for out-going mail. Other supplies, like colored dots or colored pushpins, can flag paper for the attention of individual employees or actions.

**Security.** To enhance security, reports in a particular color can be cycled so that the previous copy of that color must be turned in when the new one is delivered. Color can also be used to limit access to a particular record, such as payroll reports. For example, if red covers are used only for payroll reports, unauthorized use of the reports can more easily be identified.

**Equipment.** There is a growing trend toward using color for storage equipment and furniture. Different-colored filing cabinets can be used for different records. Color-coordinated workstations in the open office can be used to identify different work groups.

**Commercially Prepared Systems.** Commercially prepared filing systems are available from a variety of vendors. A small filing system may require only a set of alphabetical tabs, subdivided through the alphabet. A set of tabs for the months of the year and days of the month are also available. It is possible to buy color-coded labels for the various letters of the alphabet and affix colored codes for





**FIGURE 6.6** AlphaCode Filing System  
(Courtesy of TAB Products Co.)

the first three letters of the filing unit to the tab of the folder. For example, the AlphaCode system of the Tab Products Company shows the same color for the first letter, a second color for the second letter, and a third color for the third letter. This system is very popular in open-shelf filing since misfiles stand out. See Figure 6.6.

Some vendors offer folders in 25 different colors, providing arrangement opportunities either alphabetically, chronologically, or by client. See Figure 6.7.

#### Automation

Many companies today are using computerized indexing systems for both active records and inactive records. The index can be devised to give a summary of the complete file that is maintained in electronic format, in paper, or on microform. Keyword cross-referencing can be included, as well



**FIGURE 6.7** Colored Folders  
(Courtesy of Atapco Office Products Group)

as a history of the file, such as the date it was opened. In cases where files are periodically transferred to inactive storage, the computerized index can also be used to print labels for new file folders. These same computerized systems can be used for checkout notations, follow-up, and calculating reference ratios.

**Bar-Coding.** If the file folders are bar-coded, scanning of the user's bar code facilitates check-out. It is possible to check the computer monitor to learn whether a folder is in the file or checked out to a particular user. It is also possible to keep an audit trail of all users. Figure 6.8 is a sample of a file folder with a bar code.

**Information Management.** Files management may be contrasted to information management in that information systems are usually large collec-





FIGURE 6.8 File Folder with Bar Code  
(Courtesy of TAB Products Co.)

tions of data, typically stored in a corporate database or other computer system. On-line information systems usually deal with discrete units of data or information. Information systems have no set order to the information contained and are intended to be extracted, sorted, or compared.

#### RECORDS MAINTENANCE PROCEDURES

The file system consists of an alphabetic or numeric arrangement, a file plan, file controls, and records maintenance procedures. Records maintenance procedures are developed to preserve, secure, and distribute document information. Ineffective filing classification systems make it difficult to find information when it is needed for operations and decision making. Ineffective systems may cause unnecessary duplicates to be retained, make it difficult to purge files of obsolete records, and make it hard to know where to file. The filing procedure consists of receiving the document, inspection, preparation for filing, indexing, coding, cross-referencing, preparing file folders, and filing.

The day-to-day activities of filing consist of

collecting, inspecting, and preparing materials for filing; indexing; coding; cross-referencing; alphabetic or numeric sorting; charging out materials; following up; finding lost records; filing; refiling; maintaining the files; and developing standards for filing work.

#### Collection of Material

Where active files are centralized, file material should be collected from all section file boxes at least once each day. The volume of work to be filed will determine the frequency of collection trips, and a definite collection schedule should be adhered to. The collection holder should be designed to keep separate material from each collection point.

Upon receipt of records in the files section, the distribution clerk will sort them into file groups and deliver each group to the file clerk assigned to that file. Sometimes a count is made at this point to keep track of volume. Where filing is decentralized, the importance of filing material on a regular basis cannot be overemphasized. Someone in each department should have the responsibility of maintaining the files—to file new materials received, to refile materials which have been removed from the file and returned, and to track materials which have been out of the file for an extended period of time.

#### Inspection

When records are ready for filing, they should be checked to be sure they are officially released for filing action. In records maintenance procedures, this is called *inspection*. A release mark such as an initial, a signature, or a stamp shows that a record has been released. Before sending a letter to the file, the letter writer or his or her secretary should indicate where cross-referencing is necessary. By agreement, the request for cross-reference may be indicated by drawing a line beneath the name or subject.

Useless material such as working papers, extra copies, preliminary drafts, or informational



material that has served its purpose should be removed to prevent overburdening the files. The file manual should indicate which material should be excluded from the files.

### Preparation for Filing

When papers are checked in by the file clerk, all pins and paper clips should be removed from the material. Related papers should be stapled together, and small papers should be mounted on a standard-sized sheet. Torn or work papers may be reinforced with mending tape. Oversize documents may have to be folded to the dimensions of the folder.

### Indexing

If the record has been officially released for filing, it is then indexed, or classified, by an index clerk who scans the record to decide its proper filing classification. Selecting the correct category under which to file each document is indispensable to location and retrieval.

In order to design a filing system that will meet the needs of the users, it is necessary to know how users will most often request the particular records, that is, which filing feature will they most frequently request. Most people tend to see filing from their own perspective.

**Correspondence.** To the secretary, the most important type of document is probably correspondence. Users may request letters or memorandums by one or more of the following eight filing features, shown in Figure 6.9.

- Name of organization.
- Date prepared or used.
- Surname of individual.
- Title of individual.
- Name (title) of project, product, or transaction.
- Location (geographic or political division).
- Number (symbol) assigned to transaction, commodity, location, project, individual, or organizational unit.
- Subject topic describing the content.

For personal letters, the name of the writer may be used. Not every piece of correspondence has all eight filing features, but most have more than one.

**Forms.** To the accounting clerk, the most important type of document may be forms. The most common filing features of forms are shown in Figure 6.10 and include:

- Title of form.
- Surnames (names or titles) of individuals or organizations.
- Names of organizations.
- Numbers (symbols) assigned for transaction control or other identification.
- Subject.
- Dates.

Because forms are used often in case files, they are usually filed by name or number.

**Reports.** The manager may perceive the most important type of document to be a report. Figure 6.11 shows the principal filing features of reports as:

- Assigned control number.
- Subject.
- Surname of author.
- Number of project or contract with which identified.
- Name of originating organization.
- Date.

Some file systems classify recurring or periodic reports under *Reports*. Subdivisions are arranged by report title or by form title if the report is a form.

In some offices, the person releasing the material marks the index reference or code. Consulting the relative index for the files may give some clue as to selecting a category for an item that is difficult to index.

### Coding

At the time of indexing, the file code should be indicated on the record by colored pencil. This is

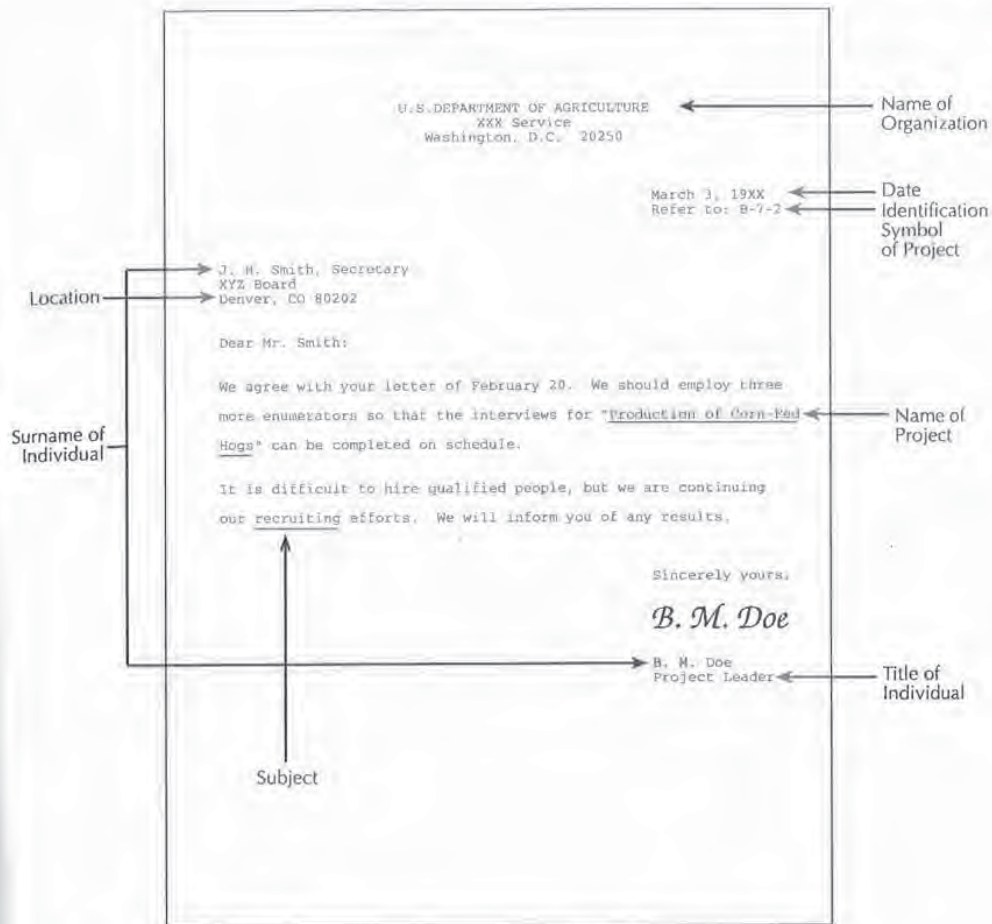


FIGURE 6.9 Filing Features of Correspondence (Courtesy NARS Files Operations)

called *coding*. If the firm name has several words, underline only the keyword and place numbers above the remaining words in the order in which they are to be considered in filing. If a subject heading is selected, it should be circled or written at the top of the page. Only the most important subject heading is circled. If a numeric system is used, the code number is determined from the index and written at the top or at the right-hand corner of the material. Some file operators prefer to write both the subject heading and the code

number on the material to be filed. This speeds identification for future refiling.

### Cross-Referencing

If a record could be called for under more than one name or classification, a cross-reference notation is made on the record when it is coded. This is usually done by underlining any secondary classifications and placing an *X* before the underlined item. A cross-reference sheet (Figure 6.12), card,



Subject GENERAL SERVICES ADMINISTRATION REQUISITION FOR EQUIPMENT, SUPPLIES, OR SERVICES	Date 1. Requisition Number	Control Number 2. Stockroom Control Number
To:	3. Page Number	4. Stockroom Code Number
From:	5. Date Prepared	6. Job Number
Delivery Instructions	7. Signature of Approving Officer	
	8. Title of Approving Officer	
	Order	

Name of Organization (points to To: and From:)  
 Surname of Individual (points to Signature of Approving Officer)  
 Title (points to Title of Approving Officer)

FIGURE 6.10 Filing Features of Forms (Courtesy NARS Files Operations)

or folder is then completed. In some cases, however, an extra copy, such as a photocopy, is made at the source. The latter copy must be clearly marked as cross-reference material or the two copies may end in the same file. While cross-refer-

encing is safer than risking the loss of an important paper, it is expensive because additional filing time and materials are involved and the amount of records in the file is doubled. It should be used with care and prudence.

FIGURE 6.11 Filing Features of Reports (Courtesy NARS Files Operations)

NAVS PERS 01980	Assigned Control Number
OFFICE EQUIPMENT by Dr. John Roe	Subject Surname of Author
FINAL REPORT SUBMITTED UNDER CONTRACT NBS 34896	Number of Project
The ABC Research and Development Co.	Name of Originating Organization
May, 19XX	Date

FIGURE 6.12 Cross-Reference Sheet

CROSS-REFERENCE SHEET	
Name or Subject	SEE
Name or Subject	
Date	
Correspondence preceding	
Filed	

### Sorting

Sorting is the process of arranging records in the order in which they will eventually be filed; it is the preparatory step to actual filing. The sorting process is divided into various stages, depending on the volume of records to be filed. The use of sorting devices increases the speed of handling quantities of records because it reduces travel motion and drawer opening during the filing process. A cost-benefit analysis should be made to decide how fine the sort should be. Use of terminal- and middle-digit filing can greatly reduce the need for pre-file sorting in numeric file arrangements. Standard sorters are available with 25 divisions, 50 divisions, or multiples of 50, with fused or insertable tabs. In alphabetic and numeric files, the number of guides or compartments necessary for file sorting should be approximately 10 percent of the number of guides for the system in use. In large files one guide for each drawer is needed. For numeric sorting, guides should be provided in multiples of 10 or 20, whether 100s, 1000s, or 10,000s. For geographic sorting, guides should be labeled with state or country names, followed by cities sorted alphabetically.

There are three general tools for sorting records: (1) horizontal sorters for fine sorting (Figure 6.13), (2) vertical sorters for rough sorting

FIGURE 6.13 Horizontal Sorter

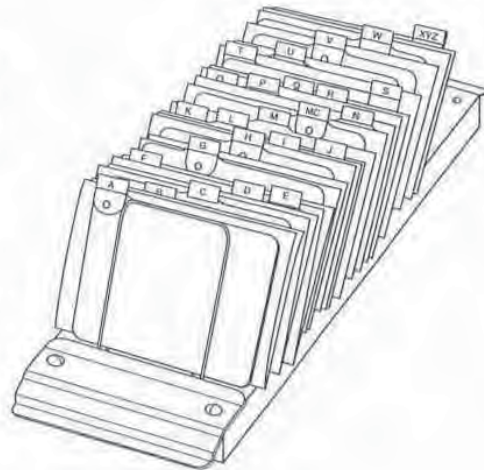
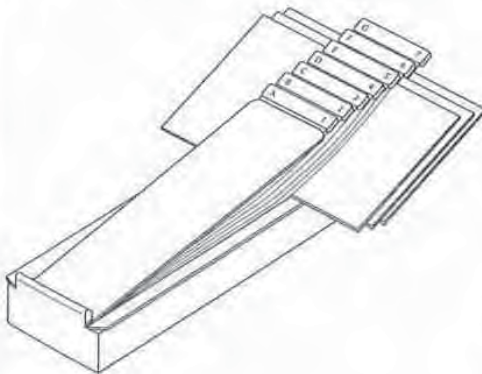


FIGURE 6.14 Vertical Sorter

(Figure 6.14), and (3) circular sorters also used for fine sorting (Figure 6.15).

Sorter divider labels should conform to the filing system. In most cases, numerical sorting is the quickest method, for there are only ten primary divisions used. After fine sorting is completed, the clerk should count the number of pieces to be filed and record the amount on a daily tally sheet. When records are placed in file drawers, the clerk should work from the front to the back of the file drawer to minimize work.

**Alphabetic Sorting Procedure.** As a quick aid in presorting, records may be divided into alphabetic divisions, such as the following:

A B C	3
D E F G	4
H I J K L	5
M N O P Q R	6
S T U V W X Y Z	8

These divisions are merely suggestions and should be modified to particular needs. Each group of records can then be sorted for individual letters. The documents for each letter can then be





FIGURE 6.15 Circular Sorter  
(Courtesy of Tab Products Co.)

arranged in alphabetic order. If there is more than one record for a particular name and location, the record with the most recent date should be placed on top.

**Numeric Sorting Procedure.** When a numeric classification system is used, the records are sorted by digits, starting with the extreme right and moving a column at a time to the left. The units column is sorted into ten piles (0–9). The piles are stacked into one pile in numeric order with the highest number on top. This process is repeated for the next column to the left until all the columns have been sorted. After the last column has been sorted, the pickup of the group is reversed so that the highest number is on the bottom and the complete pile is in strict numeric order.

### Filing

After records have been coded and cross-referenced, they are ready for filing or storing. *Filing* is the process of inserting the item into its proper folder in the file. If a filing shelf is available (see

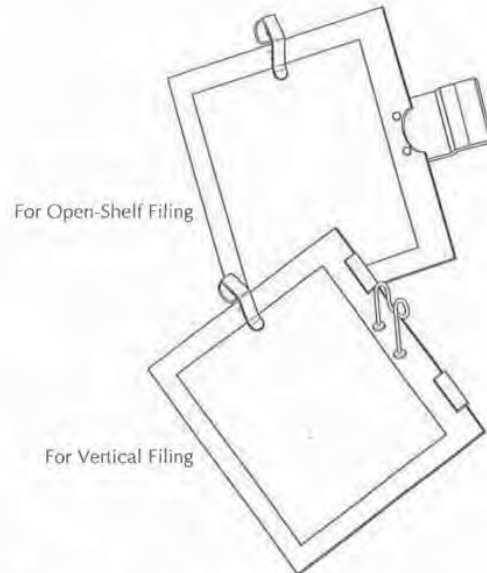


FIGURE 6.16 Filing Shelves

Figure 6.16), it should be hooked onto the drawer handle or the side of the opened drawer.

In searching for the correct folder, find the correct guide and then continue to the correct folder. When placing the record in the folder, double-check the accuracy of the drop. The same caption should appear on the records already in the file. The folder should be placed in the file with the tab side to the rear of the file. The headings of the records to be filed are placed to the left. The documents are arranged in chronological order within the file with the latest on the top because it is assumed that the most recent will be referred to most frequently.

An individual folder, or special-name folder, is prepared for each subject when four or more pieces of correspondence accumulate concerning it. Otherwise, a miscellaneous folder is used for relatively inactive subjects. These are kept in alphabetical order, with the latest piece of correspondence on top if there are several.

Files in folders may be subdivided for two reasons: volume and subject content. When vol-



ume becomes too great for the designed capacity of the file folder and the subject content has not changed, the file is simply divided by date. A common rule of thumb is that when the last *score* (indented or raised line near the bottom edge of a folder) is folded, and the folder reaches its capacity ( $\frac{3}{4}$  inch), the file is subdivided. For efficiency, the file should not be allowed to expand beyond  $\frac{1}{2}$  inch in depth.

The second occasion for subdividing occurs when the subject content of the folder develops subset subjects. Then, subdivision is made regardless of volume. For example, a file may be set up on the general subject of *Motor Oils*. As time progresses, it may be necessary to subdivide the general file into various tests and evaluations. The documents should be subdivided, either by type of information or chronologically. These divisions are made not only after files have been established, but also during the conversion progress, if the files are being reorganized. In some instances, the files may be organized into case files.

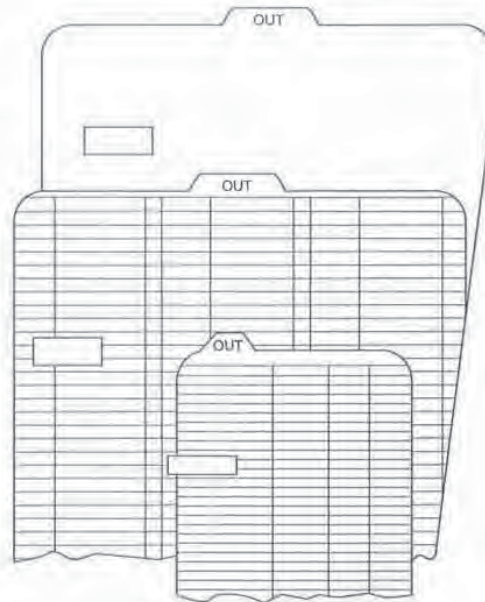


FIGURE 6.17 Out Guides

### Charge-Out

The charge-out system helps the file clerk to keep track of materials removed from the file and to locate them quickly. It is a reminder that the material is temporarily out of the file and that the material might be needed in research or decision making. Only those persons responsible for the files should remove materials from them.

Because of the availability of photocopying equipment, the clerk can make a photocopy of the requested material, record the name of the recipient, and thus keep the files intact.

If the record copy is to be removed from the files, a *charge-out guide* is inserted into the file to show that the folder or document has been removed. It is actually a substitution card. The tab of the charge-out guide extends above the folder to signal a withdrawal. The face of the guide provides space for the name of the borrower and the date of the charge-out, or in colored plastic *out guides*, a pocket holds a copy of the charge-out request. A duplicate copy can be maintained in the

tickler file for follow-up. When the material is returned, the name of the borrower is removed or crossed out and the guide is used again. A container should be available for placing returned documents for refile.

Several variations of the charge-out guide are the *out card*, *out sheet*, and *out folder* shown in Figure 6.17. When the charge-out requisition calls for one document or a few related documents, an out card or out sheets may be substituted in the folder. The requisition card is attached to the out card to save rewriting. When the requisition calls for an entire folder, the operator may replace the original material with either an out guide or out folder. The out folder method allows additional filing to be made while the original folder is out of the file.

### Follow-Up

Records that have been released for filing may require follow-up action. To ensure the action will



be taken at the appropriate time, provision for follow-up can be made by using such manual devices as a pending folder, a card tickler, a desk calendar tickler, or a charge-out card. Follow-up records include papers on prospective customers, delinquent customers, expiring subscriptions, expiring life insurance, orders, and so on. Where bar-coding is used on documents, forms, or boxes, the item can be scanned and the name of the recipient can be scanned to maintain a computer listing of all charge-outs. In addition, some systems allow for scanning each time a document moves to a new location so that the document may be tracked at all times. This permits computer reports at any time showing the location of the charge-out documents or documents in transit. A report may also be printed daily to show documents which have exceeded their check-out time, or any other action which should be taken on that specific date.

Any of the manual follow-up devices mentioned previously can be used in conjunction with a set of month guides and one or more sets of day guides for each day in a month. In the follow-up file the guide for the current month is at the front of the card-file holder, and the other months follow in sequence. When a follow-up action is necessary, the information is written on a 3- by 5-inch card and filed in the correct day guide of the follow-up file.

Reliable follow-up, whether done on the computer or manually, is one of the important services of the active records center. If a good follow-up method is not devised, documents awaiting future action will accumulate, preventing referral to information and also risking the loss of the documents.

#### IDENTIFICATION SYSTEMS

Identification schemes identify each class of records and group-related classes of records. The identification scheme reflects the structure of the classification system. Most classification schemes have three levels of organization—a broad divi-

sion, such as *accounting*, subdivisions for major activities within the group, and a third level of breakdown.

Identifiers that are consistent help users find and use information and make training easier. The same system should be followed in all departments enabling users to understand the overall system.

The capacity of an identification system varies with the scheme selected. For example, in a numeric system, if the primary division consists of 99 divisions (1-99), and the secondary, 100 (0-99), and the tertiary, 100 (0-99), a total of 990,000 combinations is possible.

All systems should be devised to make computerization easy. A decision needs to be made as to whether fields will be sorted on text fields (character-by-character) or as numeric fields. In the case of numeric fields, each group of numbers should be the same size consistently.

Identification systems are an important segment of any records systems; they encompass guides, binders, folders, tabs, labels, signals, and the use of color.

#### Guides

Guides are to the file clerk what signposts are to the tourist. Without file guides, the file clerk would have to look at every paper in the file until he or she came across the right one. Many different types of guides are available for cards filed in trays or drawers as well as for letter-size documents.

In addition to supporting folders, guides show the exact location of records and folders and speed up the accuracy of filing and retrieving. Guides show the major subdivisions and minor subdivisions by position. Guides on tabs in the first position (extreme left) may show the major headings or, if the file is very large, may show the subdivisions of the main topic. Guides in the second position may be used for a chronological or alphabetic breakdown.

In most card or suspension guiding systems,



only the guide tabs are visible. Cards are usually of the same size and lower than the tops of the guides.

The major requisite of a guide is durability. Durability is determined by the type and weight of paper used and the construction of the tab and rod projection. The weight of the guide can be determined from its thickness, which is measured in terms of points, one point being equivalent to  $1/1000$  inch. Guides are available in fiber, pressboard, manila, bristol board, plastic, and light metal.

*Fiber* guides are made of hard, tough, flexible, long-fiber paper, usually black. Fiber guides are also available in various thicknesses.

*Pressboard* guides are the most commonly used for general purpose filing. They are stiff enough to support the contents of the drawer in upright position and flexible enough to ensure serviceability. The standard weight is 25 points.

*Manila* guides are popular as card file guides or in transfer files. They are less expensive than pressboard guides and also less durable.

*Bristol board* is similar to pressboard and is used primarily for temporary card indexing. It has great tear resistance and combines the features of stiffness with strength and flexibility.

## Binders

Binders for computer output are designed in two basic styles, depending on whether they are to take burst or unburst forms. Continuous forms can be bound in one long accordion piece (unburst), or they can be run through a special machine called a burster that pulls them apart at the perforations to make burst forms before binding. The trend is toward unburst forms. Burst forms can be handled like any other records. Binders are available to fit any printed form. The dimension of the form at the bind edge is specified first; for example,  $8\frac{1}{2}$  by 11 inches, if unburst; 11 by  $8\frac{1}{2}$  inches, if burst. The quality of the binder varies with its ultimate use. Heavy-duty binders are available for frequent reference. Lightweight

binders are so inexpensive that they can be thrown away with the form to save the cost of disassembly.

## Folders

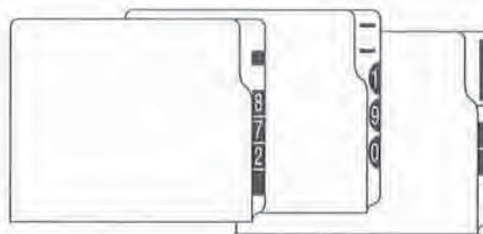
Folders segregate papers into related groups behind the guides. If guides are signposts, folders could be likened to house numbers that follow street signs. Folders are justified when related correspondence or other documents are to be retained either for future reference or to avoid summarizing and transferring data to cards or computer media. Folders are available in a wide variety of styles and materials.

Two common styles of folders are top-tab and side-tab folders. Side-tab folders, shown in Figure 6.18, are used in lateral and open-shelf filing. Top-tab folders are used in drawers.

Important characteristics for folders are stiffness and a minimum of thickness. If the folder is not stiff enough, the contents cause it to bend and buckle, resulting in jumbled and torn papers. A hard, smooth surface will resist soil and allow the folder to slide easily between the other folders. Other desirable characteristics are resistance to tearing and a high folding endurance.

Because there are many variations in the quality of raw materials, processes, and skills in manufacturing, the general use of the folder should be kept in mind in choosing between comparative grades and qualities. The more common folder

FIGURE 6.18 Side-Tab Folders  
(Courtesy of VRE, Inc.)





materials are pressboard, manila, kraft, and red rope or fiber, as well as the recently introduced colored plastic.

*Pressboard* is the same material that is used in making guides. It is used where large or bulky papers must be filed and where handling or use outside the file drawer is frequent. This type of folder usually comes with a metal, plastic, or celloid tab. It requires a cloth expansion hinge on the bottom. The usual weight for pressboard is 25 points.

*Manila* is the most popular type of folder material.

*Kraft* is darker in color than manila, so it does not show the soil readily. It is comparable to manila in quality, price, and common weight.

*Red rope*, or *fiber*, is a heavier material, made from sulphite with a tough jute and hemp fiber. It is usually given a trade name by manufacturers and is especially popular for file pockets and envelopes.

Folders may be scored to permit expansion, or they may come in a bellows-folded style, which flattens out and makes a more solid base for papers as the file contents increases. Special purpose folders, called pocket folders, are made with bellows folds on the ends and bottom.

Folders are used for a variety of data-processing applications. They are available in various sizes with built-in pockets to house disks or diskettes, with or without related papers or interpreted copy.

Suspension or hanging folders differ from conventional folders in that they are technically equipment rather than a supply item, and they do not have the same uses. Instead of stiffness, the hanging folder needs tough, flexible material that will hold the papers while hanging from metal rails (see Figure 6.19).

Suspension folders may house several conventional folders, each containing correspondence, orders, or invoices for the same project,

FIGURE 6.19 Hanging Folders for Computer Printouts  
(Courtesy of Robert P. Gillette Co.)



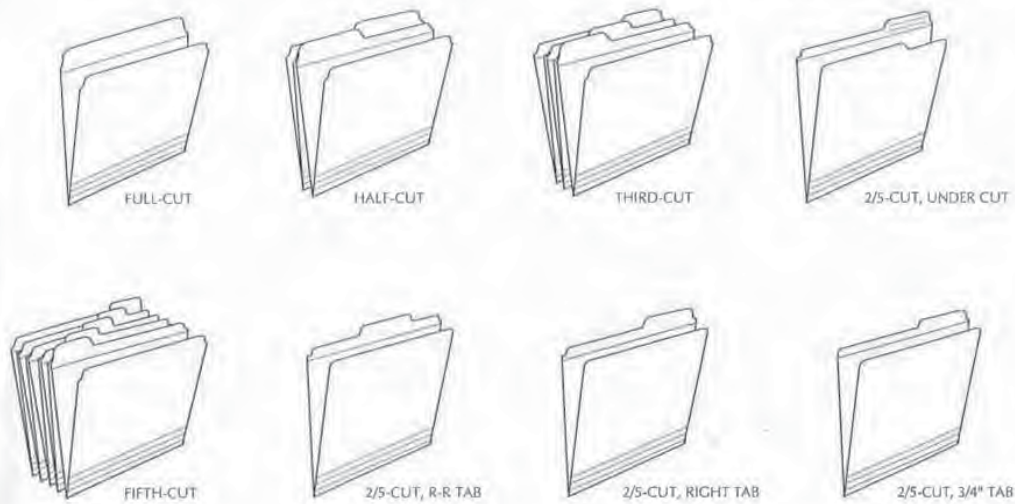


FIGURE 6.20 Various Types of Folder Tabs (Courtesy of Shaw-Walker Co.)

person, or firm. Special folders, which are 9 inches from the fold to top edges, are available for this purpose. These interior folders may also be used as liners to the suspension folders and to simplify transfer of records.

4. Folders are sometimes known as individual, special, or miscellaneous. *Individual* folders are created when at least four pieces of correspondence have accumulated for a particular topic and the folder is so labeled. *Special* folders are designed to collect data of a certain type, such as application blanks or letters of congratulations. A *miscellaneous* folder contains a variety of correspondence without any topic warranting an individual folder.

#### Tabs

A tab is a projection on the top or side edge of the guide or folder. Tabs on guide systems or folders may be either flat or angular. When encased in plastic or metal, the tabs are available with a 45-degree slant backwards for increased visibility.

Folder tabs range in width from a one-fifth to full-cut length, as shown in Figure 6.20. One-third cut is the most popular, with half-cut tabs used for longer titles. Special systems use special widths, such as two-fifths cut. Folders are usually undercut just below the tab to allow more reading space for the label.

In a file drawer, tabs are arranged in either a staggered or straight-line method. In the straight-line position, the tabs are in the same position, one behind the other. Printed tabs are available. One popular style is the miscellaneous folder with alphabetical division.

#### Signals

The use of signals to denote placement of information on a filed card is one of the outstanding features of visible filing equipment. The various positions and colors of signals mean specific actions. Dates and quantities, for example, are brought to the attention of the reader. By such signals, a whole tray of cards can be scanned and the items requiring immediate attention quickly spotted. See Figure 6.21.





FIGURE 6.21 Signals  
(Courtesy of Tabbies)

### File Fasteners

To insure against loss of small documents or where a file consists of multiple-size documents, each document may be fastened to the back of a file folder by means of an Acco fastener as shown in Figure 6.22. Two holes are punched in the top of the document, and the document is threaded over the prongs of the fastener, which is attached to the back of the folder. This method to safeguard documents is particularly useful where files are transported over long distances or where files are taken out in the field.



FIGURE 6.22 Folder with File Fasteners  
(Courtesy of Esselte Pendaflex Corporation)

### PRESERVING AND SAFEGUARDING FILES

Finding lost records, maintaining files in good condition, developing standards for filing tasks, and safeguarding information are all important to the task of keeping an organization's files in good working order.

### Finding Lost Records

It is said that experience is the best teacher. Accordingly, the following suggestions for finding missing records have been collected from experienced file clerks:

1. Check the folders before and after the one where the record belongs; check between the folders and at the bottom of the drawer.
2. Look for a similar name or number (*Roberti* for *Roberts*). Look under other vowels following the initial letter (*Ra, Re, Ri, Ro, Ru*).
3. See if the name or number was transposed (*George Richard Co.* for *Richard, George, Co.* and *10750* for *10570*).
4. Check alternative letters and spellings (*h* for *k*, *a* for *o*).
5. Try a similar sounding name (*Braun, Brown, Browne*).
6. Look in the sorter.
7. Look in the messenger's transfer bag, or check to see if the record could be en route.
8. Check the miscellaneous folder to see if a special name folder should have been used.
9. Look in the charge-out tickler for the name of the last person to check out the material: Check his or her pending tray.
10. Look in the relative index for titles under which the material might have been misfiled.



### Maintaining Files in Good Condition

Folders should be reviewed regularly and new folders made up when necessary. With day-to-day use, folders and tabs do get worn and should be replaced when the condition is first noticed.

Records can get lost if everyone has access to the files. The National Office Products Association has identified 22 common filing problems; they are listed in Table 6.2.

### Developing Standards for Filing Tasks

Productivity standards for filing should be developed and followed for active records control. The records manager should periodically determine if the standards are realistic and whether accuracy suffers when employees are aware that production is being measured. For this reason, it may be well to have an evaluation committee that can give its appraisal of filing accuracy and the standards developed. A committee approach has the advantage of generating more interest in the filing problems and of getting suggestions for improvements from the file operators.

Standards vary because of the variances in types of records and working conditions. Suggested standards for filing tasks are shown in Table 6.3.

### Safeguarding Information

The need for policies to safeguard information has become apparent by increases in thefts of files, tapped data transmissions, information disclosures, modification of data, and destruction of information. The use of computers and time-sharing facilities has added to the problem. This usurping of valuable personal information, both by insiders violating confidentiality rules and by outsiders breaching system security, is going to increase in coming years.

More comprehensive information about people is being collected in large-scale record systems that are evolving, such as charge-card systems and national information systems. As more organizations make use of the low-cost and flexible services of both local area networks (LANs) and wide-area networks, they become more high-payoff targets of computer theft. Thus, security in multiple-user facilities is even more important than it used to be. The need for administrative, technical, procedural, and physical safeguards to information is also reflected in recent federal and state legislation.

In government, as in the private sector, the cost, economy, and technological feasibility of protecting records must be weighed against privacy, the public's right to know, and other civil liberties.

Administrative measures needed to implement records protection policy may include establishing and enforcing rules of access; adding computer software that appropriately screens requests for access and also keeps accurate and complete records of access and disclosure; and installing locks and similar security devices. Each computer network user has an access password, and the network administrator is able to maintain information security by giving access to different levels of information. In cases where individual computer workstations are used, it may be necessary to have removable media to safeguard information. Where hard disks are used—and information is not downloaded to removable disks and the hard disk file erased—access to the computer workstation should be limited to those persons who are cleared to use the information. In all cases of computer use, backup copies are essential.

In some cases all employees who are allowed direct access to the systems of records and information will have identical authorization, and thus the use of physical safeguards, such as a guard at the computer facilities or a card key to some doors, will be sufficient protection. In some small manual systems, requests for information may be handled by the records staff, who have full authority, as



TABLE 6.2 Common Filing Problems

TROUBLE	SOLUTION
There are too many filing places.	Centralize filing of records of common interest in one location under one supervisor. File specialized records in departments where handled, but follow established handling procedures.
Everybody is a file clerk.	Centralize authority with responsibility. Allow only designated persons to use files except in emergencies.
Files do not keep pace with firm's progress.	Check size of alphabetic breakdown to see if it is adequate. Check type of alphabetic breakdown to see if it fits customer name patterns.
Files are disordered; they show no particular plan or arrangement.	Pick a ready-made, engineered system that best fits your needs. Adjust it, if necessary, as time goes on. Your office products dealer carries several systems and can suggest one to suit your needs.
System does not fit the way material is requested.	Study the possibilities of using subject, geographic, or numeric filing, as well as alphabetic filing, for certain specialized materials.
Filing decisions are erratic.	Start a filing procedure manual and then use it! Do not depend on snap judgment or the opinions of others. When a problem arises, make a ruling; then write it down.
It takes too long to find a folder.	Have an index guide for each inch of active drawer space or each six to eight folders. Twenty-five guides per drawer provide the best efficiency.
It takes too long to find a card in the card files.	Have no more than 30 cards to a guide in an average reference file, no more than 20 in an active or growing one, and definitely no more than 10 to 15 to a guide in a posted record file, such as a ledger.
Drawers are jammed too tight.	Allow 3 to 4 inches of working space in letter files, 1 to 2 inches in card files.
Bulging folders slow down filing speed.	Have no more than 25 sheets per folder for best efficiency; do not exceed 50.
Papers pile up in the Miscellaneous folder.	Create a file for a firm or individual after the sixth letter to your firm. If that does not work, a larger number of divisions is needed in the index.
Individual folders are too full.	Make a special name guide for the individual; then put a set of period or chronological folders in back of the guide.
Guides are in bad condition.	Replace broken guides. Use reinforced tabs in the active file. Use angular tabs for easier reading. Use tab inserts for greater versatility and less expansion.
Folder tabs are difficult to read.	Use gummed labels; they strengthen and add legibility. Use reinforced tabs when reference is frequent. Use a good grade of material for active files.
Folders are out of sight.	Use stiffer folders. Use scored or bellows folders for better expansion. Investigate use of suspended folders.
Folders wear out too soon.	Use at least an 11-point folder for frequent use out of the file; 14-point or pressboard for heavy use. Save space yet add strength with double-tabbed folders.
Old correspondence is slowing up filing of current papers.	Transfer old material at least once a year. See if some types of correspondence need to be filed at all.
File storage is using up valuable floor space.	Check use of five-drawer cabinets. Check shelf filing for certain records. Establish a definite destruction plan for all types of papers you file. Consolidation of files might help.
Finding material requested <i>before</i> it is filed is difficult.	Hold the material arranged for filing in a sorting device.
Getting papers into the folders takes too long.	Use sorting devices to completely arrange the papers.
Filing work is tiring.	Use filing shelf to free both hands for filing. The stool is another handy device to ease fatigue.
Finding checked out papers or cards is difficult.	Keep trace of removed papers and cards with out guides or folders.

Source: National Office Products Association

TABLE 6.3 Standards for Filing Tasks

Task	Units per Hour
Type 3- by 5-inch cards, labels, or tags.	100
Code one-page letters.	200
Sort 3- by 5-inch cards.	300
Sort indexed or coded correspondence.	250
File 3- by 5-inch cards.	180
File correspondence.	250
File vouchers numerically.	700
Retrieve 3- by 5-inch cards.	180
Retrieve correspondence and prepare charge-out forms.	70

well as the ability, to decide that an employee's use is legitimate.

### FILE REORGANIZATION

Reorganizing existing subject file systems is a major undertaking in records management and normally is not recommended unless the existing system is beyond repair. Records analysts who do this type of work are usually specialists because it requires unique skills and talents. Working as an apprentice with an experienced analyst is an excellent way to enter the professional ranks of records management because the principles learned here are useful in almost all other areas of the field.

A file reorganization may involve only a few file cabinets or it may involve hundreds, but the principles of conducting the project are the same for either. A distinction must be made, however, between reorganizing and organizing. The term *reorganizing* means that most of the files in the system will be retained (except for needed purging) and changed over to a new system. *Organizing* means that existing files will be left as is, destroyed, or stored, but they will not be integrated into a new system. The latter uses the same techniques for developing the file plan, but the actual conversion process is not involved.

### Uninterrupted Operations

A basic principle in a file reorganization project is that the file department must not be hindered in its operation during the conversion. In addition, the file department personnel should not only be trained in the new system as it is being developed, but should also be consulted for their knowledge and experience before the change decision.

### Analysis of Data

The project begins by interviewing the department manager or representative to determine the functions of the department. Organizational charts should be studied, and any other information about the department's activities should be obtained from the various section chiefs. Complaints regarding the existing system should be noted, but no action taken at this time. This is done so that particular attention is given to correcting past mistakes and ensuring they do not recur in the new system.

### Tentative File Plan

After activities are analyzed and understood in general terms, a tentative file plan is developed in outline form, such as was seen in Chapter 5, Figure 5.2. This plan is discussed again with the management and section chiefs, as well as the file department; deletions, additions, and changes are made until everyone is satisfied that all of the known subject matter is included and organized in a logical and correct manner. Particular attention must be given to the terminology of the users and file room staff.

### Conversion

As the conversion progresses, subjects overlooked or previously unknown will develop, and they must be studied, discussed, and properly integrated into the system. If the system is to be classified numerically, a coding system must be devised. It is made part of the file manual used by



the analyst during the conversion process and must be continually changed as required during conversion. The same applies to an alpha-classified system.

To prevent disruption in the conversion process, actual conversion begins with drawer 1 and proceeds in sequence, so that at any time everyone knows at what point the new system begins and the old system ends. Each file must be scanned, not read, to avoid wasting time. Scanning involves looking for key phrases to determine the subject matter and to decide if subject matter changes within the file. If it changes, the file must be divided.

In an alpha system, the exact file captions are written on 3- by 5-inch cards, with the old file number written in the upper right-hand corner. The card is attached to the file and turned over to the conversion assistant, who types the new label from the card, places the documents in a new folder, and affixes the label. The card is then filed by the old file number to give a quick reference to the new caption. These index cards are retained for about a year after the conversion is complete, because correspondence will be received that makes reference only to the old number.

In a numerical system, the new number is entered in the upper left corner, with the old number entered on the right. In this case the card is prepared in duplicate, and one serves as the new index, which will be used to prepare the final file manual. With alpha systems, the label is prepared in triplicate. One label is affixed to the folder, the second and third to 3- by 5-inch cards. One card is filed in the same alpha sequence as the files. This gives the analyst a quick and convenient method of checking to see if a file has already been prepared on the subject or if inconsistencies exist. The other card is placed in a pocket inside the cover of the file folder to be used as a charge-out to eliminate the need to write a long caption at the time a file is charged out.

As the files are completed, they are placed in the file cabinets emptied during the process. Thus, on a day-by-day basis, the new file system grows and is used as it is being established. When unforeseen subjects occur, entire file patterns must

be changed to fit the subject into the system if the system design is not flexible enough to accommodate it. In this case, the analyst and assistant must backtrack and change cards, captions, and folder arrangement.

### **Time Estimate**

The file conversion process is slow. A team of two analysts and a conversion assistant may be expected to complete one file drawer per working day, if the documents are placed into new folders in date order and the duplicates purged. This is important in estimating completion times and in measuring productivity. The task can be even more challenging if the new system must be integrated into an organization-wide uniform filing system because many additional problems will be encountered in designing file patterns that serve the needs of the department while maintaining organizational uniformity.

### **File Manual**

When the system is complete, a final file manual is prepared for everyone who uses the system. Follow-up audits must be made frequently at first to determine if the system is being used properly and to detect and correct any problems. Details of preparing the file manual are discussed in Chapter 16.

### **SMALL-BUSINESS FILING SYSTEMS**

Although the concepts presented in this book are applicable to all sizes of business organizations, it might be well to point out that frequently records management expands with the growth of the organization. In some instances, a secretary has been charged with developing a subject file. As time progresses, the need for storing records outside the office becomes evident, and the need to segregate vital records becomes apparent. If these three functions can be implemented, this small company then has three elements of a total records management program: files management; records storage; and a vital records program. Depending



on the size of the firm and the personnel involved, other aspects of records management will possibly need to be added.

One true story illustrates the possibilities of growth in a small business. A secretary developed her filing program to include all of the functions of a total records management program. The development entailed adding more personnel with the growth of the company and identifying records management functions into separate positions. She ultimately became the corporate records manager and also eventually served as president of ARMA International.

Vendors of filing supplies are often an excellent source of information on implementing a files management program in a small firm. Vendors offer alphabetic, numeric, and geographic pre-printed guides and tabs. Vendors also offer general advice for files management. In some cases, where equipment is involved, vendors also offer to do feasibility studies.

If the person responsible for maintaining the records of a small company does not have the time to devote to the project and does not have the capability of adding staff, several options are available: outsourcing and the hiring of temporary services.

### Outsourcing

If the individual responsible for managing the company's records is not totally knowledgeable in records management, the services of a consultant may help the individual plan the program. The program may be implemented by doing whatever

is possible in house. However, firms that provide needed services include off-site records centers, microfilming service bureaus, and accounting and bookkeeping service agencies. Many of these firms have consultants available to recommend implementation of needed services. It is important to remember that regardless of who provides the service, the person responsible for managing the company's records maintains the responsibility.

### Temporary Services

Several of the leading temporary help agencies offer assistance with various aspects of records management, from consulting to the actual work performance. If the continuous use of a temporary service is not feasible, it would be necessary to have a designated employee trained to maintain the records management program that has been established.

Regardless of who is responsible for managing the records in a small firm, that person must have the cooperation of all staff members. All staff members must understand the importance of records management to provide the right information at the right time at the least possible cost. Their cooperation in using and maintaining an efficient records systems is essential. The person responsible for the records management program can assist in its success by providing a manual of procedures. That person must also be cognizant of how technology can be used to the fullest (within the constraints of budget) in carrying out the necessary program.

### SUMMARY

In order to maintain an efficient and effective filing system, it is necessary to separate records into basic types and to consider factors such as disposal, identification, volume, and completeness. Basic types of records include general correspondence; transitory correspondence; case records; case working papers; technical reference

material; extra convenience copies; film, tape, or disk records; cartographic materials and drawings; and cards.

The primary tools for locating records are arrangement of documents, indexing, labeling, use of color, and automation. File arrangement may be alphabetic or numeric, or a combination. In-



dexing assists with finding records by arranging items in a searchable order. Labeling identifies the contents of drawers, shelves, trays, bins, binders, boxes, and folders. Color is used in supplies, in assisting to provide security, in designating equipment, and in commercially prepared systems. Automation is used to maintain an index and to track records.

File maintenance procedures include collection, inspection, preparation for filing, indexing, coding, cross-referencing, sorting, filing, charge-out, and follow-up.

Identification systems identify each class of records and group-related classes of records. They include guide systems, binders, convention folders, suspension folders, tabs, and signals.

Lost records may be found by checking before and after the folder where the record belongs, looking for a similar name or number, and looking in the sorter, transfer bag, and charge-out tickler. Productivity standards for filing should be developed and followed for active records control. The need for policies to safeguard information is becoming increasingly apparent. File reorganization means that most of the files in the system will be retained and changed over to a new system.

Suggestions for how small business can implement a records management program include the use of outsourcing and temporary services.

#### QUESTIONS FOR DISCUSSION

1. What kind of records are included in file systems?
2. What are the factors which will aid in reducing the area and time of search for records?
3. What are some other names for files of general correspondence?
4. When are case working papers usually disposed of?
5. When is separate filing of technical reference materials warranted?
6. What is a common problem with long-time storage of electronic media for audio, text, and graphics?
7. What factors make cards a logically separate file group?
8. What are the primary tools for locating records?
9. How is color used in records management?
10. How is the computer used in records management?
11. How does information management differ from files management?
12. What are the day-to-day activities of filing?
13. What are some procedures which should be followed in preparing papers for filing?
14. What are the eight features of correspondence by which it may be indexed?
15. What are the common features of forms by which they may be indexed?
16. What are the common features of reports by which they may be classified?
17. What are three general tools used for sorting records?
18. When are files in folders subdivided?
19. What are the variations in charge-out forms?
20. What are some manual devices which can be used for follow-up of records?
21. What are some devices used as identification systems in filing?
22. What are some possible solutions to common filing problems?
23. What problems point to the need for policies to safeguard information?
24. What are some administrative measures that could be taken to safeguard information?
25. How does reorganizing files differ from organizing files?
26. What are two options for records management available to companies which do not have the capability of adding staff?



## PROJECTS

1. Visit a small professional services office such as a lawyer's, a dentist's, or a doctor's office in your area. Ask to see how basic types of records are filed, such as (a) general correspondence; (b) case files; (c) working case papers; (d) technical reference materials; (e) film, tape, or disk records; (f) cartographic materials and drawings; and (g) cards. Prepare a written report on the file folders (if any) and housing used for these records.
2. In the office visited for Project 1, ask the following questions: (a) What arrangement (alphabetic, numeric, or alphanumeric) is used for the records stored? (b) What labeling is used on folders, drawers, guides, or shelves? (c) What use of color is made in supplies or equipment? (d) Are bar codes used? Prepare a written report on your findings.
3. Visit an organization in your community that has a records manager. Ask to review the file maintenance procedures, such as: (a) collection of materials to be filed; (b) inspection; (c) preparation for filing; (d) indexing; (e) coding; (f) cross-referencing; (g) sorting; (h) filing; (i) charge-out; and (j) follow-up. Prepare a report describing these procedures.
4. Visit local office supply stores, and collect samples of materials for identification systems, such as guides, binders, folders, signals, and labels. Also collect samples of out guides, binders, and fasteners. Prepare a bulletin board for the records management class showing these supplies.
5. Call the temporary help agencies in your area. Ask what services they offer in records management. Apply for a position as a temporary in records management. Prepare a written report.
6. Indicate the indexing order for the following names. Show cross-referencing where required. Use Appendix D to get the "ARMA Rules for Alphabetic Filing."

## As Written

1. W. Oscar Collins
2. John McHale
3. Ronald MacDonald
4. Sander VanOcker
5. Pope John Paul II
6. Mother Theresa
7. Buffalo Bill
8. Anne Jirgal Estate
9. KDAL Radio
10. YMCA, 901 North 21 Street, Superior, WI 54880
11. Fannie Farmer Candies, Inc.
12. J. C. Penney Co., Inc.
13. NBC, Washington, DC
14. Anheuser-Busch Co.
15. U-Haul Co.
16. Los Alamos Fencing Station
17. 4 Hour Dry Cleaners
18. 400 Club
19. Anthony Yano, Owner, Yano Brothers
20. Industrial and Electric Utilities Division, Allis-Chalmers Corp.
21. Ann Arbor News
22. Nakladatelstvi Universam vPraze
23. Taxpayers Information, Internal Revenue Service, United States Government.
24. Colorado Department of Education
25. Fort McCoy
26. Quebec
27. Principat d'Andorra
28. Suomen Tasavalta (Finland)
29. Republik Oesterreich (Austria)
30. Household Finance, 2662 East Hennepin Avenue, Minneapolis, MN 55534
31. Local 395, AFT
32. Department of Business and Industrial Edu-



cation, College of Technology, Eastern Michigan University

33. Walter Reuther Labor Relations Library, Wayne State University, Detroit, Michigan
34. Karlov Vary, Bohemia, Czech Republic
35. Washtenaw County Department of Public Assistance

### CASE PROBLEM

The Fruit Tree Experimental Station maintains a large volume of records containing experimental data, research reports, and publications used by 30 scientists. In addition to research information, the office retains ordinary business records, such as correspondence, payroll records, and personnel records.

The director, Janine Perez, believes that the research scientists are wasting valuable time looking for information. In addition, there are other problems. The majority of the research data are kept in notebooks that are difficult to handle or stored in the personal directories of each scientist on the local area network (or personal computers). Some of this research has been downloaded to either 5 1/4-inch or 3 1/2-inch disks.

The scientists' offices are becoming overcrowded with filled filing cabinets. On the average, each scientist has four 4-drawer cabinets. At least one of the drawers is used to house computer disks. Stacks of unfiled material are everywhere. The costs for filing equipment and supplies have increased about 25 percent each year for the past two years. In addition, many of the scientists are asking for additional space in their computer directories.

The director has decided to centralize all hard copy records in an area adjacent to that of the local area network administrator. She has also delegated the responsibility of establishing a cen-

tralized records control program to a records manager. She estimates that, initially, one clerk and the records manager can operate the central records center. She has given the records manager the authority to choose the equipment and supplies to be used in the central records center. The records manager is thinking about the use of open-shelf filing equipment for a large portion of the hard copy records. The director, whose brother-in-law is the sales representative for a manufacturer of lateral filing systems, has suggested that the records administrator look into the use of lateral files and color coding.

The scientists are fighting the reorganization of the records program because, in their opinion, the records should be located in the offices of the personnel who create and use them. They object to the proposed use of open-shelf filing equipment because they believe it will not protect the records from unauthorized access. They would also like to have appropriate housing for the disks they are storing.

Assume that you are the records manager. Write a memo to the director indicating:

1. How you propose to do a needs analysis in this hostile environment.
2. The kinds of equipment that you suggest be used.
3. The space requirements (assume the volume of records reported is correct and project future needs).
4. Personnel requirements.
5. Floor plan for the proposed space, equipment, and personnel.
6. How color could be used in the proposed records area.
7. How a records management manual would help both the scientists and the persons responsible for records maintenance.

*PART III*

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*Electronic Records  
Management*



## Chapter 8

### *Electronic Records*

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#### Learning Objectives

1. To define electronic records, their importance to government and business, the problems associated with their management, and the challenges and opportunities these problems will create for records managers during the future.
  2. To list various types of electronic records and the media used to store them.
  3. To explain principles for inventorying electronic records.
  4. To describe the various methods and techniques for managing active electronic records which reside on nonremovable electronic records media.
  5. To elucidate the proper methods of labeling and identifying electronic files on removable media.
  6. To describe special software for managing documents and files in PC computing environments.
  7. To list guidelines for the selection, handling, and storage of removable electronic records media.
  8. To describe principles and techniques for managing inactive electronic records including the development of records retention schedules for electronic records.
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#### THE IMPACT OF THE COMPUTER ON RECORDS MANAGEMENT

According to an article in *Fortune* magazine, electronic computing is not yet the largest industry in the world—at less than \$400 billion in annual sales, it is smaller than either the petroleum or the automobile industry—but “it has become the most important because of its power to transform the way people work.”<sup>1</sup> According to the *Fortune* article, worldwide annual shipments in 1993 included some 12,000 mainframe computers, just

under a million minicomputers, about 6 million high-performance workstations, and a staggering total of 31 million microcomputers (PCs). The article estimates the total worldwide installed base of mainframes at 70,000 and the installed base of PCs at 135 million.

Few people would dispute the notion that the widespread use of electronic computers has been, by far, the single most significant occurrence to



affect records management during the past ten to twenty years. Such an assertion is justified for the following three main reasons.

1. *Computers generate enormous quantities of records.* The many millions of computers are huge records-creation devices; they store an unknown but tremendous quantity of business information on the several types of storage devices and media that accompany them. This tremendous quantity of electronic records is growing rapidly, and continual growth is sure to occur. In addition to the electronic records they produce, computers and their peripheral devices produce huge quantities of paper and microfilm records. Thus, records managers have many more records to manage than would be the case if computers were not so ubiquitous in virtually every business office.

2. *There are numerous problems associated with the management of electronic records—problems that require records management solutions.* Computers are relatively sophisticated machines, but their use still causes many records management problems not unlike those encountered in noncomputerized recordkeeping environments: Electronic files can still be poorly identified, mislabeled, “lost,” or otherwise difficult to retrieve; electronic information loses its value and needs to be systematically destroyed just as paper records do; electronic records are just as vulnerable as any other record to the risk of disaster (indeed, the risks are often greater) and require special protection; and removable electronic media need to be stored and managed properly just as noncomputer media do. These problems and many others are analogous to traditional records management problems, and each of them can be solved by properly applying traditional records management principles to electronic recordkeeping environments.

3. *Computers provide new ways of solving records management problems.* Prior to the advent of computer technology, records managers had no software to index, track, and monitor file folders or records storage cartons; no bar codes to

enhance record media circulation control; no software for computer-assisted microfilm retrieval; no optical disk systems; no electronic forms management; and none of a dozen more computer-related techniques for solving the problems associated with document-based information systems. This book presents records managers with guidance to enable them to apply these electronic records management technologies successfully so that the value of document-based recordkeeping systems can be enhanced in business and governmental organizations.

This chapter is about managing electronic records. More precisely, it is about ways to improve the management of computer-based information through better management of the media on which electronic records are stored. Records managers are most often required to solve the problems associated with managing microcomputer-based electronic records. Records managers are generally not as directly involved in managing the electronic records that reside on the larger mainframe and minicomputers, as this task is usually the primary responsibility of computer specialists who work in data centers and MIS departments. On the other hand, records managers are frequently involved in developing and implementing records retention schedules for records that reside on large computers. They are often responsible for storing security copies of magnetic media generated by the computers in vaults, records centers, or other facilities over which they have jurisdiction, and for accomplishing various other records management tasks involving large computers.

## MAJOR TYPES OF ELECTRONIC RECORDS

*Electronic records* may be defined as records containing *machine-readable*, as opposed to *human-readable*, information. A collection of electronic records is often generally referred to as a *file*; the term *file* is often used together with other terms denoting the physical storage medium on which

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the information is recorded. Examples include the terms *disk files*, *tape files*, and *image files*.

The machine-readable information recorded on electronic records takes the form of *character-coded electronic signals* and exists in three primary forms: text, data, or electronic images.

### Text Files

*Text files* are usually produced by word processing programs or by other software. The records consist of character-coded letters, digits, or other symbols appearing in typewritten documents, such as correspondence and reports. Text files are most often created by keyboard entry of the data, but optical character recognition (OCR) programs, electronic messaging software, and various other types of computer programs may also be used to create them.

Each individual character in a text file document is represented by a predetermined number and sequence of *bits*; this sequence is determined by the type of digital coding scheme utilized by the computer system. Most text files are created using either the ASCII or the EBCDIC coding scheme. ASCII—the American Standard Code for Information Interchange—is used in virtually all minicomputers and microcomputers, and in many non-IBM mainframe computer systems. The EBCDIC scheme—the Extended Binary Coded Decimal Interchange Code—is used for text files created on IBM mainframes and other IBM-compatible mainframe computers.

The particular type of coding scheme employed in creating text files can sometimes have important records management ramifications. Because the ASCII file format is the broadest compatibility for file interchange, it is the best option for insuring that text files can be read and processed over a period of years on a variety of computer devices. Thus, text files having long retention requirements should generally be preserved in ASCII format whenever possible.

### Data Files

*Data files* are computer-processable files that store numeric data (and frequently some textual information as well) as *quantitative values*, so that the numbers can be manipulated utilizing arithmetic computations. Text files also store numeric digits, but the digits are stored simply as characters, without regard to their quantitative significance. Another distinction between data and text files is that data files are stored in a more structured manner. These electronic records are normally subdivided into one or more *data elements*, also referred to as *fields*, which store designated categories of computer data. Data fields are sometimes further subdivided into *subfields*. For example, in accounting or general ledger files, separate fields and subfields would be dedicated for credits, debits, etc.

### Image Files

*Image files* are electronic records which contain computer-processable images of documents that generally existed in hard copy format prior to having been converted to image files. These files consist of digitally coded document images; they are created by electronically scanning the hard copy documents or by various other methods, including computer-aided design programs, fax modems, and business graphics software programs. Image files may be stored on magnetic or optical media. Optical media are an increasingly popular storage option for very large quantities of documents because these media have such high recording densities.

## STORAGE MEDIA FOR ELECTRONIC RECORDS

Text files, data files, and image files can be stored on a wide variety of storage devices, or media. However, two broad classes are most common:



magnetic media and optical media. *Magnetic media* are the much older of the two and have been used to store electronic records since the advent of electronic computers in the early 1950s. *Optical media*, on the other hand, are comparatively new devices for electronic records storage, having been introduced commercially in the mid-1980s.

### Magnetic Media

Magnetic storage media come in a wide variety of types and sizes, each having its own uses in storing electronic records. As a generic class, however, all types of magnetic media share a common physical attribute: They are ferromagnetic, that is, they are coated with a recording material which is capable of being magnetized when placed in a magnetic field, and of retaining magnetization when the field is removed. The most common magnetic media are magnetic disks, diskettes, and magnetic tapes.

**Magnetic Disks.** *Magnetic disks* are platter-shaped storage devices on which data are recorded and retrieved. Magnetic disk drives may contain one or more platters with highly polished aluminum substrates, on which the information is recorded by magnetizing small areas of the platter's surface in a manner corresponding to the bit patterns associated with the text, data, or image files. The disks are divided into tracks, and successive bits are recorded in a linear fashion within each track. The actual recording is performed by an electromagnetic read-write head, which aligns the material in the proper direction. The recording material itself may be gamma ferric oxide, in which small iron particles are dispersed in a binder compound that binds the particles to the disk substrate. Alternatively, a thin metallic film, which provides more durable properties, may be used as the recording material.

Magnetic disk drives are the preferred storage medium in high-performance computing environments requiring very rapid, on-line access to electronic records. These disks may be *fixed* (per-

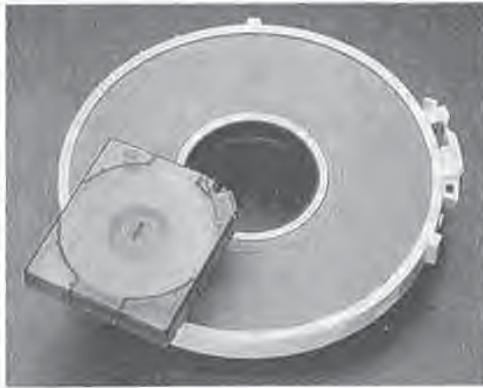
manently installed within the computer itself) or *removable* from the computer when not in use for near-line or off-line storage. Fixed disk drives with high-storage-capacity platters are generally used in the larger mainframe and minicomputer installations; these disks usually vary in storage capacity from about 500 megabytes to 5 gigabytes or more. The lower capacity fixed disks used in microcomputers typically have storage capacities ranging from 40 to 200 or more megabytes. The removable hard disk cartridges are intended for desktop installations and typically offer about 44 megabytes of storage capacity. In terms of physical size, the larger, high-capacity magnetic disks range from 9 to 12 inches in diameter, while the low-capacity disks range from 2 to 5.25 inches in diameter. See Figure 8.1 for an illustration of a 5.25-inch magnetic disk drive with fixed media.

**Magnetic Tape.** A removable magnetic storage medium for electronic records, *magnetic tape* is a ribbon or strip of plastic film coated with a magnetic recording material. In mainframe and minicomputer installations, the most widely used magnetic tapes are half an inch in width, 10.5 inches in diameter, and 2,400 feet in length, and are mounted on open reels. As shown in Figure 8.2, these nine-track tapes utilize gamma ferric oxide as the recording material and have a storage ca-

FIGURE 8.1 A 5.25-Inch Magnetic Disk Drive with Fixed Media  
(Courtesy of Western Digital Corporation)







**FIGURE 8.2** Nine-Track Magnetic Tape and an IBM 3480 Tape Cartridge  
(Courtesy of International Business Machines Corporation)

capacity of 6,260 bits per linear inch of tape, or 160 megabytes. Because access to the data recorded on them is serial, this medium is unsuitable for rapid, on-line access; thus, magnetic tapes are used mainly for batch processing applications, data archiving for off-line storage, and duplication of on-line files for disaster backup protection.

A newer type of magnetic tape is the IBM 3480 magnetic tape cartridge, or "3480 cartridge". These smaller and easier-to-handle tapes measure 4 inches by 5 inches by 1 inch. The standard cartridge contains 550 feet of magnetic tape and stores 200 megabytes of data. The recording material is chromium dioxide. Like their nine-track counterparts, they are used primarily for data archiving and off-line storage purposes.

**Diskettes.** *Diskettes*—flexible, or *floppy*, removable magnetic media—are encountered in virtually every business office that has a PC. They are of polyester construction; the recording surface is usually gamma ferric oxide. As shown in Figure 8.3, the surface of a diskette consists of an inner track and an outer sector for data recording, and a cover opening for the read-write head. The most common sizes are 5.25 inches and 3.5 inches. The

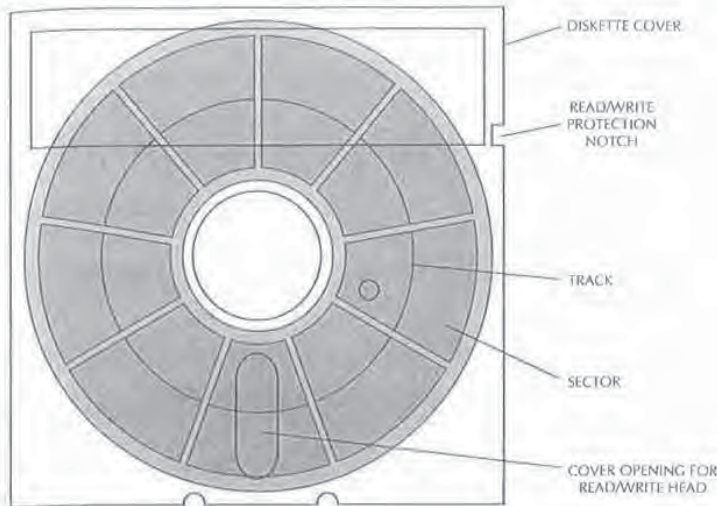
smaller size has steadily replaced the 5.25-inch disk since its introduction in the mid-1980s. The most common usage for these media is near- and off-line file storage, data archiving, and backup. In IBM-compatible PC installations, the 3.5-inch floppy disks, or diskettes, typically provide 720 kilobytes or 1.44 megabytes of storage capacity, the former being double-sided/dual density and the latter double-sided/high density.

### Optical Media

Like magnetic disks, optical disks are platter-shaped storage devices, but they utilize an entirely different, nonmagnetic recording technology to write the data on the disks. Optical disk systems use high concentrations of laser light to record information on the disk platters. During recording operations, the laser light alters the light reflectance characteristics of the recording surface of the disk. Depending on the particular recording method utilized, the laser may form holes or pits in the recording surface, or bumps or bubbles. Optical disks are typically used in conjunction with magnetic storage in many records management system configurations, as any information that can be stored on magnetic disk or tapes can also be stored on optical disks.

In a records management context, the most significant and attractive feature of optical disks is their very high recording densities, densities much higher than those of magnetic media of comparable size. Depending on the size and type of disk, optical disks can accommodate storage capacities of up to 10 gigabytes, making them the highest-capacity storage medium for business information in existence. For business documents and data, the two main types of optical disks are the WORM (write *once* read *many* times) disk, and the rewritable optical disk. As the acronym indicates, write-once disks are not erasable; once information has been recorded in a given area of the disk, that area cannot be reused. These disks are manufactured in sizes ranging from 5.25 to 14 inches in diameter. The rewritable optical disks are manufactured in sizes ranging from 3.5 to





**FIGURE 8.3** Diskette Structure  
(Courtesy of ARMA International)

5.25 inches; these are used primarily in computer installations, while the WORM disks are used primarily in large electronic recordkeeping systems. Both types of optical disks are used mainly to provide on-line access to documents and data, as well as for off-line data archiving and disaster backup purposes. See Figure 8.4 for an illustration of write-once and rewritable optical media.

#### ELECTRONIC RECORDS MANAGEMENT: PROBLEMS AND ISSUES

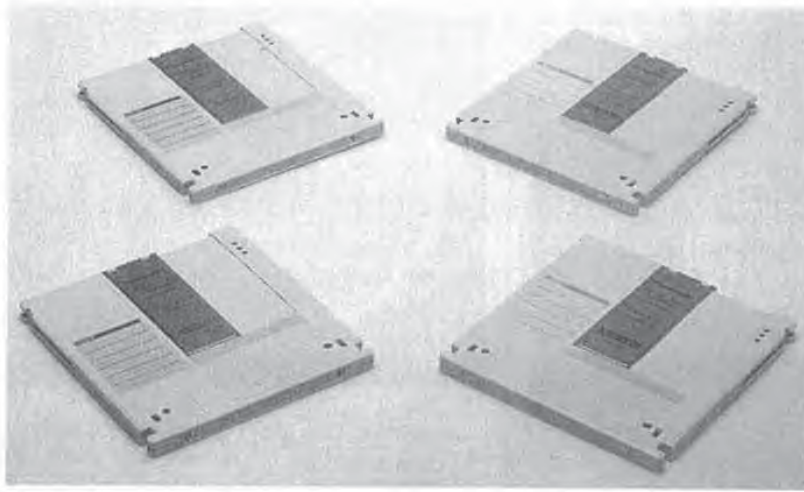
Electronic records and the systems that support them suffer from many of the same records management problems that beset their paper and microfilm counterparts. These major problems are:

1. *Inadequate consideration is often devoted to the creation of records.* Because computers are such powerful information-processing devices, people at times create records on them that have little utility, are seldom if ever read and used, and perhaps should have never been created in the first place. This is particularly true with many management reports that are printed in hard copy

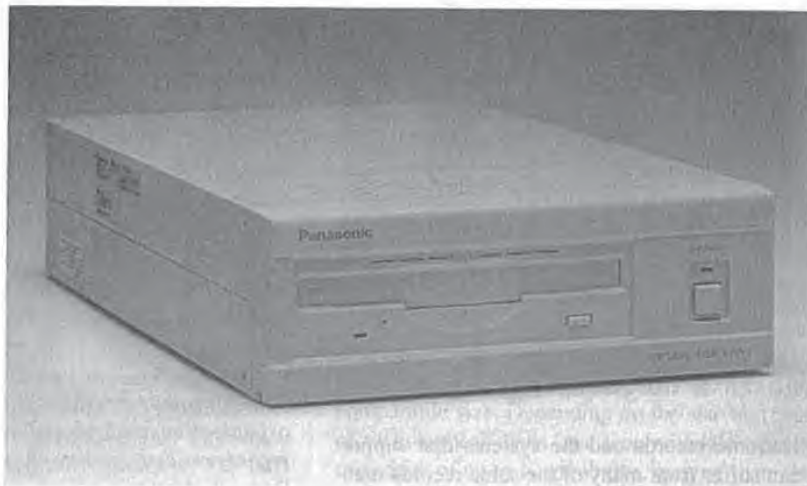
or microfiche format. The report writer capabilities programmed into many software packages often generate lengthy reports, sorted in innumerable ways, that are of questionable utility. Once printed, however, they require considerable labor and expense to classify, file, and maintain. Records managers should provide guidelines to departmental personnel encouraging them to create and maintain only those computer-generated records that are needed to accomplish some valid business purpose.

2. *Inadequate attention is often devoted to the organization and identification of electronic records resident on-line on nonremovable media.* Because electronic records are machine-readable (they cannot be read by sight), it can be difficult to retrieve them unless adequate attention is devoted to how the files are named and identified, what tools are developed to facilitate their efficient retrieval (e.g., data dictionaries, thesauri, and other index devices), how they are organized into directories, subdirectories, and other structures designed to enhance retrieval, and what other software-related tools are available to enhance the file search capabilities of the users.





(a)



(b)

**FIGURE 8.4** (a) Write-Once and (b) Multifunction Rewritable Optical Disk Cartridges  
(Courtesy Panasonic Communications and Systems Company)

3. *Inadequate attention is often devoted to the organization and identification of electronic records resident off-line on removable media. Particularly in the case of PC-based electronic records on removable media, the creators of re-*

*movable media often identify and label them in a very arbitrary and haphazard manner. The labels on diskettes often consist of brief and very cryptic terms which are insufficient for effective use of the records. As they grow in volume, these media*



are often poorly organized, and frequently no inventory exists to indicate their specific contents, date ranges, or other data needed to manage them.

4. *The protection and security of electronic records is often overlooked.* Even though electronic records often contain mission-critical information which is never printed and is thus unique and irreplaceable, many vital electronic records are unprotected and their owners are fully exposed to the risks of their loss from disasters or other causes. Again, this is particularly true in PC computing environments. Similarly, despite passwords and other options for protecting electronic records against unauthorized intrusion, theft and other threats to their integrity remain a major problem in many organizations which maintain sensitive data.

5. *The retention and disposition of electronic records is often overlooked.* Because electronic records consume so little space and are not a visible problem in many offices, their retention status is often not considered. Even many records managers often do not include these records within the scope of their retention scheduling programs. Electronic records, however, are subject to regulatory retention requirements as well as the risks associated with litigation, just as much as their paper and microfilm counterparts. Moreover, there is usually no business justification for retaining useless electronic information, however small its size.

6. *The relatively short usable life of many electronic records may be insufficient to meet the organization's retention and archival needs.* Because the proven longevity of some electronic records media is relatively short and because these records cannot be read or used without the proper hardware and software, electronic records may not be a suitable format for long-term retention or permanent archival preservation. The useful life of these records is significantly shorter than that of paper and microfilm records. Thus, records managers must often work with data processing personnel to develop and implement suitable options for those electronic records that must be retained for many years.

7. *The ownership status and management responsibility for many electronic records is unclear.* Although the users of electronic records have the strongest proprietary or ownership interest in them, it is often unclear who has primary management responsibility for these records. This is particularly true in the case of PC-based electronic records. The creators of these records often regard the records as their own private files or personal working papers, and they sometimes feel free to manage them as they please, remove them from official custody, or even dispose of them without regard to their status as official records, their retention, or other considerations. Many organizations have issued neither policies prescribing the management responsibilities for electronic records, nor guidelines for their use. Thus the roles of the data processing or MIS department, the records management department, or other units of the organization in managing electronic records may be undefined. In these situations, records managers should adopt a very proactive posture in defining an appropriate role for themselves in the management of electronic records.

#### INVENTORYING ELECTRONIC RECORDS

The first step records managers should take in developing a program for managing electronic records is to conduct an inventory of them. As described in Chapter 2, this is required in order to determine the problems posed by electronic records and to formulate strategies for solving them. An inventory of the organization's electronic records will disclose the types and quantities of records on hand, their condition, the equipment used to process and house them, and many other details essential to establishing appropriate records management controls over these records.

Inventories of hard copy and microfilm files are typically conducted on a department-by-department basis and consist of collecting descriptive data concerning each records series. This approach is also workable for electronic records, but some variations are required to ensure that the inventory of electronic records is comprehensive.



1. *The records series concept should be applied to electronic records.* The term in data processing parlance that equates most closely to the term *records series* is *data set*. For our purposes here, a data set is defined as a separate body of computer data (text files, data files, or image files) that is logically related, serves a common purpose or function, and can thus be considered as a discrete unit for records management purposes.

2. *All electronic records series in each computer or electronic imaging system should be inventoried.* For those computer and imaging systems installed in and operated by a particular department, it is appropriate to conduct the inventory of electronic records on a department-by-department basis. However, for those systems operated by a centralized data processing unit or by an outside service bureau, it will be necessary to collect certain inventory data from the persons who operate the system, while other data must be collected from the end users—persons in the various program units who actually use the records to conduct business.

#### Electronic Records Inventory Data

Most of the basic records inventory principles discussed in Chapter 2 are applicable to inventorying electronic records. In addition there are special inventory data that must be collected for each electronic records series in order for the inventory to be complete and of maximum utility in developing programs for the management of electronic records media. Figure 8.5 shows a sample of a records inventory form specially designed for inventorying electronic records.

**Name of Electronic Series.** As is the case with nonelectronic media, the series name must be reflective of its nature and contents. Names such as "Computer Printouts," "Floppy Diskettes," or "Magnetic Tape," which describe the type of storage media on which the records reside, are inappropriate names for electronic records series.

Rather, terms that reflect the type and nature of the records themselves should be chosen. These terms should be both generic and specific as to record content. Examples might include "New Drug Development Reports: Monthly and Year-End Summaries" or "Electric Power Usage Reports—By Municipality."

**Series Description.** As with nonelectronic records series, a brief description of the series purpose, use, and detailed contents will be sufficient. However, with electronic records series, it is important to note any details relevant to the series status as an electronic record; i.e., the name of the automated information system on which the electronic record resides, the type of files (e.g., text, data, or image), or the copy type for removable media (e.g., working copies, storage copies, backup or security copies).

**Medium Description.** The inventory analyst must note the type of storage medium on which the electronic records series resides (e.g., fixed, hard disk, magnetic tape, diskettes, compact disks, optical media) and the physical size and recording format or capacity of the medium (e.g., 5.25-inch diskettes/360 kilobytes).

**Date of Records and Medium.** The inclusive (beginning and ending) dates covered by the series should be shown on the inventory. In some cases, it may also be useful to note the medium manufacturing and recording dates, as this may be relevant in projecting the useful life of the records.

**Hardware and Software Environments.** The type of computing equipment used to record and process the electronic records must be shown, together with the operating system software, the applications software, and specific brand names and versions of each of these components of the computing system. An example might be "Standalone word processor IBM-compatible microcomputer with 4 megabytes of random-access memory and a 120-megabyte hard disk drive uti-



## RECORDS INVENTORY WORKSHEET—ELECTRONIC RECORDS

*Instructions:* Complete this form for each electronic records series or data set in your organization. Complete one form for each separate body of computer data (text files, data files, or image files) that is logically related, serves a common purpose or function, and can thus be considered as a discrete unit for records management purposes.

NAME OF COMPUTER SYSTEM/SUBSYSTEM/APPLICATION \_\_\_\_\_

NAME OF RECORDS SERIES \_\_\_\_\_

SERIES DESCRIPTION \_\_\_\_\_

MEDIA DESCRIPTION \_\_\_\_\_

DATE OF RECORDS/MEDIA \_\_\_\_\_

HARDWARE/SOFTWARE DESCRIPTION \_\_\_\_\_

NETWORK ENVIRONMENT \_\_\_\_\_

VOLUME OF RECORDS \_\_\_\_\_

FREQUENCY OF UPDATES \_\_\_\_\_

RATE OF ACCUMULATION/FUTURE GROWTH \_\_\_\_\_

REFERENCE/RETRIEVAL ACTIVITY \_\_\_\_\_

RETENTION STATUS \_\_\_\_\_

PROTECTION STATUS \_\_\_\_\_

RELATIONSHIP TO OTHER RECORDS \_\_\_\_\_

REMARKS/NOTES FROM INTERVIEWS WITH END USERS/COMPUTER SPECIALISTS \_\_\_\_\_

INVENTORY ANALYST \_\_\_\_\_ DATE \_\_\_\_\_

FIGURE 8.5 Records Inventory Worksheet for Electronic Records

lizing MS-DOS 6.0 and Windows 3.1 operating software and WordPerfect 6.0 for DOS and 6.0 for Windows word processing software.”

**Network Environment.** If the computing system is connected to a local or wide area network (LAN or WAN), the type and characteristics of the net-

work should be noted, for example, “Novell LAN supported by file server with 2.0 gigabytes of capacity.”

**Volume of Records.** The size and quantity of records consumed by the electronic records series should be noted, expressed in any manner appro-



appropriate for the type of records being inventoried. For series resident on fixed disks, the volume of records is normally expressed in bytes; for removable media, an item count should be recorded. If the electronic records series does not fill a given medium, it is often useful to note the percentage occupied and available for future growth.

**Rate of Accumulation or Future Growth.** The anticipated annual growth of the electronic records series should be shown; it can be expressed in bytes per year or disks per year.

**Reference Activity.** The inventory should include the method and frequency of references to the files, the nature and speed of the queries, who performs the references, and other relevant details respecting the access and usage of the electronic records series. Distinctions must be made between on-line, near-line, off-line/on-site, and off-line/off-site retrieval activity. On-line retrieval of documents data resident on fixed magnetic disk drives or other high performance, direct-access devices generally support near instantaneous retrieval requirements of between a few seconds down to a fraction of a second. Near-line retrieval of documents or data is generally accomplished by the use of storage devices such as optical disk jukeboxes, which support very rapid retrieval requirements of 15 seconds or less. Off-line/on-site retrieval situations generally involve the use of removable media stored near the computer, which must be manually mounted in drives; retrieval times are usually measured in minutes. Off-line/off-site retrieval situations involve the storage of removable media in records centers, data vaults, or other remote facilities. Retrieval time is usually measured in hours or even days.

**Retention Status.** Any written policies or operating practices (whether formal or informally executed) that govern the disposition of the electronic records series should be detailed on the inventory. The inventory analyst should determine the period of time that the electronic records series is deemed to be active (accessed and used for

quick reference purposes and updated) or the time period or events that cause the series to become inactive (e.g., the data are superseded; the project is completed; the fiscal year expires, etc.). Finally, the inventory analyst should note any ongoing need to retain the electronic records after they become inactive, as expressed by the persons using or managing them. Examples might include audit requirements, long-term research needs, or litigation potential. Chapter 3 contains a detailed discussion of these issues.

**Protection Status.** The inventory should include a summary of the protection status of any electronic records series which is vital—the information is required to operate the business and the consequences of its absence would be unacceptable. The inventory analyst should note whether the series is currently being protected in any manner. Examples of protection strategies for vital electronic records include the creation of security copies of magnetic tapes, diskettes, and other removable media for on-site or off-site storage in a data vault or other secure facility and the use of special software programs for on-line electronic vaulting.

**Relationship to Other Records.** The inventory of each electronic records series must include the relationship of the series to other related records. Examples would include any indexes (whether integral to the series being described or maintained separately) or other related records maintained in electronic, hard copy, or microfilm formats. If the series exists solely in electronic format and is never printed in any form, this should be noted. If the series is duplicated, in whole or in part, in hard copy, microfilm, or other format, this should also be noted.

#### MANAGING ACTIVE ELECTRONIC RECORDS

With traditional paper and microfilm record media, records managers employ specific methods and techniques for managing active records. Many of these concepts are directly applicable to the



management of electronic records. Active electronic records are those resident on nonremovable (fixed disks) media within the computer itself and those residing on near-line removable media kept near the computer for quick access, as well as off-line removable media kept on-site for slower but still convenient reference.

Active electronic records maintained in PC computing environments are of more immediate concern to records managers than those maintained in the larger computing environments. This chapter focuses on PC-based records maintained in IBM PC-compatible environments utilizing the MS-DOS operating system supplied by Microsoft Corporation. This operating software is installed in approximately 75 percent of the world's PCs; it manages the electronic signals and records between the computer and popular applications software programs such as word processors and spreadsheets, which constitute the majority of electronic records that records managers are called upon to manage.

#### PC-Based Nonremovable Media

Twenty years after its invention, the microprocessor, a thumbnail-size computer chip composed of a tiny sliver of silicon, has suddenly made possible PCs as powerful as mainframe computers. The microprocessor has always been a more affordable source of computer processing power than the mainframe, but during the early 1990s, these small devices finally caught up with mainframes in speed. The Pentium microprocessor, manufactured by Intel Corporation, successor to this company's 486 chip, is rated at a processing speed of 100 MIPS (millions of instructions per second), the same as a typical mainframe. Yet this small microprocessor carried a sale price of less than \$1,000 when it was introduced. As a result, PCs are currently making obsolete the technology used in many earlier mainframe and minicomputer environments. Moreover, PC hard disk drives can now store 50 times the amount of data that more costly computers could store just a few years ago.<sup>2</sup> What this means is nothing less than a

revolution in electronic recordkeeping in the "office of the 1990s." It has equally significant implications for the future of records management because records managers are, or at some point should be, responsible for many of the electronic records that are created and stored in PC computing environments.

#### Fixed Disks, Directories, and Subdirectories

PC-based electronic records are organized in the computer system into *directories* and *subdirectories*, which are created and managed by the operating system that controls the computer's basic functions. This method of organizing PC-based files is analogous to organizing paper documents into file folders and then storing them in separate drawers of a file cabinet. A computer's fixed hard disk (which may be thought of as an electronic file cabinet) can store hundreds, thousands, or even tens of thousands of files. However, as is true with paper records, the greater the volume of computer files, the more difficult the files are to manage and retrieve effectively. Thus, it is critical that records managers and PC users work closely together to organize PC-based records in a manner which will permit their precise and timely retrieval.

Under the MS-DOS operating system, the software's instructions can be used to group related files into directories. When the directories become too large, they can be further subdivided into subdirectories in which subordinate groups of files are stored within a larger directory. The organization of PC-based records into directories, subdirectories, and files creates a kind of filing hierarchy referred to under the DOS operating system as a *directory tree*. DOS considers the *root directory* to be the starting point for all subordinate subdirectories established under it. In managing PC-based records, a directory serves as a kind of table of contents to indicate to the user the index address of the files stored on the disk.

Electronic records are further organized and identified under DOS by *filename* and *filename extension*. Disks may also be identified by sepa-



rate volume names, or divided into separate partitions, particularly if they are high-capacity fixed disks. The computer actually stores files on cylinders, tracks, and sectors of the disk. It locates them for retrieval by using a *file allocation table* to keep track of clusters of occupied disk sectors that contain the data in various files.<sup>3</sup>

### Applying Traditional Files Management Concepts to PC-Based Records

In order for retrieval of documents to work efficiently in paper document filing systems, files must be organized into logical categories and subcategories, and they must be identified using a controlled vocabulary which establishes consistency in identifying and labeling the files. These classic records management principles have been used successfully for decades. Notwithstanding the computer's powerful capability to search a database using keywords or other retrieval techniques, these traditional file management principles can be applied to electronic records. If they are not, the users will experience some level of difficulty in precise and timely retrieval, particularly if the quantity of electronic records is great. To do this, careful consideration must be given as to how to organize directory structures, how to name documents and files, and how to label removable media.

**Organizing Directories and Subdirectories.** Large electronic filing installations will generally require a custom-designed hierarchy of directories and subdirectories reflecting a logical organization of the records. This can be accomplished in a variety of ways. A separate directory can be set up for each major software program (e.g., WordPerfect, Lotus), with subdirectories established for each department, project, or individual user. Alternately, entire directories can be established for each major project, with subdirectories for each individual user for the text and data files they create. Regardless of the directory-subdirectory hierarchy that is selected, it must reflect the specific retrieval needs of the users.

**Naming Individual Files and Documents.** If dozens, hundreds, or even thousands of documents and files are created and are arbitrarily assigned different file names, names that are too cryptically abbreviated to be understood, or names that are too broad or too narrow to accurately reflect the content of the records, retrieval can be a very difficult task, especially if an entire collection of electronic records needs to be searched and assembled from different directories and subdirectories, or worse, from the PCs of different departments or different network servers.

Under the DOS operating system, this problem is exacerbated by the filename limitations imposed by the software: A DOS filename may be no more than eight characters in length, with an optional extension of no more than three characters. The situation is considerably better under some other operating systems: The Apple Macintosh system allows filenames of up to 31 characters, and the system allows individual documents to be filed in "folders" that can be "nested" within larger folders, which can contain combinations of programs, data files, or text files, an electronic filing methodology which is analogous to the directories and subdirectories established under the DOS operating system.

**Establishing Filename Conventions.** Regardless of the constraints imposed by the computer's operating system, records managers should provide guidance to all system users for naming files in a manner that reflects a given file's origin, content, and purpose, such that the file can be identified and retrieved by persons other than the person who created it and assigned the filename to it. Two approaches are commonly employed to do this.

1. *Develop a data dictionary or a thesaurus.* These data retrieval tools are designed to provide consistency in naming files so that numerous computer users in multiple departments utilize the same indexing terms to identify documents in a computer database. The purpose and structure of these tools are very similar to the uniform files



classification schemes employed for paper records. Data dictionaries and thesauri vary in format, but they all contain a listing of document indexing terms, both general and specific, and cross-references to related terms, to provide a controlled and standardized indexing vocabulary with filename conventions for electronic records.

2. *Relate the organization's file indexes for paper records to its electronic records.* If the organization has a well-developed uniform files classification system consisting of standard primary, secondary, tertiary, and other subordinate subcategories, together with a numeric or alphanumeric coding scheme, the system can be applied to the indexing of electronic records. The same terms and numbers (or abbreviated versions of them) can be used for filenames of computer records. Primary and secondary categories can be directories and subdirectories, while subordinate categories can be used to name "folders" or individual files or documents.

#### Labeling and Identifying Removable Media

Thus far, our discussion has focused on identifying PC-based electronic records on fixed, nonremovable hard disks. It is equally important that the documents which reside on diskettes be labeled and identified properly. These removable media have a kind of character limitation of their own: The small labels on 3.5- and 5.25-inch diskettes often do not permit complete index data to be recorded on them. Moreover, these media are often poorly organized in storage trays or cartons, and they are frequently uninventoried. The following are guidelines for identifying electronic records stored on diskettes, hard disk cartridges, optical disk cartridges, computer tapes, or other removable media. A master inventory should be created for these media which shows:

- The name of the department or organization which created the disk, tape, or diskette, or the organization which is responsible for the medium.
- The names of the files by records series, in-

cluding a listing or description of the files which the medium contains.

- The name or type of computer on which the medium was created and can be processed.
- The name and version number of the software used to process the data.
- The type and capacity or recording density of the medium.
- A serial number or other unique identifier of the medium (e.g., tape or disk numbers).
- The date or range of dates on which the data were recorded and/or the inclusive dates of the records.
- Any special security requirements or access restrictions applicable to the medium.
- Whether the medium is a working copy for use on the computer, a backup copy, or a storage copy.

As in the case of electronic records on fixed disks, records on diskettes should be designated for specific applications. Users should never intermix records of different projects or departments on the same medium. This is especially important with low-capacity diskettes; high-capacity magnetic tapes and optical disks, in particular, do sometimes contain multiapplication data.<sup>4</sup>

#### SOFTWARE FOR MANAGING ELECTRONIC RECORDS

Documents in electronic format can sometimes be electronically "misfiled" or can be otherwise difficult to locate. To find these documents by scanning directory listings and viewing documents on the screen can be just as time-consuming as thumbing through file folders stored in a cabinet. Fortunately, the computer industry has developed a number of software-based solutions to this problem. These software products may be grouped into three categories as follows.

##### Search Capabilities in Previously Installed Software

Many of the most popular PC software packages in use have some special document search and



retrieval features that the users may not be aware of. A good example is the document summary capability supplied with the newer versions of WordPerfect. Because the filename conventions in this software are so limited with respect to number of characters, a document summary capability is provided in order to facilitate file retrieval. This feature permits the user to enter the document name (up to 68 characters in WordPerfect), the document type (up to 20 characters), and the document creation and revision dates, the author, the subject, account field, keywords, and an abstract at the time of the document creation. With this detailed index data, subsequent searches will obviously be facilitated.

#### **Files Management Software for Standalone PCs**

There are software products that provide a wide range of files management functions designed to enhance the user's ability to retrieve and manage electronic records on a standalone PC. Some products provide special *shells* to enhance the capabilities of the standard DOS shell by enabling the user to obtain a better view of the files listed on the directories and subdirectories of the hard disk, and to scroll and view selected files. Some products provide a *string search* capability, which enables the user to search an entire disk by entering a string of text reflecting the contents of a particular file. Some products also provide a wide variety of special file management functions, including the ability to transfer entire directories and their contents from one directory to another, change drives, rename volumes, etc. Finally, some software programs are programmed with diagnostic utilities designed to detect and repair many common disk problems. These utilities may protect media from viruses or other defects, optimize the performance of the hard disk by reallocating space on it, and so forth.

#### **Document Management Software for LANs and WANs**

In large local or wide area network PC environments in which very large quantities of documents are maintained, the need for better file man-

agement can require special software. A family of document management software products is available for this type of PC computing environment. Some of the functions of this type of software include the ability to execute searches from any point on a local or wide area network regardless of the number of network file servers, the ability to transmit documents and their associated index data within and among any server on the network, the ability to retain the documents of individual users on both the network servers and the users' workstation disks, and various other network management functions.

Most of these types of software products also provide a variety of sophisticated document search and retrieval features, including indexing the full text of documents and maintaining an abstract description of each document in the database of the user's home file server, the ability to conduct network-wide full-text searches by any word, phrase, or combination of words in a document, and a computer-assisted indexing capability, by means of which the system automatically assigns the directory structure. Alternately, the network administrator or the user may assign the directory structure by selecting the appropriate data for fields such as document type, subject, author, and descriptive keywords.

#### **STORAGE AND HANDLING OF REMOVABLE MEDIA**

It is important that records managers provide a proper storage environment for electronic records and that the personnel observe proper procedures in handling the media. Improper environmental conditions can adversely affect the stability and longevity of these media. High temperature and humidity levels can accelerate their deterioration. In general, a cool and dry environment is best for electronic record media; hot and humid conditions promote the degradation of the binder materials used in the construction of these media.

#### **Storage Conditions for Magnetic Media**

The optimum environmental conditions for magnetic media is an air-conditioned facility capable of maintaining a constant temperature of 63° F to



68° F, and a relative humidity of 35 to 45 percent. Temperature and humidity levels should be constant—free of fluctuations—as this can exacerbate damage to the binder materials of these media.

In addition to temperature and humidity conditions, an ideal environment for the storage of magnetic media should provide protection from fire, water damage, and theft or other human-caused threats. As described in Chapter 4, a data vault for long-term magnetic media storage should be designed and constructed in accordance with standards issued by the National Fire Protection Association.

It is important to note that storage copies of magnetic tapes must be properly maintained, especially if they must be stored for long periods of time. Otherwise, they may be subject to loss of the data recorded on them. Such tapes must be wound and rewound at regular intervals and at normal speeds with constant tension. If the tapes are stored under the optimum environmental conditions, rewind intervals as long as 3 1/2 years may be acceptable. If the storage conditions are less than ideal, rewinding should be performed annually or more frequently.

#### Storage Conditions for Optical Media

Ideal temperature and humidity conditions for long-term storage of optical media have not yet been established. Records managers must, therefore, rely on guidance provided by optical media manufacturers in their product literature. However, such guidance is problematic because the composition of these media varies, and because the temperature and humidity limits may be applicable for the extreme ranges beyond which deterioration will occur, rather than the constant optimum levels for long-term storage. In the absence of reliable technical standards for optical media storage, records managers may wish to adopt the guidelines provided for magnetic media and await further developments.

#### Guidelines for Handling Removable Media

Improper handling of removable magnetic and optical media by users is a common cause of

physical damage to the information recorded on these media. This is particularly true in the case of working copies of such media that are handled frequently by users. Records managers should issue the following guidelines to alleviate this problem:

- Magnetic and optical storage media should always be handled by touching their protective housing.
- Reels of magnetic tape should be handled and carried by their hubs.
- Magnetic and optical media should never be placed under heavy objects or squeezed, as this can damage the data recorded on them. These media should always be stored vertically; they should never be stacked horizontally on shelves or left unprotected on window sills, desktops, or storage cabinets, where they may be exposed to direct sunlight or other sources of heat.
- Magnets should be prohibited from all areas where magnetic media are stored or utilized.
- Smoking should be prohibited in areas where media are stored, as smoke particles can be potentially destructive to such media.
- Food and drink should also be prohibited.

#### RECORDS RETENTION IN COMPUTING ENVIRONMENTS

It seems safe to speculate that the growth of electronic records must be at least double that of paper records—somewhere between 20 and 40 percent per year. What happens to these computer data and text files? Can the principles of records retention be applied to govern their disposition?

Although retention scheduling of paper and microfilm files is widely practiced by organizations throughout the United States, these programs often do not include electronic records. Perhaps the major reasons are that the retention of electronic records does not pose a visible problem in business offices, and that these records do not consume significant quantities of office space. Moreover, data processing and information systems specialists have not often put the matter of electronic records retention high on their agendas,



nor have they frequently requested the assistance of records managers in addressing the issue.

Nevertheless, the principles of records retention scheduling can and should be applied to electronic records. These records should be stored, retained, and scheduled for disposition just as their hard copy or microfilm counterparts. Electronic records which should be scheduled for retention include data and text files produced by computer software (e.g., word processing, spreadsheets, database programs, graphics, etc.), and stored on various types of electronic media (e.g., hard disks, floppy disks, magnetic tapes, or optical disks).

### Some Principles for Scheduling Electronic Records for Retention

The following discussion relates the traditional principles of records retention scheduling to electronic records maintained in computing environments.

1. *The records series concept must be properly applied to records in electronic format.* In order for an electronic records retention program to be workable, a retention period must be established for each *electronic records series*—defined here as a discrete body of computer data that can be considered as a single unit, or series, for purposes of establishing a retention policy to govern its disposition. It will usually not be necessary for a separate retention period to be established for each individual report, just as it is not necessary to establish one for each individual document in a records series of hard copy records. In electronic recordkeeping systems, the records series concept will usually equate to each data set—each major class or subclass of reports, data files, or text files maintained in each system, subsystem, or database.

2. *The end users (owners of the records) must usually be consulted in formulating valid retention periods for electronic records.* This is particularly true in mainframe computing environments, where a retention period should be estab-

lished for every major class (and many subclasses) of computer data. Because they use the data to conduct business, the end users of the computer records should usually be consulted and asked to render a judgment as to the retention value of this information to meet the operational requirements of the business.

3. *The principles of records appraisal and cost-risk-benefit analysis can be applied to electronic records.* The principles of determining retention values outlined in Chapter 3 should be applied to electronic or any other record medium. The concepts of primary and secondary values and the benefits or risks of retaining or disposing of records are just as valid for computer-processable records as for any other business record.

4. *Government retention requirements may apply to but do not usually specify electronic records as an authorized or required retention medium.* With rare exceptions, statutes and regulations do not address the retention of electronic records per se. Almost all the federal and state laws and regulations that require records to be retained are silent on the issue of which record medium must be used to satisfy the government's retention requirements. Thus, the presumption is that unless a particular medium is specified, users may retain the required records in any form or format they desire. A notable exception is the Internal Revenue Service's Revenue Procedure 91-59, which specifies that taxpayers retaining tax records on computer systems must maintain the electronic records and the related hardware and software required to process them for the period of time they are subject to a tax audit.

5. *Computer files are just as vulnerable to the risks of litigation as other business records.* Electronic records are subject to subpoenas and document discovery orders by adverse parties in legal proceedings just as information on hard copy or microfilm is. For purposes of evidence, the law makes no distinction as to the physical format or medium on which requested information resides. Full legal protection is possible only if the



organization's records retention program includes computer records.

6. *Computer media used to retain electronic records are generally not considered to possess qualities of archival permanence in the same sense as paper and microfilm media.* If an organization must retain computer records for many years, it must usually rely on paper or microfilm output to meet its long-term archival needs. Even though computer tapes, disks, and other storage media are constantly being improved with respect to their ability to maintain the stability and integrity of the data they contain for long periods of time, these media cannot be read and used without the proper hardware and software. Because the hardware, software, and other components of a computer system become obsolete relatively quickly (the components often have a service life of less than five years), it may be impractical to retain electronic records for long periods of time.

7. *The principles of official and nonofficial records are relevant to retention determinations respecting computer records.* Unless information exists solely in electronic form, computer data and text files are often considered to be nonofficial in character; thus, a shorter retention period may be justified for them as compared to the hard copy or microfiche output. This output is often considered to be the record copy that reflects the organization's official position on a matter. Under this principle, most word processing text files, most or all computer *processing files* (data files generated and processed before the production of a *master file*) and perhaps all electronic mail and voice mail may be considered nonofficial and thus subject to relatively short retention policies—a few days, weeks, or months; seldom longer than a year or two.<sup>6</sup>

8. *The concepts of active, semiactive, and inactive hard copy records equate to on-line, near-line and off-line computer data for purposes of establishing retention periods for electronic records.* Active electronic records should remain on-line if they must be processed and retrieved in

"real time" to meet heavy user reference needs. The term *near-line* refers to semiactive computer files resident on removable media kept on-site—near the computer for quick processing. Inactive electronic records would include those archived or copied from internal memory onto external, removable media for storage in a secure, off-site location. Retention periods for electronic records series should be established to provide for the on-site and off-site phases in the life cycle of each series.

9. *The total retention period for an electronic records series depends on how long the information needs to be retained in a computer-processable format.* If computer data or text files no longer need to remain in a manipulatable state, there is no justification for retaining them in a computer-processable format. Thus, the total retention period for an electronic records series would be determined on this basis. Of course, business or legal needs may justify further retention, but these retention needs can usually be satisfied by transferring or archiving the data onto alternative storage media.

10. *For computer records having permanent or long-term retention requirements, COM or COLD systems often provide the best retention media.* At the point in their life cycle when computer records no longer need to remain in a computer-processable format but still require long-term or permanent retention, the records can often be dumped to computer-output-generated microfilm. COM provides a relatively inexpensive data storage medium which can offer excellent archival properties for the long-term preservation of computer records. A newer technology, COLD (computer-output-to-laser-disk), is also being used for this purpose. In COLD system applications, data from the host computer are downloaded to a microcomputer equipped with an optical disk drive. The data are then archived onto an optical disk for subsequent retrieval on the PC. Again, the high storage capacity of these disks coupled with the relatively low cost of this form of optical disk technology make the COLD system an excellent



archival medium for many types of semiactive and inactive computer data.

**11. Retention periods for electronic records will usually (but not always) be shorter than those for records in hard copy or microfilm formats.** By its very nature, computer information is valuable because it is highly dynamic—it is processed and manipulated each day in response to the organization's current business operations. This characteristic usually has a relatively short life span; computer files rarely need to be retained longer than three to five years, and are frequently disposed of in a matter of days, weeks, or months in the data processing cycle. By contrast, the static information contained in hard copy or microfilm files is immutable or frozen in time and format. Thus it tends to possess operational or research value for longer periods of time and will often require longer retention than electronically based records.

**12. The small quantity of physical space consumed by electronic records does not, by itself, justify long retention.** The retention value of any business information should be determined by an assessment of the costs, risks, and benefits of its presence or absence after varying time periods. The mere fact that computer records do not constitute a space problem does not justify retaining them indefinitely. Storage on disk drives can be very expensive and thus should be limited to records needed to operate the organization's business or to comply with legal retention requirements.

**13. Detailed transactional data versus cumulative summary data will often be the basis for short- or long-term retention decisions.** Many detailed transactional computer data files can be disposed of routinely in the data processing cycle—after the data are updated or superseded—or they may be destroyed after relatively short periods of time; e.g., at the end of the month, quarter, or year. On the other hand, summary data containing cumulative information (e.g., annual reports) will often require longer retention.

### Records Retention in Mainframe Computing Environments

The manager of the computer operations department usually implements a tape or disk management system to provide for the disposition and reuse of electronic record media which reside on the host or mainframe computer. Under these systems, the computer keeps track of all tapes and disks under its control. The system's operations utilities can be programmed to indicate the number of generations of reports that should be maintained, and the disposition process is applied when the system erases, or scraps, tapes containing obsolete data and makes them available for reuse.

None of these steps, however, should be accomplished in the absence of records retention analysis provided by the organization's records manager. The records manager should establish retention periods for the mainframe's electronic records by interviewing the end users of the record in each department, and by applying the concepts and principles of records retention.

### Records Retention in PC Computing Environments

PC computer systems present special records retention challenges for records managers because PC users often consider these electronic records to be nonofficial personal files to be used and disposed of at their discretion. Also, because of the nature of PC data, the records series concept can be harder to apply to these types of electronic records.

Most PC-based computer systems contain considerable information in both operations and applications software concerning the type, size, age, and other characteristics of the records that enable the retention period of electronic records to be established and the disposition of the records to be effected. For example, directory and subdirectory names, volume indicators, filenames and extensions, file dates, and file sizes expressed in bytes can all be obtained easily by the records manager.



In order to apply the required disposition instructions in the records retention schedule, the organization's PC users must scan directory listings for files that match the records series in the schedules. Because of filename character limitations, this can be a very time-consuming and laborious process, particularly if the users have not adopted systematic naming conventions that are consistent with the records series in the retention schedules.<sup>7</sup>

Many organizations have adopted a records retention policy for records residing on PCs that requires the end user to retain PC-based records no longer than the retention period for the official hard copy output, as specified in the retention schedules. Often, the PC records retention policy indicates that users may, at their discretion, destroy the electronic version of the record sooner, since it would not be considered the record copy.

If the organization's PCs are linked by a local area network (LAN), the LAN administrator (as well as the end users) should be consulted in performing retention analyses on PC-based records and devising retention policies for them.

#### Applying Retention to PC-Based Electronic Records

In traditional hard copy or microfilm environments, records retention periods are typically implemented by effecting the disposal of all documents comprising an entire records series within a certain date range. Assuming the records are well organized, a detailed review and purging of selected documents is seldom practiced, as this is very time-consuming and may result in adverse legal consequences if it can be demonstrated that the selective weeding of documents is contrary to the established retention policy.

How are these retention practices applied to PC-based electronic records? Under the MS-DOS operating system, the user can delete single files, selected groups of files, or all files

on a directory or on a disk, including the directory itself, just as operators of manual filing systems can destroy single documents, folders, groups of folders, or the contents of entire cabinets or shelves.

Unless the electronic records have been logically organized by directory and subdirectory on the hard disk into categories corresponding to their retention status, unless a retention field has been programmed into the database, and unless disposal dates have been properly entered, the process of applying retention to PC-based electronic records can be as time-consuming as it is in manual recordkeeping environments, or even more so. The user must scan directory listings to determine the files that are eligible for disposal as provided by the retention schedule. For these reasons, it is essential that records managers work with end users to organize PC-based records in a manner that will facilitate the implementation of retention policies.

In applying retention to PC-based records, records managers and users should be aware of the capabilities of the *Undelete* function. Under MS-DOS and certain popular word processing programs such as WordPerfect, it is possible in some cases to undelete a file using optional DOS utility programs. This is possible because DOS does not actually erase a file that has been deleted; rather, it simply makes the disk space occupied by the file available for new files, and it deletes the index data that provide access to the file, so that the file will no longer be shown in a directory listing of files.

In some cases, the Undelete capabilities of the DOS utility programs may prove useful in correcting file deletion errors which may be made during the process of applying retention to these PC-based records. Records managers should be aware, however, that the restoration of deleted records could expose the organization to some degree of legal risk. If records exist and are subpoenaed, they must be produced, regardless of the difficulties that may be associated with retrieving them.



### The Archival Status of Electronic Records

Records managers are often called upon to provide guidance relative to retention and archival needs to both end users and data processing and MIS personnel. Because the useful life of electronic records is significantly shorter than that of paper and microfilm records and because these records cannot be read or used without the proper hardware and software, records in electronic format may not be suitable for long-term retention or permanent archival preservation.

- *Archival standards for electronic record media.* With respect to their properties of stability and longevity, national and international standards have been issued for various types of paper and photographic record media. However, these standards have not been published for magnetic or optical record media.

Records managers must rely on technical guidelines and various studies conducted by media manufacturers, governmental agencies, and other interested parties. While some of these studies may be of questionable validity, they do provide some degree of guidance to records managers in arriving at logical and informed decisions concerning the length of time that information recorded on electronic media may be usable.

The U.S. National Institute of Standards and Technology (formerly the National Bureau of Standards) conducted studies during the 1980s which suggest that magnetic tapes composed of gamma ferric oxide recording material will be processable or readable for a period of 10 to 20 years. However, this period assumes that the tapes will be stored and maintained properly. Optical storage media have no known archival properties; manufacturers of these media assert that they will retain playback utility for periods ranging from 10 to 100 years, depending on the type of medium and the particular recording technology employed. However, because optical

media are such new storage devices, the manufacturer's stability claims are necessarily based on accelerated aging tests rather than actual operational experience.

- *Media hardware and software dependence.* Magnetic and optical media have no utility unless appropriate hardware and software are available to process and read the information recorded on them. In this regard, the archival situation is highly problematic: The hardware would need to be supported by its manufacturer over a multigenerational period and new versions of software would need to be managed over a period of years. The dynamic nature of the computer industry, with its short system life cycles and rapid product obsolescence, would suggest that lengthy or permanent retention requirements for electronic media would be difficult to meet.

Records managers have three main options for dealing with this issue:

1. *Preserve the electronic records in ASCII format.* As noted earlier, this data format provides the most flexible option for future processing on a variety of computer platforms.
2. *Rely on micrographic media for long-term and archival retention purposes.* Several options exist here: As noted earlier, the electronic records can often be dumped to COM microfiche or COLD optical media; the records can be microfilmed at the time they are converted to electronic format for long-term storage purposes; or a micrographics subsystem can be sometimes designed into an optical imaging system, in which the film is scanned and digitized for subsequent display at the user workstations.
3. *Retain the paper records.* While this may not appear to be an attractive option, it often proves to be the simplest and best method of dealing with the risks that may be associated with the nonarchival properties of electronic record media.



## SUMMARY

The widespread use of computers has been the single most significant occurrence to affect the field of records management during the past two decades. This is true because computers generate enormous quantities of records for records managers to manage, because there are numerous problems associated with the management of electronic records—problems that require records management solutions—and because computers provide many new tools for solving records management problems.

Electronic records consist of machine-readable information in the form of character-coded electronic signals, and they exist in three primary forms: text files, data files, and image files. These files reside on two major classes of electronic storage media: magnetic media and optical media. Magnetic media, in turn, consist of magnetic disks, tapes, and diskettes, each of which is coated with a recording material that is properly magnetized during data recording operations. Magnetic disks are used primarily for rapid, on-line access to electronic records, while magnetic tapes and diskettes are used mainly for off-line data storage and archiving and to provide security and disaster backup for mission-critical electronic records.

Optical storage media, the newest major class of storage media for electronic records, were commercially introduced during the mid-1980s. These devices provide much greater storage capacities than their magnetic counterparts, and their principal records management application is for the storage and rapid retrieval of large collections of documents. Optical media are available in erasable and nonerasable formats.

Electronic records pose the following major records management problems: Many electronic records are unused and unneeded; they are often poorly organized and identified on both removable and nonremovable media; their security and protection status as vital records is often over-

looked; inadequate provisions are made for their retention and disposal; they have a relatively short usable life which may be insufficient to meet their organization's retention requirements; and their ownership status and the responsibility for their management is often unclear.

To be properly managed, electronic records must be inventoried. The inventory should be conducted at the records series, or data set, level, and it should describe the content, use, purpose, and other characteristics of all electronic records maintained by the organization.

Records managers should provide extensive guidance to their organizations on the management of both active and inactive electronic records, particularly those that are filed in PC-computing environments. The basis for much of this guidance can be found in traditional records management concepts applicable to hard copy and microfilm records media, as these concepts are largely transferable to electronic records.

Active electronic records should be properly organized into a logically related hierarchy of directories, subdirectories, and files, and they must be identified and labeled using terms specific to their purpose and content. The filename conventions established by a data dictionary or a thesaurus, both of which provide a controlled vocabulary for filing the electronic records, are proven tools to ensure accurate and consistent retrieval of electronic data. These records management techniques are still necessary even though the computer has relatively powerful and sophisticated search capabilities.

Records managers should ensure that all electronic records maintained on removable media are labeled, identified, and inventoried in a manner that permits their effective management.

A wide variety of software is available to enhance the management of electronic records that reside on standalone PCs, as well as those



connected to networks. This software is generally designed to assist the user in locating files appearing on directory listings, to retrieve files, to manage directories and disks, and to manage electronic records residing on network servers of local or wide area networks.

Records retention schedules should be developed to provide for the disposition of all electronic records, including those residing in both mainframe and smaller computing environments. Most of the principles associated with developing records retention schedules for hard copy and microfilm media are relevant to developing schedules for electronic media.

#### QUESTIONS FOR DISCUSSION

1. The widespread use of computers has been called the single most significant occurrence to affect records management during the past two decades. Why is this assertion justified? List and briefly discuss two primary reasons.
2. Define and discuss the principal types and characteristics of electronic records.
3. There are three major types of magnetic storage media. What are they?
4. From a records management perspective, what is the principal advantage of utilizing optical storage media?
5. List and briefly discuss four records management issues and problems affecting electronic records.
6. Define the term *data set* and discuss its significance in inventorying electronic records.
7. File cabinets, file drawers, and file folders are common storage devices for paper documents. What are their counterparts in electronic filing systems?
8. Explain why filename conventions are so important in managing electronic records efficiently, and describe some common tools and methodologies for this technique.
9. Special shell software can be purchased to enhance the files management capabilities of

PC-based records controlled under the MS-DOS operating system. Briefly discuss these enhanced capabilities.

10. Special document management software can be acquired to enhance the management of electronic records maintained in local or wide area networks. Discuss the major functions of this software.
11. List and discuss ten principles of developing records retention schedules for electronic records.
12. The archival status of electronic records media is an often debated (and frequently misunderstood) issue in data processing and records management circles. Discuss this issue in the context of its records management significance, and describe some approaches to dealing with it.
13. List the optimum temperatures and humidity ranges for the storage of magnetic media.
14. List three do's and don'ts for the handling of electronic record media.

#### PROJECTS

1. You are the records manager of the Global Electronics Corporation. Your records management program has been mostly directed towards managing records on paper and microfilm formats, but you want to extend its scope to include computer-based electronic records as well. Prepare a presentation to your firm's senior management detailing the specific records management problems encountered by Global's electronic records, and how you propose to solve them.
2. You are the records manager of the Global Electronics Corporation. You have just been given a mandate to extend the company's records retention program to include all electronic records in the firm. Develop a detailed action plan for how you propose to proceed with this project. The plan must include inventorying and retention decision-making



steps applicable to electronic records in both mainframe and PC computer environments.

3. Electronic records management problems are very similar to those encountered in traditional recordkeeping environments. Prepare an outline for a research paper entitled "Traditional versus Electronic Records Management: Common Problems, Common Solutions."
4. You are the records manager of the North Slope Petroleum Company. Your supervisor, the vice-president for Administration, has asked you to work with a team of computer specialists from the MIS Department on a project to select one or more software packages to improve the management of North Slope's standalone and networked PCs. Prepare a report for the vice-president for Administration indicating the functional capabilities such software is to have, and how it could improve the retrieval of PC-based data and enhance the overall performance of the firm's PCs.
5. Review three of the leading PC magazines, locate articles and vendor advertisements on software products for PC documents and files management, obtain vendor literature from the software houses, and prepare a report of your findings, indicating what products you believe to possess superior features and why.

#### CASE PROBLEM

You are the new records manager for the Life Insurance Company of North America (LICNA). This medium-size but rapidly growing insurance company has not had a records management program—one has just been authorized by the firm's Executive Management Committee—and there is much to do in order to establish control over the firm's approximately 20,000 linear feet of active and inactive paper records. Moreover, the management of electronic records appears to be a real problem. You are asked to meet with LICNA's chief information officer, the vice-president of

Management Information Systems, and the manager of the Data Center. These individuals request your assistance on a special ad hoc study team to review the status of the firm's electronic records management, determine its problems, and propose appropriate solutions.

At this initial meeting, you learn that:

- No formal policies or procedures exist to govern the retention of LICNA's electronic records, regardless of whether they reside on the mainframe computer, on a file server that supports one of the firm's 20 local networks, or on a standalone PC.
- The storage copies of the magnetic tapes are stored in an off-site vault. However, upon inspecting the facility, you learn that it is not really a data vault, but a storage room in an unsprinklered office building. The room has a window-unit type air conditioner and a Halon-type fire suppression system, but the gas cylinder is located outside the room where the tapes are stored. There is an inventory of the tapes to control their rotation cycle, but no other descriptive data appear on the inventory.
- LICNA's approximately 2,000 PC users were recently surveyed to determine their level of satisfaction with these machines. The users of standalone units expressed frequent complaints with hard-to-locate documents, particularly if the quantity of files on their hard drives is great. The users were furnished with no guidance as to proper organization of filing structures on their PCs, nor any guidance as to naming files, developing thesauri, or using other PC files management techniques. Moreover, these matters were not covered in the basic courses taught on how to use word processing or spreadsheet software. No special files management software had been acquired or installed on any standalone or networked PCs.
- The users of PCs on LICNA's large wide area network expressed frequent complaints about



their inability to retrieve and share certain files across the network.

- No written guidance or procedures had been furnished to PC users relative to the handling or storing of removable computer storage media.
- The LICNA executives indicated that they have been investigating converting the firm's insurance policy files to an optical disk system, but they are concerned about the archival status of this storage medium, in light of the fact that the firm's policy files often have a very long active life and an inactive life of 15 years.

You must work with LICNA's Electronic Records Management Project Team to conduct a detailed study of these matters and develop an action plan for problem resolution. Prepare a report containing three sections:

1. A section entitled "Current Situation of LICNA's Electronic Records Management," detailing the problems you identify.
2. A section entitled "Action Plan," recommending how to address the problems identified in the current situation section.

3. A section entitled "Executive Summary," outlining the benefits of your major recommendations, as well as the consequences of failure to adopt the proposed recommendations.

#### NOTES

1. Stratford Sherman, "The New Computer Revolution," *Fortune*, June 14, 1993, p. 58.
2. Ibid., pp. 56,66.
3. John T. Phillips, CRM, *Organizing and Archiving Files and Records on Microcomputers* (Prairie Village, Kansas: ARMA International, 1992), p. 20.
4. William Saffady, *Managing Electronic Records* (Prairie Village, Kansas: ARMA International, 1992), pp. 138-139.
5. For a general discussion of electronic records retention, see William Saffady, "Retention Schedules for Electronic Records," in *Managing Electronic Records* (Prairie Village, Kansas: ARMA International, 1992), pp. 87-109.
6. Donald S. Skupsky, JD, CRM, "Establishing Retention Periods for Electronic Records," *Records Management Quarterly*, April 1993, p. 40.
7. John T. Phillips, CRM, *Organizing and Archiving Files and Records on Microcomputers* (Prairie Village, Kansas: ARMA International, 1992), p. 13.



## Chapter 11

### Electronic Imaging Systems

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#### Learning Objectives

1. To describe the capabilities and advantages of optical disk-based electronic systems.
  2. To list the major components of electronic imaging systems and their purposes.
  3. To explain the various types of optical disks and their characteristics.
  4. To discuss the benefits and design of networks.
  5. To list the benefits and economics of computer-output-to-laser-disk (COLD) imaging systems.
  6. To discuss how the electronic imaging systems can interact with departmental and enterprise-wide computer systems.
  7. To discuss how hybrid micrographic systems are complementing electronic imaging systems.
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#### AN ALTERNATIVE TO MICROFILM

In the early 1960s there was some experimentation by the Ampex Corporation and some user corporations with the use of magnetic videotape to record document images, but the process proved to be economically and technically unfeasible. In more recent years, however, the use of laser videodiscs prompted a new interest and successful application of electronic imaging of documents.

A newer technology, sometimes known as an optical disk system, but more often as an *electronic imaging system (EIS)*, or as *electronic image management (EIM)*, has made great inroads into document-based information systems during the last 10 years, and at times is providing a viable alternative to microfilm systems. Like microfilm systems, EIS stores document images, retrieves them, displays them, and transmits them in a

highly automated electronic fashion. Through television and the computer monitor, society has become very accustomed to the electronic image, and perhaps this may account for the ready acceptance of this technology.

As we saw in the last chapter, microfilm technology is essentially a photographic approach to document management, utilizing silver halide film to record microimages of business documents. The electronic imaging system achieves practically the same results by using laser beam technology to digitize an image and to record that image digitally on an optical digital data disk, commonly known as an *optical disk*.

The microfilm image is an analog image which can be seen with the naked eye, although more clearly under magnification. Conversely, the



electronic image is created by a binary digital representation of an image, which is called a *bit map* and is transparent to the user, just as the data on a magnetic disk are transparent until read and displayed on a computer monitor. However, in either case the image is viewed on a display device—the electronic image being displayed on a high-resolution computer monitor and the micrographic image, on an optical projection screen known as a reader.

There are many similarities between microfilm systems and electronic imaging systems. Table 11.1, which compares the two systems functionally, shows that there is no great reduction in the amount of hardware or imaging labor. However, there are potentially significant technological and operational advantages to justify the change.

#### ADVANTAGES OF ELECTRONIC IMAGING

Since the system is electronic, there is nearly instant access to the image, which is very valuable for active records. In addition, the image may be transmitted over a network so as to be a valuable part of a work flow program and a readily available shared resource. With the same monitor, the image can be integrated with data and word processing systems, enabling the office worker to match an incoming electronic image with an existing (in-file) document image. The office worker can also call up relative data from a mainframe

database, respond to the incoming document through word processing utilizing windowing techniques, and finally refile the electronic documents to complete the transaction.

The electronic imaging system, while it can be used simply to file, refile, and retrieve document images, can also be a vital part of transaction processing. As such, justification for such a system may have different criteria than a simple comparison of clerical and equipment costs to those of another system. Sometimes, the electronic image can be a vital part in a strategic plan that can be the lifeblood of the organization. If the function is vital, such as customer service, introduction of the system can be easily justified, but on different grounds.

The exact components of the system may vary slightly, depending on the configuration, but generally a system, whether standalone or distributed on a network, will have at least the following components:

- Scanner (digitizer)
- Disk drive and disks
- Monitor
- Printer
- Control computers and software

Larger network or distributed systems may also have a device called a *jukebox*, to automatically load disks, and many workstations, each consisting of a personal computer (PC), monitor, and printer. Smaller standalone systems may have all of the components and software in one package, sold and installed just as would be done with

TABLE 11.1 Functional Comparison of Microfilm and Electronic Systems

Similarities	Microfilm Systems	Electronic Systems
Records Imaging	Camera	Scanner
Media	Film	Optical disk
Display	Reader	Monitor
Paper print	Reader-printer	Laser printer
Retrieval	Computer index	Computer index
Indexing	Data entry	Data entry
Manual Actions	Document prep	Document prep





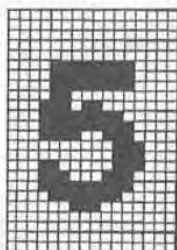
**FIGURE 11.1** Scanner  
(Courtesy of Bell and Howell)

a microfilm computer-assisted retrieval (CAR) system. Such standalone systems are basically used as a simple file-retrieve-refile system, utilizing the PC to index the system and to control imaging, retrieval, and display.

#### SCANNERS

To record a document image on an optical disk using an EIS, the paper document is manually fed into a *scanner*, or *digitizer*, in a manner similar to that used for microfilming (see Figure 11.1). The document is indexed so that it can be displayed on an electronic screen at some later time. This operation is quite simple; however, the bit-map technology behind it is not only fascinating, but con-

**FIGURE 11.2** Bit-mapped Image  
(Courtesy of Association for Information and Image Management)



siderably more complicated than the scan process appears.

#### Overview of Bit-Mapping

An array of charge-coupled devices in the scanner make a scan of the document. This scanning is called *bit-mapping*. A document page is electronically divided into an imaginary grid of millions of bit locations on which black and white dots, or bits, called *pixels* (*picture elements*) are recorded.

When the page is scanned, the scanner does not, for example, recognize the letter A and record the binary EBCDIC/ASCII code for A. Rather it just recognizes the white and black pixels that make up that character (see Figure 11.2) and records the grid box where a portion of the image is located.

A black bit (part of the total image) is recorded as a 1, and a white bit (clear background or white space) is recorded as a 0. These bits are recorded in digital raster format from left to right, top to bottom as a series of 1's and 0's on an optical disk mounted on a disk drive.

The disk drive uses a powerful laser light to create extremely small pits or bubbles on the surface of the disk. Each pit or bubble represents a 1, and the absence of the pit or bubble represents a 0. These pits can then be read by a less powerful laser light recreating the scanned image on the screen or on paper.

All of this extremely intricate yet simple recordkeeping and processing is controlled by a computer, which could be as small as a PC or as large as a mid-size computer. In actual practice, the bit-map coding is first recorded on a magnetic disk in the processor for reviewing, quality check, and compression, and then transferred to the high-density optical disk in the disk drive for permanent storage or automated random retrieval.

#### Compression

One of the elements of the bit-map technology that is virtually transparent to the user is the *compression ratio*. The compression ratio is controlled



by software. Computer scientists, finding that they did not need to record all of the white spaces, that is, the 0's, reduced the coding from a ratio of 7:1 to a ratio of 30:1. For example, an average 400-word page bit-mapped at 200 dpi (dots per inch) requires 467 kilobytes. Compressed at 28:1, the document image requires 17 kilobytes. The exact amount depends on other factors such as the amount of line work, the amount of contiguous white space on the document, the amount of text on the document, and the compression method.<sup>1</sup>

Compression is accomplished in the control computer, prior to sending the binary codes to the disk drive and optical disk for recording. The significance of compression is that it increases the disk capacity. The exact ratio obtained is determined by the factors previously mentioned, rather than a turn of the dial by an operator, and can vary from document to document. So, as a result, a scan sample is necessary to make accurate estimates of job volume and disk capacities.

The same software that compresses the image must also decompress it. This limits the use of the compressed image to computers that have the same compression software.

### Resolution

Another factor related to scanning is *resolution*. Resolution in electronic imaging is somewhat different from resolution as applied to micrographics. In micrographics, resolution relates primarily to a quality standard, and in electronic imaging, it relates to a planned readability factor. Resolution is expressed in dots per inch (dpi). A dot is a pixel

or a bit, the smallest element of a bit map, and as stated earlier, it may be either a 1 or a 0. The dots are in effect square. The fewer dots per inch, the more ragged will the edges of a visual character appear on anything but vertical or horizontal images. The effect of this is that a higher number of dots per inch results in sharper images. (See Figure 11.3.)

Generally, 200 dpi is entirely satisfactory for all office document images and is almost considered a standard, except for engineering drawings. A resolution of 200 dpi means that one square inch of the document will have 200 pixels horizontally and 200 pixels vertically, or 40,000 dots.

Selection of a higher resolution results in increased scan time and added disk storage space, since more bits must be scanned. Proportionately, an increase from 200 dpi to 300 dpi is an increase of 50 percent. That translates to an approximate 50 percent increase in scanning time as well as disk storage space. Generally, many scanners will have controls permitting the selection by the operator of either 100, 200, 300, or 400 dpi, but less expensive scanners may have a fixed 200-dpi resolution.

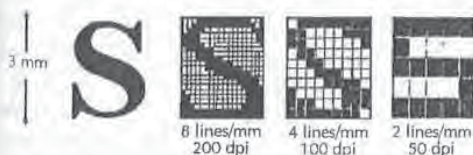
### Scanner Types

Scanners range in size from that of a table top copier to the approximate size and appearance of a microfilm rotary camera. There are two basic types of scanners used for office-size documents—the flatbed and the sheetfed type. Flatbed and sheetfed scanners can be *monochrome* (black and white), *gray-scale*, or *color*.

The *flatbed* type is similar to many office copiers in that a bound book, for example, can be placed face down on the transparent glass top and scanned from below. Of course, it is also suitable for single-page documents, but this type of scanning is very slow, so the volume must be low.

The *sheetfed* digitizer, utilized to scan high-volume documents, is used most frequently for office systems. Sheetfed scanners have belt- or roller-driven feeders that automatically transport documents from a stack tray at a rate ranging from

FIGURE 11.3 Effect of Resolution on Readability (Courtesy of Association for Information and Image Management)





one to four pages per second per 8 1/2- by 11-inch page, at 200 dpi. At the high end, the throughput rate per hour, depending on scanner model, is approximately 1,000 to 7,000 pages.

It is important, though, to realize that rated or transport speed is not necessarily the same as real-life speed. Paper hoppers for automatic feeding may hold as few as 50 sheets or as many as 500 at one time, which means that frequent operator attention will be required. Even if all goes well, with no jamming, skewing, or other mishap, operator loading of the paper hopper alone would actually reduce scanning output per hour and should be factored in when making estimates. Sampling tests provide the best estimators before beginning a major application. Generally, when we discuss black and white scanners, we are speaking of office-size paper document scanners. In addition to this type of scanner there are also microfilm scanners.

The *micrographic* scanner is used to scan microfilm images in various microformats, such as aperture card, jacket, microfiche, and roll film. Sometimes film is scanned to convert to an all-electronic system, sometimes to create a hybrid image transmission network system, and sometimes to facilitate scanning speed, such as with engineering drawings. *Large-size document scanners* are used to digitize engineering drawings varying from C to E size.

The *facsimile transceiver* is still another type of scanner that can be used for input. The fax machine can and is used as an image scanner, as part of a work flow system.

*Gray-scale or color scanning* usually requires a special scanner for imaging gray-scale documents, halftones, or color documents. Gray-scale scanning may require more than eight times as much disk space as simple black and white office-document scanning. Even more space will be needed for color. Some scanners are equipped to automatically sense the need to enhance an image, to recognize gray-scale images and photographic halftones, and to adjust. Others just provide for manual adjustment to enhance (improve) an image. In the feasibility and systems design

process, it is necessary to know what type of documents will be scanned into the system so that appropriate equipment is acquired.

Other selection factors must be considered in addition to the type of scanner. Very likely your scanner will also require an interface kit, such as a *SCSI* (meaning *small-computer system interface*, pronounced "Scuzzy"), which may also be required for all of the major components of the system.

Some scanners are designed for single-sided scanning, and others allow for duplex scanning, which means scanning both sides, often simultaneously. If there are many documents in the proposed system that contain information on both sides, it could be critical that a duplex scanner be selected.

Another consideration is the paper-size limitation. Normally, sheetfed scanners handle documents up to approximately 8 1/2 by 17 inches, although some have a limit of 8 1/2 by 14 inches. There are also minimum lengths and widths for documents, such as 2 inches, which must be considered because of a need to match the paper transport system in the scanner. Again, it is important to know the nature and condition of the documents that the system will encounter in actual day-to-day operation.

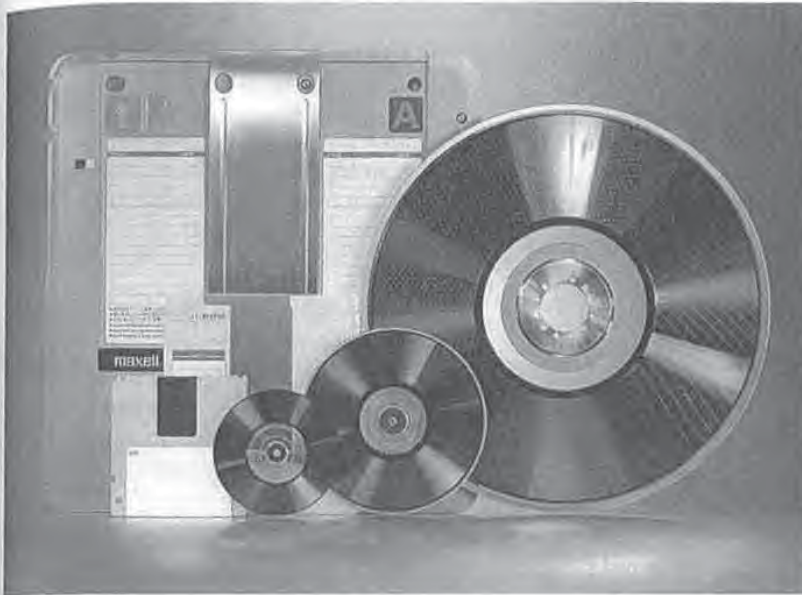
## DISKS AND DISK DRIVES

The system will have one or more optical disk drives and at least one magnetic disk hard drive and floppy drive, as the magnetic disk is also used in electronic imaging systems.

### Magnetic Disks

The magnetic disk is used for software and indexing. It also stores images temporarily until they are checked for quality, indexed, and transferred to the optical disk for permanent storage and retrieval. The magnetic disk is not used to store images permanently because it does not have the high packing density or the permanency of the optical disk. The optical disk has an areal density





**FIGURE 11.4** Optical Disks and Cartridges  
(Courtesy of Maxell Corporation of America)

of 15 to 50 times that of a magnetic disk and has an estimated postrecorded life span of 100 years. In addition, the optical disk does not wear from daily use.

### Optical Disks

In appearance, the optical disk is platterlike, resembling closely the audio compact disk used for recording music. The disk is actually enclosed in a rectangular plastic cartridge, which is usually provided by the manufacturer of the disk drive or by the disk vendor (see Figure 11.4). There are four types of recording technology used in disk manufacture, and all seem to work with about the same degree of reliability and stability.

Optical disks are not entirely interchangeable. Even though they may use the same write technology and may be the same size, they are

still proprietary. A Brand X disk drive requires a Brand X optical disk. This may seem to put the buyer into a one-source purchasing situation, which would have its disadvantages. The manufacturers, however, have licensed other vendors to also sell their disks, so that disks are available from several sources.

Not all of the disk space is usable for image storage, as some of it contains formatting data. The disk is formatted before images are recorded so that it is evenly divided with pie-shaped segments, called *sectors*, which make up part of the image address. Disk byte capacity varies between manufacturers.

The life span of an optical disk is estimated to be 100 years after it has been recorded, but only about five years before it is recorded. This means that a partially filled disk may not be suitable for additional recording after it is five years old, even though it may still be read. The life span is not of great importance since the disk can be duplicated



to a new disk at any time to restart the life cycle; however, cost and time factors must be considered. What is more important than disk quality in long-term retention is the ability to display the image as years go by and current technology makes the old obsolete.

**Types of Optical Disks.** There are three basic types of optical disks: the write-once disk, known as *WORM*, meaning *write once read many times* disk; the *rewritable*, (sometimes called the erasable or magneto-optic (MO), disk; and the *CD-ROM*. WORM disks are used most often in document imaging systems because documents provide evidence and should not be altered. With a WORM system, the laser beam permanently encodes the image using pits or bubbles to write the image.

However, if the document images are not used for evidentiary purposes, rewritable disks could be used and reused. The rewritable disk uses *magneto-optics technology*. A laser light and a magnetic field change the polarity of the bits (0's to 1's and 1's to 0's), which alters or deletes the previously recorded image. In addition to document images, the rewritable disk is also used as a substitute for computer magnetic data storage. Rewritable disks require a drive designed specifically for rewritable disks.

The third type of disk, CD-ROM, was until recently only created in a lab outside the using office. This disk is used as a publishing medium for catalogs, directories, and similar reference books. It is mastered and reproduced in large quantities and is a *read-only memory* (ROM) disk. The disk is "read only" because it is not suitable for recording, since it is already permanently written on. The CD-ROM cannot use a WORM disk drive. It must have a separate disk drive, especially designed for the CD-ROM. CD-ROM is usually not part of the document imaging system and normally is not used for images, but rather for computer databases. When the ROM disk is created in-house, using a mastering recorder, a disk referred to as *CD-recordable* (CD-R) is used. The CD-ROM and CD-R can share the same disk drive. This in-house method is generally consid-

#### Bytes per Page (B)

$$\begin{aligned}
 B &= \frac{(H \times R) \times (W \times R)}{8 \text{ (bits)}} \times \frac{1}{C} \\
 &= \frac{(11 \times 200) \times (8.5 \times 200)}{8} \times \frac{1}{10} \\
 &= \frac{2200 \times 1700}{80} \\
 &= 46,750 \text{ bytes (46.7 kilobytes)}
 \end{aligned}$$

#### Pages per Disk (T)

$$\begin{aligned}
 T &= \frac{D}{B} \\
 &= \frac{10,200,000,000}{46,750} \\
 &= 218,000 \text{ pages}
 \end{aligned}$$

#### Symbols

B	= Bytes per page
H	= Height of document
R	= Resolution
W	= Width of document
C	= Compression ratio
T	= Total pages
D	= Disk capacity

#### Factors

Disk size	12 in., 10.2 gigabytes
Page size	8 1/2 x 11 in.
Compression ratio	10:1
Resolution	200 dpi

FIGURE 11.5 Calculation of Bytes per Page and Pages per Disk

ered economically feasible when the total distribution per disk is less than 40. Even without distribution, however, it can be convenient and economical for such procedures as tape backup and archiving.

**Sizes of Optical Disks.** Optical disks come in various sizes. The WORM disks are available in



single- or double-sided 3.5-inch, 5.25-inch, 12-inch, and 14-inch sizes. The rewritable disks come in 3.5 inches and 5.25 inches, and CD-ROM and CD-R disks have a diameter of 4.75 inches. Although areal densities are usually expressed in bits per inch, records managers are usually interested in pages per disk. Expressed in average 400-word, 8 1/2- by 11-inch, black and white pages, with 200 dpi resolution and a 10:1 compression ratio, a 12-inch WORM disk, double-sided, will have a capacity of approximately 200,000 pages. This can vary depending on the compression and other factors. See Figure 11.5 to understand how to make these calculations.

### Disk Drives

An optical disk system may contain one or more disk drives, which contain the read-write laser head and the laser beam used to record or read digitized images on the disk. The drive or drives are interfaced with a SCSI to the control processor, and data are transferred from the scanner through the processor to the controller for the disk drive. The disk is inserted into the drive, either manually or robotically if a jukebox (autochanger) is used. The disk rotates at various speeds, around 3,000 rpm, depending on the design of the drive, as the laser beam reads or writes on the disk from above. A head crash, which in magnetic technology can destroy all data, is not likely with an optical disk system, since the laser beam permits the laser head to be located at a relatively far distance from the medium. WORM drives, CD-ROM drives, and rewritable disk drives all require separate, specially designed drives, and a separate drive is required for each size disk. Multiple drives may be used with a system. Also, there are multifunctional drives which accept either MO or WORM disks.

The specification sheets for WORM (or, for that matter, all) disk drives are very technical and generally are used to compare the features of various manufacturers when purchasing. They include such speed items as *data transfer rate*, *disk access*

*time*, and *seek time*. Other specifications are *media tolerance*, which affects data reliability with older previously recorded disks, *error corrections* affecting data loss due to dust or static electricity, and finally *estimated drive life*. However useful these specifications are in deciding between various drives, the main consideration is compatibility with disks in use.

### MONITORS

Monitors are an important part of the equipment configuration in a document imaging system. It is possible to use a VGA monitor such as is used in the typical PC system, but the screen will probably not be large enough, clear enough, and fast enough to *optimize* the benefits of the imaging system. After all, the end product of the imaging system is the image of the document that appears on the monitor, and so it may be a false economy to compromise the quality and size of that image. The monitor is an important tool, and it is only good business to provide workers with the best tools available at a cost consistent with their productivity. One can estimate that the five-year cost of a knowledge worker who will be using the monitor is approximately \$150,000. If we increase the productivity of the worker by only 1 percent, we have gained more than is needed to pay for the difference between a marginally and a fully satisfactory monitor.

### Size

Image monitors need to be larger than the typical PC monitor. A minimum size for the full-time worker is 19 inches measured diagonally across the screen. This size screen will display side by side (full page) 8 1/2- by 14-inch images at about a 25 percent reduction in size, thus eliminating the need to scroll or zoom. The ability to scroll or zoom at times is an asset, but the price in productivity is a degree of distraction and speed every time it is done. However, it should be kept in mind that while the overall page images fit on a 19-inch



screen, they are reduced in size, including the characters. Thus, an 8-point character may be just large enough to be viewed without eye strain at the reduced size. If the characters on the original are so small that reducing them 25 percent would make them difficult to read, it may be necessary to display full-size images, side by side. In this case, a monitor would have to measure 24 inches diagonally, but a 21-inch screen might provide a satisfactory compromise. Thus, in quality monitors, we see that there are basically three sizes for imaging—19, 21, and 24 inches. It follows then, that it is necessary to know the physical characteristics of the documents that will be scanned and displayed in the system before selecting a monitor.

### Resolution

Just as resolution was involved in scanners, it is also involved in the display devices. Remember that the typical resolution for an imaged document is 200 dpi. Most imaging monitors have a screen resolution of 1,600 dots (pixels) across and 1,200 dots vertically (1,600 × 1,200). On a 19-inch screen, this is equivalent to a density of 120 dpi.

If the bit-mapped document image is also 120 dpi, there is a perfect fit, enough room on the screen for all of the dots being displayed. If the scanned image is 200 dpi, some of the dots for the display will have to be eliminated. This takes time and degrades the image to some degree. So it can be seen that the resolution of the monitor screen should be compatible with that of the scanned image, for the fastest and best image. If that 19-inch monitor had a resolution of 2,048 by 1,538 (screen size of 13.65 by 10.25 inches), the dot density (image resolution) would be raised to 150 dots per inch.

One might ask, Why bother scanning at a 200 dpi resolution when the monitor will only display (actually, this is a high-resolution screen) 150 dpi. The answer is that a 200-dpi image scan matches many printers that have the capability of printing at the 200-dpi resolution.

### Refresh Rate

Another factor in high resolution monitors is the *refresh rate*. According to *Imaging* magazine,<sup>2</sup> "Refresh rate is how often the monitor redraws the screen. It is measured in cycles per second (Hz). You need 75 Hz. Anything lower than 75 hz has noticeable flicker—The image seems to waver—which causes eye fatigue." This factor should be shown on equipment specifications.

### Color Monitors

Color monitors should only be used in imaging if there is a true need for them. For example, if an insurance company were required to maintain a color photo in the claim file, it would be necessary to have not only a color scanner, but also a color monitor. For imaging, a monochrome monitor is preferable because of clarity and faster refresh rates.<sup>3</sup>

### Image Display Controllers

The image display controller, located in the computer, is an internal electronic board that controls all of the display functions, but primarily screen image display, clarity, and speed. In regard to clarity it should have as a minimum the ability to generate a resolution of 1,600 by 1,200. The controller may also do other things, but not all controllers do all of the potential functions, as they vary in design and costs. Some of the monitor functions controlled are compression and decompression, image rotation, refresh rates, gray scale, and windows acceleration. Some monitors are priced to include the controller, but a specific controller can be purchased to meet individual needs.

### PRINTERS

Printing the electronic images back onto paper may seem to be paradoxical, but it really is not, if used properly. For example, a customer has asked for a copy of the warranty on the machine that





FIGURE 11.6 Laser Printer  
(Courtesy of Fujitsu Computer Products)

was just purchased. The warranty file has been imaged on optical disk, so it is necessary to make a copy of the electronic image on paper to provide the customer with the document requested. To do this, the document is recalled on the screen and the Print command on the PC is pressed, causing the printer to produce a paper copy. The clarity and print speed achieved depends to a great extent on the type and model of printer used and the resolution of the scanned image. There are two basic types of printers in use today for imaging—the laser printer and the inkjet printer—both of which are also used for data output printing from the PC and word processor (see Figure 11.6).

Of the two types of printers, the laser printer produces the highest-quality output but is also the most expensive, even though the price differential

seems to be decreasing. In selecting a printer, one should consider the system's needs.

**Paper size:** What size paper prints will the system require?

**Scale:** Will the image need to be reduced or enlarged?

**Speed:** How fast will it print?

**Resolution:** What is the required clarity (300 dpi or more)?

**Paper load:** What is the required capacity of the input hopper?

**Quantity:** Will the printer be centralized or desktop?

**Compatibility:** How will the printer interface with the computer?

Users of the electronic imaging system should be encouraged to make paper prints judiciously and to avoid the re-creation of another paper convenience file. However, there are times when a print will have to be made just so that the document can be changed or annotated, rescanned, and indexed back into the system.

## JUKEBOXES

Jukeboxes are also known, more formally, as *autochangers*, *automated disk libraries*, or *optical disk changers*. The jukebox gets its name from the coin-operated record players of the 1940s and 1950s. The musical jukebox would robotically pick a record selected by the listener and place it in position for the recording needle head to begin playing. When the music was finished, the jukebox would put the record back on the shelf. A customer could select one record or several, depending upon how many coins were inserted into the machine. Mechanically, the optical disk changer does almost the same thing with the optical disk.

The jukebox is used with a single user who has many disks or on a network of users of the same library. In contrast with a standalone disk drive, where the user is prompted by the monitor to select a numbered disk, and insert it into the



drive slot, the jukebox selects the disk robotically and places it in the drive, positioned so as to rotate under the laser head, where the controller will direct it to be read or to record. One or more disk drives are located inside the jukebox, where the disk is protected from dust or other particles that may interfere with reading or writing the disks.

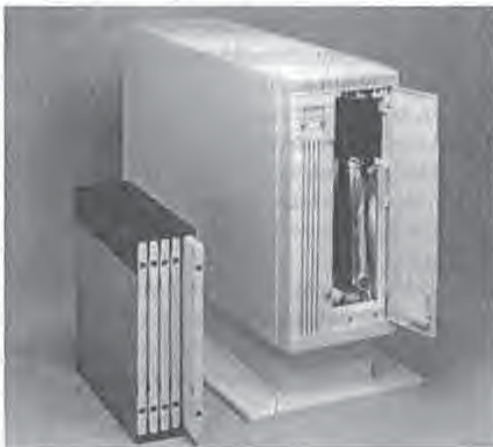
Jukeboxes are configured in many ways. Basically, WORM-type units accept 5.25-inch or 12-inch double-sided optical disks with a disk capacity from 5 to 100 cartridges. Other types and models are made for rewritable disks, and at least one, the Eastman Kodak Automated Disk Library, has a 60-disk capacity, handles both write-once and rewritable 5.25-inch disks simultaneously, and it is compact. Another manufacturer advertises that it will configure a jukebox in any size up to 1,020 disks and several drives. In addition, Hitachi, a leading manufacturer, has an expansion unit that will increase the capacity of its unit from 64 to 144 disks. So it is apparent that if there is not a suitable off-the-shelf unit, one can be custom-fitted for a special need. The LMS LF 4500 Rapid Changer holds 5 cartridges in a magazine and reads both sides of a disk simultaneously, giving a remarkably fast search. This compact drive has a total capacity of 28 gigabytes (see Figure 11.7). The jukebox, through its controller, knows what

disk to select and place in a drive, but also files the disk in the most convenient rack, so as to optimize travel time to and from the laser head.

Without jukebox capabilities, the electronic imaging system remains semiautomatic despite its sophistication, in that the manual insertion of a disk restricts its usefulness in work flow techniques, in networking, and in speed of retrievals. So it follows that the jukebox enhances the efficiency of electronic imaging systems tremendously, but it also adds substantial costs which must be justified.

A jukebox with a capacity of 64 twelve-inch cartridges will hold up to 448 gigabytes of near-line storage, or approximately 12 million pages of document images. This is the equivalent of 750 full letter-size four-drawer file cabinets. This kind of compacted storage is amazing in itself, but it should be kept in mind that every one of the images stored in the jukebox has to be scanned and indexed in some way. This quantity of material would require over 2,300 personhours of scanning at a relatively high-rated speed of 72 pages per minute, which in real world time would probably double. (See Figure 11.8 for calculations.) So justification of a system design must look not only at the costs and benefits of retrieval but also at the costs of image capture and storage so as to achieve the optimum balance between costs and benefits.

**FIGURE 11.7** Rapid Changer  
(Courtesy of Phillips LMS)



#### WORKSTATIONS, SYSTEMS, AND SOFTWARE

The computer drives the imaging system. It not only processes the binary bit stream used to record and retrieve the image, it controls the functions of the scanner, the disk drive, the jukebox, the monitor, magnetic storage, and the printer, as well as performs indexing retrieval and other software functions. In the earlier years of electronic imaging, the mainframe computer was sometimes used as the central processing unit in an enterprise-wide system, but today the trend is to process the data with the PC, which is now much more powerful than it was even five years ago, or with a mid-range computer. Depending on the configu-



**Jukebox Capacity in Pages**

$$\begin{aligned}
 \text{Pages per jukebox} &= \text{pages per disk} \times \text{jukebox disk capacity} \\
 &= 218,000 \times 50 \\
 &= 10,900,000 \text{ pages}
 \end{aligned}$$

**Disk Requirements per Project**

$$\begin{aligned}
 \text{Total Disks Required} &= \frac{\text{total pages in project}}{\text{pages per disk}} \\
 &= \frac{10,900,000}{218,000} \\
 &= 50 \text{ disks}
 \end{aligned}$$

**FIGURE 11.8** Calculation of Jukebox Capacity

ration used, the PC may act as a separate external server, or it may act as the central control computer for the entire system. As a central control computer, it manages all of the actions of the various components. Software, such as IBM ImagePlus, is also required.

Each workstation, whether standalone or on a network, will have a PC, with keyboard and monitor, that will enable the user to retrieve and to view images and data. Other functions may also be performed.

There are basically two types of electronic document imaging systems, as stated previously. One type is an electronic file system, and the other type is a distributed image processing system.

The *electronic file system* is a counterpart to the microfilm-based computer-assisted retrieval (CAR) system. With this type of electronic system, paper documents are scanned in random order, indexed and recorded on an optical disk in binary format, and retrieved and displayed on a computer monitor, utilizing a computerized database. The basic function of the system is to index a document, file a document, retrieve a document, and complete the cycle by re-filing it, all electronically.

The hardware for this type of system is relatively uncomplicated and may be purchased as a

turnkey system, ready to plug in (see Figure 11.9). The major components of this type of system would be a PC with a magnetic hard drive, a high-resolution monitor, a keyboard, a scanner, a printer, and a 5.25-inch WORM disk drive. In addition, applications and operating software programs are required and would be provided by the vendor of a complete standalone turnkey system.

This type of system could also be purchased with off-the-shelf components, even with some components already in the office of the new user, such as a PC, keyboard, and monitor, upgraded by the installation of additional boards. Software could also be purchased or developed. However, all of this integration requires considerable technical knowledge, as all of the components and software must be fully compatible. Even so, using computers and monitors that are already available in the office is an avenue of cost reduction that can be discussed with the integrator or vendor of the new system.

**The Single-Station System**

The *single-station electronic file system* is most often used when the operator is the prime user of the system rather than a facilitator or information provider to another user. This does not mean that the operator is the only user or that there is only





**FIGURE 11.9** Single Turnkey Workstation  
(Courtesy of Minolta Corporation)

one user. Rather, it may be that a department or work group has multiple users who use the system on a "help-yourself" basis, such as in a library. Often, this type of use results when only a small amount of information is needed or only one or two pages are required. In such a case, the access and read time is very limited. Usually, a paper print is made of the needed pages, and the person returns with the print to his or her desk to complete work on the document. The access and read time, plus travel time in such a case, represents only a small portion of the total time devoted to the transaction. If access and read time is so frequent or becomes so lengthy that too much time is wasted, or too much distraction incurred, other alternatives may be required. One of these alternative ways could be to have a central file operator make the searches and print and deliver the documents to the requestor, who probably made the request by phone. This operator would also be the key operator, whose duties would include scanning, data entry indexing, and possible receptionist duties. The final alternative would be to consider installing a network of workstations that would provide a workstation to everyone who

needed access to the files. A network permits each of many workstations on the network to operate as though it were the only workstation; it greatly expands the usefulness of the technology.

### Networks

*Networks* are a group of devices (nodes), such as workstations, that are linked together with various types of cables, such as fiber optic, coaxial, or even telephone lines, so that they can interact and communicate with one another. Networks are classified first by the size of the area that they serve. A network covering the smallest area, such as an office, an office building, or a group of buildings, is known as a local area network (*LAN*). The next largest type is a metropolitan area network (*MAN*), which serves an entire city. Finally, a wide area network (*WAN*) serves a whole country or even more. Our discussion here will focus on LANs.

Networks are further classified as being either *central* or *distributed*. A central network is controlled by the central computer, to which all the nodes are linked and which controls all aspects of the process. This central computer is



known as the *server*, and the workstations, as *clients*. The client will, so to speak, ask the server to provide access to its peripherals such as jukeboxes or printers, but the server does not process any data or application. A central network is well suited for a situation where there is heavy communication between the server and the nodes and very little between the peripheral nodes. A major problem with this type of network is that a failure of the server will shut down the entire system. The distributed network avoids this problem.

Distributed networks are controlled equally by each workstation on the network and allow workstations to have equal access to all nodes on it, such as to the database on the storage processor or other peripherals. This links all of the nodes to one communication line and is useful for high-volume uniform use between the nodes. The failure of one workstation will not disable the entire system as is the case with a central system.

#### Computer-Output-to-Laser-Disk (COLD)

COLD (computer-output-to-laser-disk) is an all-electronic equivalent to COM, which captures on film the output of the computer report. With a COM system, users are provided with inexpensive film copies (normally microfiche) of the computer reports, with each microfiche containing up to 270 pages of data, and the images are viewed using a microfilm reader. COLD, however, is quite different. The computer report is generated and sent to the controller of an optical disk drive and jukebox, where the ASCII data are recorded on the optical disk. From the jukebox, the report could, if required by the user, be sent to a printer or to a work station, to be viewed on a VGA monitor. To do this, a network is required, and the report is accessed in much the same manner as a bit-mapped image would be accessed. Access security for the system is provided by the mainframe software. Hardware, software, and media for an enterprise-wide COLD system can be quite expensive and must be integrated with existing software, hardware, and networks. A viable option available to most organizations is to use a

service bureau for COLD services. This requires very little if any capital expenditure for jukeboxes as the service bureau has these in its shop, which can be accessed via high-speed data links. The same service bureaus can also provide document image service. See Figure 11.10, which illustrates how one service bureau operates optical disk imaging and COLD systems. This diagram is also applicable to an in-house EIM network.

#### Work Flow

With such high-speed networking technology, it is now possible to integrate the imaging system into document flow and data processing systems while maintaining a highly efficient document-based information system. Not only has networking made file-sharing practical, it has made it possible to integrate data processing and word processing into the same workstation. A closer examination of the work flow system in the following scenario will help to understand how all of this technology fits together.

#### THE ACCOUNTS PAYABLE SCENARIO

Every workday, thousands of invoices and requests for payment come into the central mail room from the U.S. Postal Service, via a lock box delivery service. Since all invoices are addressed to the post office box, no further sorting is required. Included with most invoices are delivery receipts or copies of purchase orders. There is very little uniformity in the size of the documents. The bags of mail are delivered unopened to the accounting department, where envelopes are opened and the contents automatically sequenced-stamped by the scanner and entered into the index. This is done so that we can locate original documents by sequence number order, without sorting, if the documents need to be retrieved.

The documents are scanned at 200 dpi, using a sheetfed scanner. At this point, the images, temporarily stored on magnetic disk, can be displayed on the high-resolution monitor at the input station and checked for clarity. If necessary, poor-quality



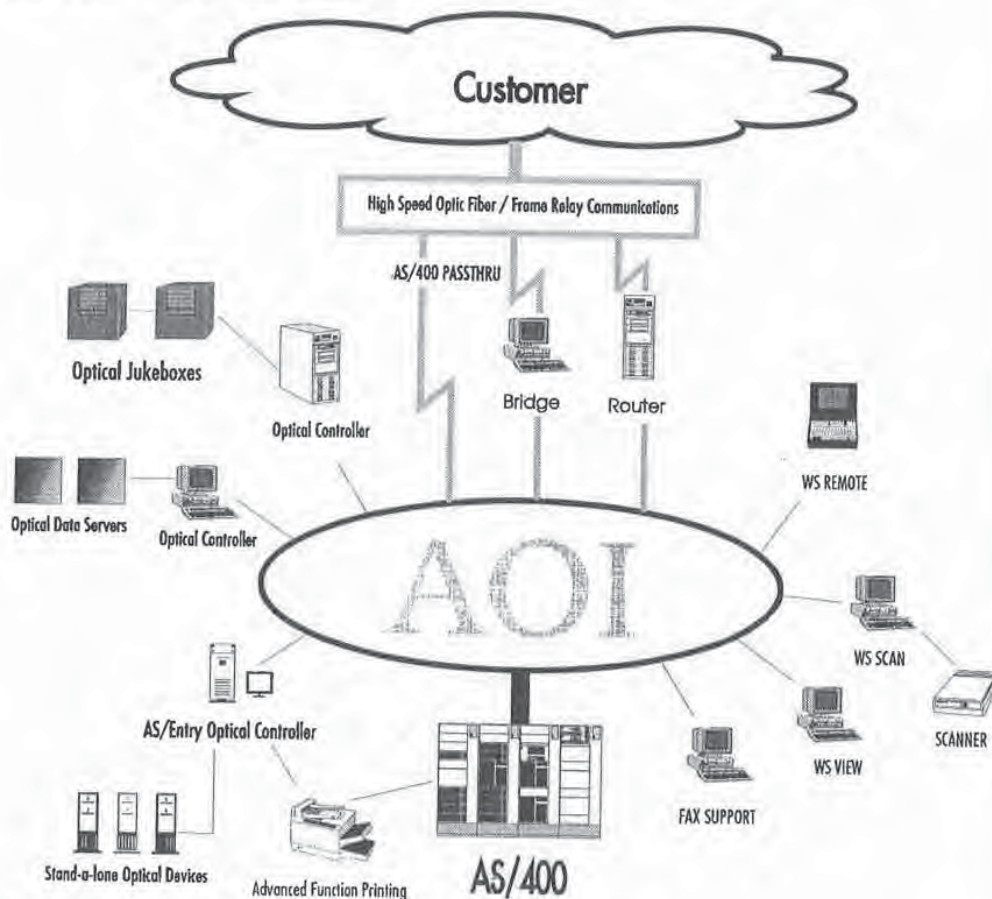


FIGURE 11.10 Computer-Output-to-Laser-Disk (COLD) Laser Access  
(Courtesy of Advanced Optical Imaging, Inc.)

images may be enhanced, and significant data, such as the purchase order number, invoice number, and vendor code, may be keyed into the system. These are put into an electronic file folder so that related documents are kept together. It should be noted that there is no duplication of data entry. From this point on, any one of the documents can be retrieved electronically at any of the workstations.

Once the document image has been recorded on the optical disk and its disk address entered into the index, the image is sent to the check-

writing station, where it is held in an electronic inbasket (a buffer) until one of ten clerks is ready to process it. This routing is done automatically, but there can be a manual override, should there be a need to send a document to another workstation, for perhaps some exception work. Our invoice is displayed on the screen as soon as the previous invoice is finished. The check-writing station's PC is interfaced with the mainframe computer's accounts payable system, and all data are entered into the system using the high-resolution imaging monitor with windows.



The mainframe computer generates the check, which is attached to a voucher that explains the payment to the payee while providing a record of payment on optical disk for the paying company. The check is mailed.

If there is some exception to the invoice as it is being processed, the invoice is routed to the exception clerk. The exception clerk reviews the electronic file folder. If there is a correction to be made or if payment is not in order, the clerk will either telephone the supplier or, using an imaging screen, windows, and word processing software, write a letter to the supplier or to the purchasing department. If the letter is mailed out, it is printed on a laser printer, which is part of the workstation. If the letter is addressed to the purchasing department, which is a part of the LAN, it is sent electronically. If the letter must be retained after being read, it is scanned into the system as part of the file folder.

In this system, the two exception clerks also respond to telephone requests and letters from vendors or other parties who might have some question or complaint about correct or prompt payment. The electronic file system is particularly useful on these occasions, as the clerk can easily call up on the screen the appropriate file with no delay, answer the question, or even enter the invoice into the system for payment if required.

## HYBRID SYSTEMS

*Hybrid systems*, as used here, refers to a sharing of technology between micrographic systems and electronic imaging systems. In almost all instances it involves an inroad by EIM into micrographic imaging systems and often a complementary micrographic response.

Most hybrid technology is possible because microfilm images in almost any format can be scanned and digitized to create a bit-map image from the analog microfilm image just as paper documents are scanned. Hence it is practical with existing technology to read paper to optical or magnetic disk, creating a bit-map image, and to read the disk to display an image on film just as it

would be on a monitor screen or on paper through a printer.

Some of the applications of hybrid systems which will be discussed here are scan-on-demand micrographic to EIM conversions, aperture card and CAD applications, COM image output, and image transmission systems.

## Scan-on-Demand Conversions

Hybrid systems are used in backlog conversions of micrographic systems to EIM systems. To avoid the expense of converting all micrographic records in a system, *scan-on-demand* techniques are used, that is, the backlog is scanned only as needed. Specifically designed multimedia micrographic scanners make it feasible to scan microfilm records into the EIM system quickly and easily. This may require the scanning of almost any micrographic microform such as roll film, jackets, and aperture cards, so multimedia capability is required. (See Figure 11.11.)

## Aperture Card Applications

Aperture cards remain a viable part of engineering documentation in conjunction with electronic scanners and *CAD* (*computer-aided design*) systems. Today not only can the film image in the aperture card be scanned in order to be electronically displayed, but the aperture card can also be the recipient of a CAD-created image written directly on the dry silver film in the card which is instantly processed for viewing or printing using a thermal technology. In addition it is easier and faster to scan the image of a large drawing mounted in an aperture card, than it is to scan the original document with a large-document scanner; thus the aperture card becomes an intermediary in the imaging process.

## COM Image Output

Ordinarily, COM recorders record only digital ASCII data and do not bit-map analog images. However, recognizing a need to record both ana-





**FIGURE 11.11** Hybrid Film and Optical Disk Workstation  
(Courtesy of Minolta Corporation)

log and digital information and the need to move information to and from film, Anacomp, the leading manufacturer of COM recorders, has added a bit-map function to its top-of-the-line Datagraphix XFP 2000 COM Recorder (see Figure 11.12).

This technology is being used at the Army Personnel Center in St. Louis, Missouri, where personnel records previously recorded as analog images on updatable microfiche are being scanned and bit-mapped from the updatable film into the existing optical disk-based electronic image system. With this system, the COM recorder can output, on microfiche, bit-mapped images of the updatable film in addition to images scanned currently onto disk from paper documents. As the need arises, the microfiche copies of service records are provided to former service members or other government agencies.

#### **Microfilm Image Transmission**

Hybrid systems may utilize microfilm and magnetic and optical disks in the same imaging sys-

tem, such as with image transmission systems. Image transmission systems have been marketed for almost ten years and are still used successfully as a hybrid system. Bell and Howell displayed such a system at the 1993 AIIM equipment show. This demonstration illustrated how the Ministry of Revenue in Quebec, Canada, successfully uses a combination optical disk and CAR microfilm system. One of the largest imaging systems in North America, this organization had been using 16-mm cartridge-loaded microfilm CAR systems for some time. The microfilm cartridges are loaded into any one of eight microfilm jukeboxes, each containing 1.8 million microfilm images. The jukebox robotically selects a cartridge of microfilm, locates the correct image, scans (bit-maps) it, and in less than 10 seconds, transmits the electronic bit-mapped image to the requestor at one of the workstations on the LAN. This same network, however, is shared with other files of the Ministry, which are recorded on optical disk using an optical disk jukebox. Both the optical disk image and the microfilm image are displayed utilizing the





**FIGURE 11.12** Computer Output to Microfilm (COM) Recorder  
(Courtesy of Anacom)

same electronic image display monitors on the network. The system is effective and fast and provides random access for both optical disk and microfilm-based electronic images.

#### Other Hybrid Uses

Another method of marrying film to a bit-mapped electronic image uses a microfilm rotary camera to simultaneously image on film and disks. This provides an analog image on microfilm, and an exact duplicate bit-mapped image on optical or magnetic disk (see Figure 11.13). This type of hybrid operation is done for one or more possible reasons, such as using the microfilm image as a backup or protection copy, using the optical disk

image during the high-activity, short-retention period of a record, and using the film for the long-retention, low-reference period to save on media cost or for legal reasons.

#### THE FUTURE OF MICROFILM

The new electronic imaging technology is an exciting and challenging tool for the records manager. It provides the records manager with the ability to manage documents in ways that were not possible or feasible ten years ago. Some have thought that the optical disk would render micrographics obsolete, just as it was thought that television would make the radio obsolete. Yet we know, the radio is stronger than ever, judging by





**FIGURE 11.13** Film and Scan Hybrid Rotary Camera  
(Courtesy of Eastman Kodak Co.)

the number of licensed stations. What happened in the radio broadcast field is that new segments of the market were carved out and formats became more flexible. Such will probably be the case in the micrographics industry, but only time will tell. For right now, micrographic products and services are still being purchased at a healthy rate, although market share of the micrographics imaging industry appears to be somewhat flat. According to AIIM's 1992 annual report,<sup>4</sup> based on revenues, micrographics captured 47 percent of the imaging market and electronic imaging captured 53 percent. This reflected a 4 percent drop in micrographics and a 4 percent gain in electronic imaging. This report also reflected a steady gain of electronic imaging, similar to that gained in the year reported, over the previous three years. So the trend is to electronic imaging, but continued and slower growth for micrographics is also predicted in this same report.

From a technological and practical viewpoint, the hybrid systems, which are largely transitional, already show signs of permanency: a case of finding a niche. Also, film in itself has a permanence

which appeals to many on the basis of legal and archival needs as well as backup for disaster planning. Film is an information medium that can be read with the human eye, and its usefulness is not dependent on the availability of specific hardware and software 10 or 15 years down the road. Joan Mariani Andrew, of Bell and Howell, said in a recent article, "Industry analysts are quick to dismiss microfilm technology as low tech and out of date in the '90s, but the very fact that it is low tech is what makes it the only storage medium other than paper that is immune to obsolescence. Today and in the foreseeable future, microfilm remains the best alternative for long-term record retention, inexpensive storage and digital backup."<sup>5</sup>

Finally, there are many organizations that have high-volume microfilm systems with considerable hardware investment and which are quite satisfied with that level of technology. After all, it is entirely reasonable to ask why one needs 2-second retrieval, if 2-minute or 2-hour retrieval would suffice. It is a case of designing a system that meets current and foreseeable needs at a reasonable cost consistent with those needs.



## SUMMARY

Optical disk systems are descendants of other electronic imaging systems, such as videotape and videodisks. Although technologies of micrographics and electronic imaging are quite different, they have similarities.

A workstation for an electronic imaging system is made up of the following components: scanner, disk drive, display monitor, personal computer, printer, and jukebox. A single-station standalone system is usually purchased as a turnkey system but could be configured from off-the-shelf products.

A group of workstations linked together is called a network. The three types of networks are the local area network (LAN), metropolitan area network (MAN), and wide area network (WAN). Most networks are LANs serving a limited geographical area, such as an office or group of office buildings. Networks are also known as distributed networks and central networks. All workstations on a distributed network have the same controls as their peer workstations. A central network is controlled primarily by a central processor. A process to record computer output on an optical disk is called COLD (computer-output-to-laser-disk). This is an alternative to microfilm-based COM.

Workflow is a network system designed to process electronic images of documents from entry into the office to final disposition or output. It interfaces with mainframe hardware and software and applications systems, including word processing.

Hybrid systems are imaging systems that interact with both micrographic technology and optical disk technology. This includes the scanning of micrographic images for COM microfiche output; scanning for input to optical disk systems; simultaneous filming and scanning of documents; image transmission of micrographic images; scanning of microfilm images for conversion purposes; scanning of microfilm in aperture cards; and creation of film images directly from CAD vector

systems. While electronic imaging will probably dominate the document imaging field in the future, micrographics will continue to play an important, but more limited, role.

## QUESTIONS FOR DISCUSSION

1. Explain how electronic imaging systems and micrographic systems are similar.
2. Explain why instant access after imaging is valuable.
3. Explain the major difference in sheetfed and flatbed scanners. When would each most likely be used?
4. What is bit-mapping?
5. Explain what is meant by compression and why the operator does not select the compression ratio.
6. What factors are involved in selecting a scanner for purchase?
7. Why are magnetic disks used in optical disk systems?
8. Describe the types and sizes of optical disks.
9. What is the purpose of a disk drive and a disk drive controller?
10. In a typical document imaging system, should a monochrome or a color monitor be selected? Why?
11. What size monitor screen is required to view two letter-size documents side by side at full size?
12. Describe the function of a jukebox.
13. What is meant by *turnkey* and *standalone* systems?
14. What is the purpose of networks?
15. What is a LAN?
16. If a COLD system is installed, what system might it replace?



17. Describe a work flow system.
18. What is a hybrid system?
19. What are some of the reasons that some organizations simultaneously microfilm and scan documents?
20. Name some reasons microfilm will probably continue to be used in addition to electronic imaging systems

#### PROJECTS

1. Read three magazine articles that deal with electronic imaging systems in specific organizations. Summarize each article in approximately 200 words.
2. Read an article or opinion on the legality of optical disk systems, and summarize it in 500 to 700 words.
3. Prepare a chart of manufacturers and sellers of optical disks and disk drives, arranged by product description.

#### CASE PROBLEM

You work for a large chemical company that has 350,000 technical reports on product development. Each report consists of an average of 15 pages. These files are complete with no additions or changes made to them after a report number is assigned. As products are discontinued, the reports are removed from the active files and stored in a records center for a period of 50 years to protect against product liability lawsuits. The reports are indexed by the product report number, the product group number, generic product name, and ingredient data. The indexes are all computer-

ized and are accessed by an on-line display monitor in the file area and in the using offices.

The files are accessed daily by some 30 engineers, chemists, and customer service representatives. All of these personnel are located in the same building—one group on the tenth floor, the others on the eighth floor—and the files are on the tenth floor. Approximately 350 searches are made daily. To protect the record, only photocopies are sent to the requestor; the actual report never leaves the file area. The central file area consists of 400 letter-size file drawers in 80 five-drawer file cabinets. The area uses 640 square feet to house the records and employs one supervisor, three reference clerks, and six librarians who extract and index. Data entry is done in the data processing department from the index sheets prepared by the librarians.

The company wants to reduce space, save the time and cost of making copies, and reduce the wait time for service. From an economic and technical viewpoint, would you recommend a CAR microfilm transmission system or an optical disk system? Explain your reasons.

#### NOTES

1. Don M. Avendon, *Introduction to Electronic Imaging*, (Silver Spring, Maryland: Association for Information and Image Management, 1992), p. 23.
2. Marta Neilson, "Imaging's Biggest Myth: We Can Skimp on the Monitors," *Imaging*, Vol. 2, No. 8, August 1993.
3. Ibid.
4. *Information and Image Management: The State of the Industry 1992* (Silver Spring, Maryland: Association for Information and Image Management), pp. 5-6.
5. Joan Mariani Andrew, "Counterpoint," *Imaging World*, Vol. 2, June-July 1993, p. 21.



## Chapter 12

### *Imaging Systems Evaluation and Systems Design*

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#### Learning Objectives

1. To identify the advantages and limitations of using micrographic or electronic imaging in the management of an organization's records.
  2. To learn what information should be gathered in a fact-finding survey and why such a survey is necessary.
  3. To learn how to determine the economic and technical feasibility of using an imaging system in the management of records.
  4. To analyze information gathered in an imaging system feasibility study in order to enable the effective design of an appropriate system.
  5. To make plans to implement an effective and cost-justified imaging system.
- 

#### THE VALUE OF A SYSTEMS DESIGN STUDY

If microfilm or optical disk were the definitive answer to every records management problem, the records manager would be concerned with only one question—"Can our documents be imaged?"—in his or her effort to devise better systems. However, imaging is not the answer to every problem, so the manager must ask two questions—"Can our documents be imaged, and should they be imaged?" The answer to the first question is "yes" in almost all cases. The answer to the second question is more complicated. To answer the second question, an intimate knowledge of micrographics and electronic imaging is required, in addition to a general knowledge of computer science. This means that one must understand the advantages, capabilities, limitations, costs, and savings potential of imaging.

The old adage *If it's not broke, don't fix it* generally applies to document-based information

systems as it does to many areas. However, this does not imply that we cannot look for more effective ways of accomplishing our tasks. The systems design study improves the chances that imaging will be used judiciously. "Judicious use" simply means that the imaging system employed is used wisely to improve information systems at costs that are equal to or less than any other system *that will achieve satisfactory levels of efficiency*. In a study of the existing file system, all aspects of filing, interfiling, refiling, sorting, as well as quantities and volumes of documents and related clerical activity, must be examined, with an eye to improvement.

#### REASONS FOR THE STUDY

The systems design study can be triggered by various events. It can be part of a systematic



planned records analysis, perhaps emanating from the original records inventory. For example, the analysis may point to a problem, and the study can be made to determine if imaging will solve that problem. More frequently, however, systems design studies are prompted by obvious records problems, such as the volume and storage of records, which have resulted in increased labor costs and a backlog of work.

Sometimes the systems design study is used to evaluate an existing document imaging system to determine if it is performing as planned and to see if the predicted cost factors materialized. The development of new technologies may warrant taking a second look at existing systems to see if they can be improved. Previous studies which may have found imaging systems not to be feasible may be re-evaluated, especially when new technologies appear on the market. Occasionally, an organization will unwisely decide on a universal imaging program and order studies to "substantiate" the economic benefits. Studies performed under such circumstances are never impartial.

When department managers are confronted with this situation, they frequently turn to the records manager for assistance. The astute records manager will consider all alternatives, including microfilm, optical disk, and other media as well as improved hard copy systems.

Generally, the imaging systems study consists of four phases:

1. Data collection and analysis
2. Problem definition and system design
3. Cost justification and approval
4. Implementation

Although the records manager attempts to approach the study in a rather structured manner, some aspects of the study will from time to time have to be modified because of the circumstances of the project. In these situations, one needs to keep the objectives of the study in mind and let common sense and reason reign. The following descriptions of the various phases should be un-

derstood as guides and considerations in the process.

#### DATA COLLECTION AND ANALYSIS

The records manager will most often begin the study with a fact-finding survey. The data collected in the fact-finding survey is almost identical to the data collected in any records analysis, including the initial records inventory, and hence a records management approach to an imaging study is not only logical but avoids duplication of effort. Frequently, a specially designed form is used to collect the data, but that is not always necessary. If the records inventory form is still fairly current, most of the information for the imaging systems fact-finding form can be obtained from it. The fact-finding form provides a simple guide in conducting the imaging study and cost analysis. The method of data collection used for the imaging system is the same as that used in the inventory, as was discussed in Chapter 2. The reasons certain information is collected and the impact that information may have on an imaging system are discussed in this chapter. Like the records inventory form, a separate form is prepared for each records series being studied. Using the inventory form shown in Figure 12.1a and b as a guide in this discussion, we can learn how and why certain information is collected in phase one of the study. We will also learn to appreciate the value of the information obtained in the initial records inventory. We will begin the analysis with Section II.

#### Section II: General Description, Purpose, and Use of Record Series

A thorough understanding of the purpose of the organization's records and records series is necessary so that, in solving one problem, others are not created. This knowledge provides the basic foundation for the study.

Understanding the function, purpose, and



flow of a record means knowing why a record came into existence, who created it, when it was created, as well as how it is used in a particular office. Furthermore, it means knowing what records or sources of information are used to create this record and also the information provided or records created from this record. Every records series serves a particular function in an organization, and if that function happens to be vital, the supporting records may also be vital. If so, imaging should be considered as a method of vital records protection.

**Procedural Considerations.** First of all, it is very important to determine the *point of stability* in the flow of the document. Stability is the point at which no more annotations or additions are made to the document or file. This is important because conventional microfilm cannot be annotated and WORM optical disk imaging systems can only be annotated by making a copy, annotating the copy, and re-scanning the new document into the system. If the point of stability is established early, microfilming can simply be postponed until the file is closed. A flowchart may be helpful in this analysis, such as is provided in Section XIII of the form in Figure 12.1b.

In microfilm systems, *additions* to the file may require splicing or using jackets or other insertable or updatable microforms. However, in electronic imaging there is the advantage of adding documents easily at any time and bringing them together into a file for display without splicing or special microforms.

If the document or file is subject to annotation *throughout its normal life*, such as is the case with some engineering drawings and other types of records, the analyst must consider alternate methods of annotation, perhaps using a microform that has a paper area for annotating, such as an aperture card, or by reimaging. When this type of problem is discovered in the study, it should prompt the analyst to investigate the technical possibilities of the potential systems or microforms before proceeding further.

**User Considerations.** In studying the flow of the document, user considerations are also important to a successful system. For example, if the record is an architectural plan, viewed at the construction site as well as at the office, paper prints will be required, and equipment will be required to make the print. At the construction site, the lack of electrical power, the weather, the bright sun, and normal convenience would probably make a portable viewer and screen image impractical for the engineer. On the other hand, the construction site office might be equipped to use aperture cards and perhaps produce prints on site if needed.

In some operations, telephone inquiries are answered using microfilm or optical disk as the information source. In this type of use, speed is normally an important factor. A few moments waiting on the telephone can seem interminable to a caller, so even a slight delay can have an adverse effect on customer relations. In such a situation it is important not only to know how fast the current system is, but more importantly, to provide adequate service if the speed is satisfactory. It should be noted that the "satisfactory levels of efficiency" discussed earlier in this chapter may require a much higher level of technology and thus may have a cost that far exceeds the present cost. When this occurs, the required level of efficiency should be closely examined to determine if it is really necessary. Usually, the retrieval speed requirement is established by the person responsible for providing the service, usually the manager or the manager's manager. Ultimately, it is a matter of managerial judgment tempered by costs.

User considerations also include ergonomics, that is, those aspects that deal with the physical problems people experience with the machine. At the simplest level, the analyst needs to be concerned with employee comfort and physical welfare. An uncomfortable position, eye strain, long reaches, and insufficient work surface can all impede efficiency.

The number of people who use these records and where they are located is very important. We need to know, for example, if ten employees each



INVENTORY AND RECORD SERIES SUMMARY									
1 INVENTORIED BY AND DATE DLD 4-30-79		8 SCHEDULE NO 10-101		9 RETENTION PERIOD 6 Years					
2 RECORD TITLE Drafts Issued, Voucher Copies		3 STORAGE CODE A		4 100 CODE C-4b					
5 RECORD ALSO KNOWN AS Computer Drafts		6 CONTACT W. A. Proov		7 APPROVED BY [Signature]					
10 DEPARTMENT Disbursements Accounting		11 SECTION Payables							
GENERAL DESCRIPTION, PURPOSE AND USE OF RECORD SERIES									
Copy of voucher portion of draft issued for payment of bill or invoice for equipment, supplies or services. File is maintained for reference, proof of payment, audits and as a supporting record for journal entries.									
RETENTION REQUIREMENTS									
COMPANY		REGULATORY		OFFICE		STORAGE			
1 year		6 years		4500 lin inch		2400 pages		2700	
5 years				3/77 - 3/78		per day		1/74 - 12/78	
6 years								per year	
REFERENCES									
QUANTITY	TIME SPAN	INDEX TIME	SEARCH TIME	REFER TIME					
30	day	.5 min	1 min	5 min					
STORAGE									
5	day	.5 min	6 min	5 min					
EQUIPMENT IN OFFICE									
DESCRIPTION		QUANTITY	FLOOR SPACE	INVENTORY NUMBER					
7 Shelf TSF		8	50 sq ft	1-8					
5 dr ltr File Cabinet		5	35 sq ft	9-13					
FILE SUPPLIES UTILIZED									
DESCRIPTION		QUANTITY							
File folders, end tab ltr size		30,000							
File folders, 5th cut ltr size		1,500							
INPUT/OUTPUT RECORDS									
1 RECORDS USED TO CREATE THIS RECORD (FROM R 1-10)		2 RECORDS CREATED FROM THIS RECORD (UNDER R 1-10)							
Contracts		Journal Entry							
Leases		Budget Recaps							
Purchase Orders		Tax Returns							
DUPLICATE AND ALTERNATE SOURCES									
1 DUPLICATE SERIES		2 ALTERNATE SERIES							
(10-010)		Canc & Pd Drafts							
Microfilm copy		Purchase Orders							
FILE CONTENT AND DISTRIBUTION									
DOCUMENT #1		DOCUMENT #2		DOCUMENT #3		DOCUMENT #4			
Original Receipt or Invoice		Payment authoriza.		Request For Payment		Voucher Copy of Draft			
MEDIA CODE		C/MS		F2-4/MS		PO-3/MS			
FORM NUMBER		N/A		23000		35010			
JOB NUMBER		N/A		N/A		AT022			
SIZE		Various		8 1/2 x 11		8 1/2 x 8			
COLOR		White		White		Green			
% OF VOLUME		25%		25%		25%			
LOCATION OF DUPLICATE COMPONENT DOCUMENTS (Show Office)		Payables (2)		Payables (2)		Payables			
		Purchasing		Auth Dept (1)		Vendor			
		Vendor							

\* MEDIA CODE: C - Carbon, F - Form, PM - Pencil Material, PD - Pencil, MC - Microfilm-CDM, MS - Microfilm-Sid  
1 - Typed, 2 - Handwritten, 3 - Horizontal, 4 - Vertical, 5 - Both Sides, 6 - Loose, 7 - Fastened

FIGURE 12.1 (a) Inventory and Record Series Summary—Page 1; (b) Inventory and Record Series Summary—Page 2



## FUNCTIONAL INFORMATION

PAGE 2 OF 2

Drafts Issued, Voucher Copies		RETENTION SCHEDULE NUMBER 10-101		
ORIGINATION AND PURPOSE OF COMPONENT DOCUMENTS				
DOCUMENT # 1		DOCUMENT # 2		
A. DOCUMENT NAME Original Bill or Invoice B. ORIGINATED BY Vendor C. NO. PARTS 3 D. ORIGINAL PURPOSE OF DOCUMENT To present charges for materials, equipment or services purchased. E. HOW USED IN THIS OFFICE Proof of payment, audit support for Gen Ledger Entry		A. DOCUMENT NAME Payment Authorization B. ORIGINATED BY Dept Authorizing Purchase C. NO. PARTS 2 D. ORIGINAL PURPOSE OF DOCUMENT Shows departmental authority to pay bill or invoice. E. HOW USED IN THIS OFFICE Initiate payment of bill or invoice and provide proof of authority.		
DOCUMENT # 3		DOCUMENT # 4		
A. DOCUMENT NAME Request for Payment B. ORIGINATED BY Payables Section C. NO. PARTS 1 D. ORIGINAL PURPOSE OF DOCUMENT Provides authority and information necessary for Data Processing to generate draft and voucher. E. HOW USED IN THIS OFFICE Provides proof of authority granted DP		A. DOCUMENT NAME Voucher Copy, Draft Issued B. ORIGINATED BY Data Processing C. NO. PARTS 2 D. ORIGINAL PURPOSE OF DOCUMENT Shows purpose of draft and provides accounting information necessary to close and adjust payables. E. HOW USED IN THIS OFFICE Proof of payment, audit purposes and support for Gen Ledger Entry.		
PROCESSING AND TRANSMITTING OF COMPONENT DOCUMENTS				
INTERVIEW QUESTIONS	DOCUMENT # 1	DOCUMENT # 2	DOCUMENT # 3	DOCUMENT # 4
Triggered By	PO or Del Receipt	Receipt of Service or Material	Receipt of Payment Auth	Request for Payment
Received From (Office)	Vendor	Using Dept	Using Dept	Data Processing
Parts Received (Quantity)	2	1	1	2
Process Begins (When)	within 24 hours	within 24 hours	within 24 hours	within 24 hours
Records Referenced in Processing	PO & Agreements	PO & Del Ticket	Original Bill Payment Auth	Request for Payment
Additions & Deletions Made (Portion of Time)	30 days	None	None	6 months
Additions/Deletions Consult G/	Adj for O/C	---	None	Adj for O/C
Sent From This Office To	Purchasing		Data Processing	Draft and voucher to vendor
Returned To This Office	After verification		After Draft Issued	
Copy/Original Retained in Office	Original	Original	Original	Copy & Film
Processing Period This Office	10 days	10 days	10 days	2 days
Reference Period This Office	1 year	1 year	1 year	3 years
REMARKS				
Note - Component 4 Process - Comp 1-2-3 are sent to DP and are returned from DP with voucher as complete file.				



make three searches per day or if one employee makes thirty searches per day. So the narrative should tell us how the work is distributed. Distribution of work will be discussed further in Section V.

### Section III: Retention and Legality

Managers sometimes expect imaging systems to solve paper-volume problems when they should first take a close look at retention schedules. If, for example, records are being retained five years when one year would suffice, paper volume will be five times greater than it should be; the documents should be destroyed rather than imaged. In analyzing costs of paper systems and imaging systems, always keep in mind the retention factor because that time frame governs the whole costing procedure. If records are retained for five years, the cost attributed to their maintenance covers a five-year period also. Retention periods have a direct bearing on feasibility. Very short retention periods (days, weeks, or months) seldom warrant imaging. Long retention periods, such as those for archival records, often justify micrographic imaging. And high labor costs for imaging can be more easily justified for long-term records than for short-lived ones.

In a study of the legal aspects of retention, the possible legal restrictions on microfilm imaging and electronic imaging should also be considered. Today most, if not all, courts will admit microfilm as evidence, and common opinion today is that optical disk-based document images will be accepted on the same basis as microfilm. Most, if not all, states have a Uniform Photographic Copies of Business and Public Records as Evidence act, or rules of evidence, and many have at this time modified some of those acts to specifically allow electronic images. A recent study and report indicated that the specific term *optical disk* or similar terms have appeared in at least 80 statutes of 19 states within the last five years, indicating a trend.<sup>1</sup> An AIIM task force<sup>2</sup> recommended among other things:

*If you change your laws at this time, avoid listing specific technologies. Instead permit the use of any technology that accurately reproduces the original or the equivalent.*

But these legal factors do not in themselves preclude the obligation to retain the original document for a period of time. Some states still require keeping hard copy records, even though they are already imaged on film or other media. Some documents by their very nature require that the original be maintained, such as titles and deeds, negotiable instruments, and anything else that denotes ownership rights that can be transferred. Research will reveal if a dual set of records is required, and if it is, the cost can be anticipated. Nevertheless, even in these cases the original hard copies can be stored, and the document image used to full advantage in the office. The legal discussion here is meant to alert the analyst to investigate these matters and is not in any sense a comprehensive basis for legal or retention analysis.

At this point, we can add the distinction between office retention and records center storage. This is important because the cost for retrieval and refile vary greatly between the two. This will be studied more when *references* are analyzed.

### Section IV: Volume

Accurate estimates of volume are extremely important. By sampling, measuring, and counting we can obtain fairly accurate estimates of the total pages received daily and yearly and the total records on hand both in the office and in storage. A 10 percent underestimate on large volumes can cause serious budget and timetable crises, so it is best to include a reasonable margin for error. In either micrographic applications or in EIM applications, volume relates to imaging and imaging involves a manual operation which translates into time frames and labor costs. Also, if a microimage transmission system is contemplated, or an EIM system is anticipated, volume relates to on-line or



near-line storage capacity requirements. For example, for relatively low volumes and moderate retrieval rates, an off-line storage rack for film cartridges will suffice, as the cartridge can be manually selected and inserted into the reader. In the same manner, an off-line optical disk can be selected and placed into the drive for display in the monitor. Such is the case with many standalone systems.

However, higher volumes and retrieval rates may indicate the need for on-line or near-line retrieval. This requires the use of a jukebox to robotically select a disk or cartridge for scanning and display on a monitor. Furthermore, the volume of records that must be stored near-line will also dictate the size of the jukebox required. All of this adds to cost estimates and server power.

**Backfile.** One of the most important decisions that must be made before the feasibility report can be finalized is what to do with the backfile, if there is one. In many systems, the backfile consists of those records that are retained beyond their peak access period. For example, Section XIII of the data collection form may indicate that the records reach a stability point within 30 days of creation or receipt, and reference activity may decline after about 60 days in the life cycle. Total retention, however, may be six years. If we calculate the total number of records in this series, we realize that we have almost 3,000 cubic feet of records that will not be part of our new system, unless these old records are also imaged. This group of records is called *backlog* or *backfile*. In the instance cited here, the 3000 cubic feet of records would be phased out over a period of perhaps five years, at a rate of about 500 cubic feet per year. It probably would not be cost-justified to image this series. Indeed, their disposal date might arrive before the backlog imaging was completed.

If the backfile records had a long retention period, perhaps 50 or 100 years, we might consider imaging those records, if the reference rate justified it. Here again, it is necessary to base this judgment on costs or other intangible needs. Quite

often, the backfile records are not imaged, but rather are stored in a well-organized records center and retrieved as needed. As a compromise to this, sometimes a *scan-on-demand conversion* or *film-on-demand conversion* is performed. This means that the backfile is not imaged unless the record is retrieved for some reason and it is anticipated that there will be future retrievals. If, however, the records are, for example, real estate records and if one is retrieved from storage because the property is sold, it would appear likely that the record would not be retrieved again. Hence, there would be no need to image it after the life cycle ended, other than for historical purposes.

The backfile on permanent records is usually imaged because the records are archival and hence imaging is economically justified. Film- or scan-on-demand is not ordinarily a viable option in this case, unless current records are more active. Often, in this situation, the records have completely stabilized when they are received in the central file area. Indeed, it is not too unusual to say that the older records are more likely to have reference activity than the new.

## Section V: References

Often the uninformed think of microfilm or optical disk as a dead storage medium, whereas the opposite is true. Imaging systems, although perhaps suitable for archival storage, are most beneficial when used frequently. A well-designed imaging system saves retrieval and filing time. Since the amount of time saved is proportionate to the time spent searching for or filing information, the highly active system offers greater *opportunities* for saving than the infrequently used system. The word *opportunities* is emphasized, because the right system, equipment, and medium must be coordinated and used to realize the inherent potential of the system.

In analyzing reference activity, it is important to distinguish among reference time, retrieval (search) time, and index time. In this study, reference time is the length of time that the document



is in use once it is retrieved. It is important to determine if screen-viewing is sufficient or if paper prints are necessary, in the event of long reference times. Retrieval time is the length of time that is required to move to the file location, withdraw the file, and provide it to the user. Sometimes retrieval is self-service and information is obtained in the file area, thus eliminating the travel time associated with a refile operation. Refiling is essentially the reverse of the filing process. Index time is the time normally spent in locating the name or number under which the document is filed. Filing and interfiling are rather similar and usually require about the same time when done in an office environment, where expansion of the files is not involved. Hence they can be treated as a group. Refiling can be somewhat faster than filing because often the place in the file is marked by a charge-out card, which facilitates the refile.

A stopwatch timing is generally not necessary to determine current file activity time. Ordinarily, a file activity time sample can be made of groups of documents, perhaps numbering 50 each. These can be timed to determine the average time, if this batch size is typical of the batches of the current process. However, if the current method has a travel-to-retrieve time ratio of 5 to 1, or even 1 to 1, travel time to and from the file is probably excessive, and the paper system should be reexamined to improve that ratio by improved batching systems.

The purpose of knowing current retrieval time requirements is to be able to show, in a mathematical cost analysis, potential savings or increased costs comparing a new system to an existing one. This information will also indicate if the present system meets the time norms of the units it serves.

The distribution of the searches among the workers in the office must also be noted and considered. For example, if 30 searches per hour are divided equally among three workers, we may require three workstations, or we may have one centrally located, depending on various demands put upon the system. Perhaps the searches are divided equally among three people, but the

searches are made centrally by one person, again, providing another alternative to consider. Document traffic could have an impact on the speed of the server, the jukebox, and cache. Peak load times should be noted so that proper EIM components are selected and the peaks provided for.

## Section VI: Sorting and Filing Arrangement

In the sample, the records are first arranged by the year—that is, all 1994 drafts are filed together—and secondly, within that year, they are filed by draft number. Also, in this case the index from vendor name to draft number is created automatically on the computer as the drafts are generated. Obtaining this information from observation and from the present users is very helpful, as the information will very likely provide the index parameters that will be used on any new system, or it may point out a weakness that could be improved.

In this section also is a place to record the number of personhours spent in pre-file sorting, that is, preliminary sorting to facilitate final filing. In the sample, there is no pre-file sorting. However, sometimes considerable personhours are expended in this type of sort, and if so, this information alerts the analyst to a great potential for labor reduction. This can be accomplished by random filing using a computer-generated index, bar code, or OCR scanning.

## Section VII: Equipment in Office

This section lists all the filing equipment used in the office to house the current records which are being proposed and evaluated for imaging. This information is used to determine the value of the equipment if it is released and used elsewhere, sold, or scrapped. It also provides us with the amount of floor space that would be freed if an imaging system were justified and installed.

The value of space is low compared to the value of labor. Although a good imaging system will save more money in labor than in space, space is still a prominent factor. Rental on office space can range from an extremely low \$10 per



square foot per year to \$50 per square foot per year, and even more in specialized circumstances. Records maintained in file cabinets require about one square foot of space for each cubic foot of records. If, for example, an office area rented for \$20 per year per square foot and it cost \$20 per cubic foot to image those records, the cost of imaging would be recovered in one year, if the records have a retention period that long or longer.

There are instances, though, when using the square-foot value is not entirely realistic. If the records must be retained in the office for reference and no space is available, the only alternatives, after proper retention considerations, are to move to larger quarters or to install an imaging system. In such a case, imaging is almost always far less costly, regardless of the current cost of floor space.

In calculating the amount of floor space saved through imaging, in addition to the equipment footprint, all necessary aisle space should also be included, unless it is a general purpose aisle that will be retained in any event. The value of space saved is figured by calculating the square footage and multiplying that by the rental factor established or estimated by the corporate financial officer.

The value of freed file equipment varies greatly and ultimately depends on a figure considered reasonable and real to management. Most often, the cost-avoidance approach is used. This approach assigns a value that represents an expenditure avoided by future purchases of equipment. In other words, it assigns the current used-equipment retail price. It is unrealistic to assign a wholesale used-equipment value, unless the equipment will actually be sold to a dealer. New equipment values can be used, if the equipment takes the place of new equipment purchases.

#### Section VIII: File Supplies Utilized

File folders cost money, and this section will tell us how much is spent annually for file folders. It will also tell us something about the system and will enable us to perhaps determine if the current

system is operating efficiently. File folders are normally not used if all files contain only one document. This system, however, contains at least four documents per folder. When one considers the relatively low search rate, it appears that perhaps file folders, with their attendant annual set-up expense and folder cost, are not warranted. Even so, computer-assisted retrieval (CAR) techniques could provide electronic file folders. If microfilm was being considered as an alternative system, the number of file folders may be an indicator of the number of jackets or aperture cards that might be required.

#### Section IX: Input/Output Records

In this section are listed those records or documents that are used to create this record or the records or documents that emanate from this record. Few records are an island unto themselves, and related records must be considered in designing a new system. These records may indeed become a part of the proposed system and may require a detailed study on each record involved.

#### Section X: Duplicate and Alternate Sources

Duplicate records are "carbon copies," so to speak, of the original. Duplicates that have been made unique by the addition of annotations are not actually duplicates, but often can be considered such since one copy at least provides duplicate information. Alternate sources of information are records that contain duplicate information, but not necessarily in duplicate format. Like those records listed in Section IX, these records are related to the main record studied and must be considered in their entirety in designing any new system.

#### Section XI: File Content and Distribution

This section not only describes the file, but also describes the documents that make up this file. This particular sample in Figure 12.1 shows that the record consists of four single-page documents and describes how those pages are distributed and



their characteristics. If the record consists of only one page each, only one column in Section XI need be completed. These data help us to evaluate the technical feasibility of imaging and allow us to calculate imaging estimates and time frames. Not all of the lines of Section XI are pertinent to imaging, so if a line is not applicable it should be ignored. Size and color of the documents are almost always pertinent to imaging. The percent of volume for a particular column means that the information shown applies to the percent of the total documents in the system. For example, we can estimate that documents No. 3 and 4 combined represent 50 percent of the total documents in the system.

#### **Section XII: Origination and Purpose of Component Documents**

This section allows us to describe in narrative fashion who originates the documents, why they were created, and how they are used now. The document numbers shown in Section XII correspond to those document numbers shown in the previous section. This information permits us first to establish a retention period if that is not already done. Secondly, it helps the analyst to make an intelligent judgment in designing a new system and in communicating with the proprietary office personnel. By understanding the records thoroughly, it is possible to look at all related records and their processing and to design a comprehensive image flow system. For example, one may find that duplicate files that are presently retained could be eliminated by a network imaging system. Other systems improvements may be possible; however, present system elements must be understood first.

#### **Section XIII: Processing and Transmitting of Component Documents**

This section is a type of flowchart describing the life cycle of each of the four documents that make up the file; it is used in conjunction with Section XII. A large or more standard flowchart can also

be used, if preferred. Indeed, an entirely different form can be used for this survey, if it seems more convenient. One important factor that can be ascertained from this flowchart is the point of stability, previously mentioned. Other facts in the chart suggest other questions, such as why does it take up to 24 hours to begin processing? Is this desirable? Would a shorter time be preferable? Would a shorter processing time provide tangible benefit? These questions are pursued because we have the technology to answer them, if it is economically feasible.

In tracing the flow of the record from beginning to end, one needs to take note of facts such as are illustrated in this text. We make notes of potential shortcuts, problems identified, and tentative solutions, all of which must be evaluated or tested before the study is complete. Thus, completion of the data collection gives the analyst a full picture of the present system and permits an imaging design from the bottom up.

#### **PROBLEM DEFINITION AND SYSTEMS DESIGN**

The process of analyzing the data actually begins as the data are collected. The experienced analyst sees problem areas and visualizes potential solutions as the problems are encountered. Problems will generally fall into one or more common areas. These areas are as follows:

- Loss of records
- Slow retrieval
- Excessive volume of records
- Lack of space
- Excessive waiting for access to records
- Excessive personhours spent in filing and retrieval
- Delays in processing
- Loss of records in process

The analyst talks and listens to the user who may not know the solution, but generally has a fair idea of the problem. These suggestions de-



serve first attention, and analysis of the data collected will not only confirm the problem but indicate where it occurs.

If the present system is complex, a flowchart of the activities associated with the records should be made. The flowchart is then studied to see if any actions can be eliminated through an imaging system. For example, a separate stamping action could be combined with an automatic endorsing device on a rotary camera or scanner. Or perhaps a sorting or index reference could be eliminated by using a random imaging and retrieval system of either the microfilm or optical disk variety.

The size and form of the record, the reference data, indexing methods, volume, and turnaround requirements will all give some indication of the type of system needed and will provide the initial direction for the balance of the study.

At this point, a knowledge of micrographic and electronic imaging technology becomes necessary. In reviewing the present system, the analyst calls upon available technology to simplify, increase speed, or otherwise improve operations and to solve problems. Certain situations are key indicators for using a particular type of system. For example, a series of sequentially numbered but independent documents lends itself to roll film applications. Files or groups of related documents indicate the possible need to use a unitized microform, such as a jacket or microfiche, or a standalone imaging system. Maps or plans which are larger than B size are usually well suited to microfilm 35-mm aperture cards, although they could be scanned and digitized and viewed on a display monitor also.

Random input and computer-assisted retrieval can be used to eliminate labor costs in systems that require extensive sorting. CAR may also be indicated for systems that require complex indexing. In summary, after zeroing in on a potential system, the analyst should feel that the proposed system is both technically and economically feasible, that it will solve the problems, and that it will be acceptable to the user. The acceptability factor is dependent on establishing a close relationship with the user in the development phase.

Sometimes a particular indicator may appear to be suitable to more than one type of system, and both will need to be evaluated. Very likely, there are other factors involved that will also contribute to the selection criteria. This is particularly so in situations where electronic imaging systems are being considered or preferred.

### THE FLOWCHART

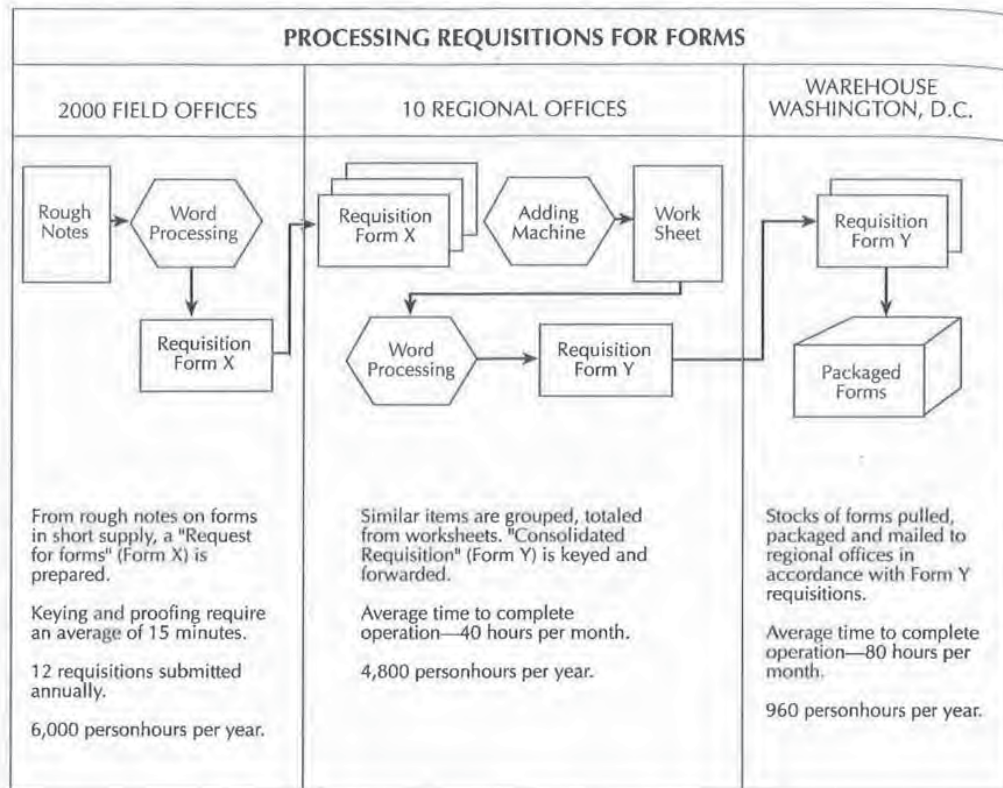
Once a tentative system is selected and all the previously mentioned factors in the survey are carefully considered, a flowchart for the *proposed system* should be developed to aid in understanding and to ensure that all facets have been covered. The flowchart can be of any style, and symbols can be adapted to imaging requirements. See Figure 12.2 as a simple example of a flowchart. Usually, there is a master chart in which a number is given to each major function. A chart is then developed for each of the major functions and possible subfunctions. A brief narrative explaining the chart can accompany it.

### TESTING AND EVALUATION

Once a tentative system is decided upon, a sample of the records should be imaged as a test to determine costs and to work out procedures in detail. The first test should include a large enough sample to be representative of all documents that will be encountered in the normal course of work. The main purpose of the preliminary test is to evaluate the system chosen and the image quality and to obtain cost estimates. If the proposed system is a micrographic system, it is important to evaluate the microform chosen. The microform must meet the requirements in every way. For example, a system may be technically suitable, but if the microform chosen bottlenecks the flow, it is most likely not the proper medium to use. If it appears that the system is acceptable, a final test should be performed. If the system requires computer assistance, the program software and the applications program should be put in place.

In those situations where an EIM network





- The flowchart shows what jobs are being performed, where, how, and by whom.
- It identifies all documents, forms, and reports in a procedure.
- It identifies the equipment used and the output of the equipment.
- It records every action required to produce the final product.
- It provides statistical data such as volumes, personhour costs, and numbers of offices involved.

**FIGURE 12.2** Sample Flowchart  
 (Simplified Flowcharting, p. 1, General Services Administration, National Archives and Records Administration, Office of Record Management)

system is proposed and the configuration and software are contracted for through a systems integrator, this phase is performed by those specialists. If the mainframe computer is used as the host server or interfaces with a system server, the in-house

computer and systems personnel will also play a major role in planning and implementation.

The final test should be comprehensive enough to predict the full-scale effect. Actual use of the system chosen in the office under normal



working conditions parallel to the existing system is very helpful before investing in equipment. If that is not possible, visiting off-premise installations similar to the proposed installation would also be suggested. Micrographic equipment is usually available on a trial basis, and standalone electronic imaging systems may also be available on a demonstration basis. The records manager should play a major role in any EIM system development. EIM deals with document-based imaging systems, and document-based information systems are the responsibility of records management.

#### COST JUSTIFICATION AND APPROVAL

Almost every organization has a need to justify capital expenditures, and imaging systems can involve capital costs that are quite significant. All imaging systems have some common costs such as the cost of labor and image capture, the cost of image retrieval and display, and the costs of equipment, maintenance, and space. In any paper-based information system, we also have these comparable costs including space, equipment, supplies, and labor. Assigning costs to these factors is one task, but determining how to justify these costs is another matter.

#### What Is Cost Justification?

*Cost justification*, in its simplest form, consists of comparing the total costs of an existing system to the total costs of a proposed system. If the proposed method costs less than the existing, we could declare that the new system was justified and that there would be a *savings* of  $x$  number of dollars per year. For example, if the existing system is considered satisfactory, there is no reason to change it *unless* there is a monetary savings that would justify the expense and effort. Even if the existing system is not entirely satisfactory, this method of cost justification is still legitimate, as it

can show a savings while solving some problems or at the very least show that it will cost very little to solve these problems.

Sometimes, the problem that an office is experiencing is quite significant, and a major overhaul in the system *appears* to be necessary. Really serious problems must be addressed through either improving a hard copy system or through computerization or through improved imaging systems. In all of these cases it would still be beneficial to perform the imaging fact-finding survey. However, in place of just comparing the costs of one new system against an existing system, it is necessary not only to compare the costs of all potential systems but also to compare the effectiveness of the systems.

Early in this chapter, it was stated that the optimum system should provide information at costs that are equal to or less than any other system that will achieve satisfactory levels of efficiency. A proposed systems remedy might cost millions of dollars, simply because the *satisfactory levels of efficiency* are set very high, and perhaps even too high. Sometimes a high premium is paid to achieve a small percentage of the overall benefit. For example, in at least one instance, 80 percent of the benefits were achieved for only 20 percent of the total cost. To evaluate this, one needs to be able to identify the benefits, the source of the benefits, and the related costs and to decide if the costs are justified. How is this done? The records manager needs to compare the costs and the benefits. Sometimes the benefits, however, are soft or intangible benefits. In this case, we have at least identified the cost, so that a manager can make a decision as to whether the intangible benefit is worth the cost.

Establishing *satisfactory levels of efficiency* should be done with some degree of caution or with a caveat to require that all the system features be necessary or justified if costs are a concern. Occasionally, a system is a part of a larger corporate strategy, and the cost is de-emphasized in favor of appearance, speed, image, and timeliness, which are some of the intangibles discussed previously.



### Developing Cost Estimates

Developing cost estimates involves careful attention to small details as well as to large ones. A fraction of a cent may seem immaterial, but if multiplied by thousands or millions of times for each action, the total amount can become significant.

**Labor.** To accurately assess labor costs to record the images on either microfilm or optical disk, one must know actual production speed capabilities. For most accurate results there should be an on-site test under actual or simulated conditions.

Moreover, normal lost production time should not be ignored. If the test indicates an imaging rate of 3,000 documents per hour, the analyst would be wrong to assume that the operator will perform at this rate every minute of every hour of the workday. More than likely, a conscientious operator will perform work functions no more than 75 percent of the workday. The other 25 percent will be valid work time such as answering the phone, placing imaged paper documents on the shelf, attending meetings, fixing paper jams, dealing with machine failures, and so forth. Although work-measurement techniques can be used to improve the efficiency of the productive time, it is best to base the study costs upon factors that can normally be expected. If an organization has had experience with imaging productivity and has historical production statistics which include "non-productive time," these statistics may be used in lieu of a test.

One important facet of any imaging operation, microfilm or optical disk, is document preparation. The documents may be in folders, and the folder may or may not be properly indexed and indexing time as a result may go way over the budget. Pages may be fastened with staples, and staple removal alone may take as much time as the filming or scanning. Pages that are ragged, crumbled, or folded will have to be straightened. All of this contributes to increased labor costs and longer completion times. If *day-forward conversion* or *scan-on-demand conversion* can be used,

these problems can be eliminated by procedural changes.

**Material.** The cost of material is easier to estimate but should still be calculated cautiously. In microfilming, the most frequent factor overlooked is film waste. Film lead and trailer can account for 10 percent of a full reel of film. When less than full reels are used at one time, the percentage of waste could be much higher. Next, the amount of film needed should be estimated according to reduction ratios, document volume and size, and camera type. For example, 2,400 feet of paper documents carefully aligned in a long row and adjacent to one another would require 100 feet of microfilm if filmed at  $24\times$  reduction. This is so since a  $24\times$  reduction means that the film would be  $1/24$  the length of the documents being filmed. Of course, we need not lay out a hundred feet of documents to estimate film requirements. It can be done mathematically and easily. A simple nonmathematical method is to film a batch of documents and count the number of document images contained on a foot of film. This method includes the spacing between images and is very reliable for estimating total film footage required, based on page volume. Of course, camera spacings vary and can be adjusted. Tables and charts are available for general estimates. As a rule of thumb, a 100-foot roll of 16-mm film will contain about 2,800 images of letter-size documents filmed at  $24\times$  in comic mode. A 100-foot roll of 35-mm film will contain approximately 500 fixed-size frames if filmed on a large-size engineering planetary camera. On a planetary camera the same amount of film is used for each frame, regardless of the reduction. Other items such as reels, cartridges, labels, jackets, print paper, toner, splicing tape, clips, cards, and processing chemicals or service costs should be included in the estimate. Some of these items are costly, and others can be included as miscellaneous and simply added in bulk to each roll or batch.

In an electronic imaging system, the major supply items are the optical disks and cartridges, magnetic disks, and ink-jet cartridges or toner for



laser printers. The number of optical disks required depends on the number of images that will be stored on them. One should refer to the previous chapter to determine how to calculate the number of document images that can be stored on a particular size disk. One should also recall that the number of images that can be stored per inch is also determined by the resolution required and by the compression ratio. This requires, as in the case of microfilm, actual on-site tests, not only for imaging speed but also for image quality, compression, and image storage density. The number of disks not only relates directly to cost per disk, but is directly affected by a decision or requirement to image backfile documents. Fewer disks will be required initially if noncurrent records are stored in hard copy form. However, this decision is based on the number of searches made once current processing is complete.

**Equipment.** The third factor, the cost of equipment, can be assessed in various ways. Some organizations show it as a one-time cost; others ignore it, if this type of equipment is already on premises; and others prorate it over the equipment's expected lifetime. One needs to consult the organization's accountant as to how the equipment cost will be handled and do so accordingly in the costs summary. Because of the expense, equipment maintenance must not be overlooked. Annual service contracts give an accurate budget figure for this expense, including both labor and material. Service contracts frequently cost an annual 10 percent of the purchase price of the equipment. Equipment costs pertain to software and to all hardware, such as cameras, scanners, monitors, readers, printers, computers, jukeboxes, and storage racks. Sales taxes should also be included, and in some areas, there may also be a property tax of some sort, which should be included in annual costs.

Supervision and facilities costs may or may not be considered, depending on the circumstances. For example, if the project does not require incremental supervision expense, such expense is not included in the operations cost.

**Service Bureaus.** Service bureaus are often used when backfile conversions are deemed necessary for either optical disk systems or micrographic systems. However, backfile conversion is generally a costly approach and should be done only after careful study. The alternative is to retain the noncurrent records (backfile) in a manual access system, if the reference rate permits it. Service bureaus are also contracted to do day-to-day work, when turnaround and costs permit. Service bureaus are used for such reasons as lack of equipment, limited staff or limited space to perform the work, and a lack of experience. When service bureaus contract to do the work, they usually quote a price on a document basis rather than as a total job. So, it is still necessary to know exact volumes and other details obtained from the study, and it is also necessary to write job specifications. Materials, however, are usually included in the price quoted by the service bureau.

#### THE FEASIBILITY REPORT

The *feasibility report*, or needs assessment report, is often submitted at the same time as the final office test. In order to obtain an approval from upper management to install a multithousand-dollar or even multimillion-dollar system, a detailed report of feasibility should be prepared and submitted to management.

The report, in simple terms, is a before-and-after picture of the system. It should show the cost of the old system in terms of labor, space, materials, and equipment, and the cost of the proposed imaging system in the same terms. The cost of the proposed system should be appreciably less than the cost of the old system, if the level of system efficiency is the same. If the level of efficiency of the new system is much greater than that of the old system (and that new level is required), there may be an added cost.

The exact format of the report is largely a matter of the particular circumstances and company policy, but a suggested format follows:



- I. Executive summary
  - A. Purpose of study
  - B. Source of data
  - C. Recommendation and reasons
  - D. Brief description of proposed system
- II. Cost-comparison summary
  - A. Cost of old system
    - 1. Labor
    - 2. Space
    - 3. Materials
    - 4. Equipment
  - B. Cost of new system
    - 1. Labor
    - 2. Space
    - 3. Materials
    - 4. Equipment
  - C. Savings or cost on annual basis
- III. Details of cost
  - A. Old system
    - 1. Labor
    - 2. Space
    - 3. Materials
    - 4. Equipment
  - B. New System
    - 1. Labor
    - 2. Space
    - 3. Materials
    - 4. Equipment
- IV. Appendix and Charts

Figure 12.3 is a form that can be used both in writing the feasibility report and in developing and comparing costs. If it is used in the feasibility report, the Explanation or Reference columns are used to indicate an item number which refers to a detailed explanation in the appendix. In addition, this form can serve as a checklist to determine if all factors have been included.

#### THE REQUEST FOR PROPOSAL (RFP)

The *request for proposal* (RFP) is a document usually prepared by the purchasing department of an organization in cooperation with the using department and the systems analysts involved. The

RFP is sometimes referred to as a *bid request* or as a *request for quotation (RFQ)*. A feasibility report is usually prepared as a preliminary estimate prior to the preparation of a *request for proposal*, so that at least ballpark costs and equipment requirements are known before the proposal is requested.

However, the RFP does more than just ask for a price quotation. It describes for the prospective vendors and all of those in the approval chain the overall objectives of the system, that is, precisely *what* the system is supposed to do. It may also specify the type of system desired. The vendor is requested to respond by stating *how* it will be done, what is required to do it, and the cost. However, the vendor may need more specific information to respond to the request.

The type of information that is normally required is a description of the using organization, the current staff and location of operation, and a brief overview of the current methods. It should also provide an overview of how the proposed system is expected to work in the generic plan, while at the same time accepting alternate suggestions from the vendor.

Specific tasks that are anticipated and specifications of systems requirements, such as equipment, data entry, document entry, document description, imaging speed, retrieval speed, number of workstations, workflow requirements, location of network if applicable, and software and hardware integration if desired, should be described. If the system desired is turnkey, it should be so stated, or if the vendor is to provide backfile conversions, details should be furnished. All invited vendors should have equal opportunity for pre-award on-site visits and meetings.

In addition, timetables for submission of proposals and awarding of contracts and implementation, as well as the basis for award, should be clearly stated. Usually, the RFP will provide a tentative system, with an estimated cost, if one has been developed in-house, but alternate hardware, systems, and approaches are often invited. Vendor information should also be requested. This includes a recent financial statement, vendor history, client reference lists, and specific experience or product lines.



SYSTEM COMPARATIVE COST SUMMARY			
<input type="checkbox"/> Initial <input type="checkbox"/> Annual			
System A: _____			
System B: _____			
Cost Factors	System A	System B	Ref
LABOR			
Sorting, Pre-file, Pre-film			
Staple Removal and Prep			
Coding, Indexing, Data Entry			
Filing/Refiling			
Retrievals and Look Up			
Filming/Scanning			
Jacket/Aperture Card Loading			
Programming/Training			
MATERIALS			
Folders and Labels			
Film, Processing & Cartridges			
Optical Disks and Cartridges			
Jackets/Aperture Cards			
Print film			
EQUIPMENT & SPACE			
Maintenance			
Cameras/Scanners			
Readers/Monitors			
Computers/Drives/Software			
File Cabinets/Shelving			
Jukeboxes & Controllers			
Telecommunications			
Floor Space			
TOTAL SYSTEMS COSTS			

**FIGURE 12.3** Cost Comparison Summary  
 (Insurance Records Services, Inc., 9932 Parkway Drive, St. Louis, MO 63137, 800-882-3753)



### IMPLEMENTATION PLANNING

After the vendor selection has been made, all approvals acquired, the system design confirmed, and tests made, there is usually some lead time prior to delivery of hardware. This time can be used for planning for a smooth implementation. This implementation process consists of three phases: training, backfile conversions, and facility modifications and plans.

#### Training

The first step in training is to prepare a detailed procedures manual for the specific project involved. This serves two purposes. It codifies the procedures so that there will be complete uniform understanding of how the work should be accomplished. It describes equipment and supplies to be used, as well as all steps in the operation. The second step is to train the personnel who will actually be doing the work. Often, employees can be somewhat apprehensive about a new project and welcome an early introduction to the new equipment and procedures. If demonstration equipment is available, the employee can exercise hands-on practice in dry runs.

#### Backfile Conversions

Backfile conversion, if required, must be planned for in an organized way. If the analysis indicates that the records to be imaged should be retained, it is necessary to plan a method of storing the records in an inexpensive area, where they can be economically retrieved if necessary. Sometimes, it is less expensive to store the originals for a period of time than it is to check each document for clarity. In most cases, however, the originals may just be retained until a spot check is made, and in the case of microfilm, until processed.

Our analysis may have informed us that we have many documents fastened together with staples. These staples normally must be removed, and the removal may take as long as the imaging. Rather than have the imaging device tied up while

staples are removed and tears taped, it makes much better use of equipment to have preparation and imaging done simultaneously.

At this time, it is important to finalize just how indexing will be done and by whom. It may be done simultaneously by the automatic reading of a bar code or in other ways discussed in Chapter 11.

#### Facility Modification and Plans

When the imaging is done in work-flow processing, a special area is generally not required. In most backfile operations, however, a separate office area should be set aside that is comfortable and well lighted and away from distractions. It is important that the vendor provide exact electrical requirements, so that the electrical requirements can be installed prior to delivery of the equipment. There must be shelving for the records prior to filming or scanning and for temporary storage afterwards. Very likely, the documents will require security during nonwork hours, and so it is best to place the temporary storage in that secured area.

### EVALUATING COMPUTER OUTPUT SYSTEMS

Computer-output microfilm (COM) and computer-output-to-laser-disk (COLD) are the two methods used today to eliminate computer output to paper. COM and COLD technologies have been discussed in previous chapters. However, in this chapter the feasibility, or economic evaluation, of these methods is compared.

#### COM Systems

Although technological marvels, COM systems actually output ordinary microfilm. Therefore, the decision to use COM can be based on data similar to those gathered for a conventional microfilm study. But in addition, it is also necessary to know the cost of producing the identical information on paper using on-line or off-line high-speed laser printers. Ultimately, the cost of paper output versus film output, with attendant expenses, will be



compared and be a major factor in the evaluation process. Such costs may include:

1. Computer costs (allocated)
2. Print costs (allocated)
3. Number of copies needed
4. Paper and forms costs
5. Postage and distribution costs
6. Paper-handling costs

When the current computer and peripheral costs are known, they must be compared to producing and distributing the same number of copies using COM and microfilm readers or reader-printers. The cost of producing COM microfilm depends on several factors such as volume, type of microform, and whether the work is done on in-plant equipment or by an external service company. Estimated COM equipment and supply costs can be obtained from equipment manufacturers, or turnkey service costs may be obtained from service bureaus that may do the work on a contract basis. Organizations that produce high volumes of COM reports may find it advantageous to own and operate their own equipment, whereas lower-volume shops may find it advantageous to use service bureaus. Such a decision is generally based on an economic comparison and security and turnaround requirements.

In addition to costs previously mentioned, the COM recorder has the added advantage of recording a page of output on film, 10 to 20 times faster than a laser printer can print on paper. This speed can have strategic advantage. The use of COM complements normal data storage methods. Although, it is usually desirable to maintain data on disks on-line, it is a reasonable option to store that data on microfiche, rather than tape or disk, after its reference activity peaks.

Generally, where there is wide distribution of computer printouts, COM is feasible. The use of COM often results in an increase in the frequency and number of copies distributed simply because a wider or more frequent distribution of hard copy would have been too expensive. Caution, however, should be exercised to ensure that *unneeded* copies are not produced through COM. This in-

creased distribution can often improve customer service at a minimal cost, even though its use cannot realistically be classified as a savings. All savings are relative, but it is not unusual for a single COM application to save thousands of dollars per year.

Normally, the advantages of COM include a substantial reduction in paper costs. As an example, 4 by 6 microfiche at 42x contains the equivalent of 207 pages of 11- by 14-inch computer-printed paper. This represents an approximate cost, based on 1994 prices, of about \$1.25 in paper. The material cost for the original microfiche is about 20 cents and the copy about 5 cents. Thus COM microfiche represent only 5 to 20 percent of the cost of the paper that would have been used. The cost of mailing COM-generated microfiche as opposed to mailing the equivalent amount of paper is extremely low. In addition, microfiche saves space and is very easy to use.

### COLD Systems

COLD systems, however, do not use film, and hence do not require microfiche readers. Nor do they require any distribution time or costs, other than the network costs, which may already be available. A jukebox, with controller and server, may be required, as are optical disks. These items are not low-cost items by any means, and unless the networks and optical disk imaging systems are already in place, it may be difficult to justify the costs. However, COLD like COM can be produced through an outside service bureau. In such a case, no equipment other than ordinary computer display monitors is required. The service bureau has compatible jukeboxes, disk drives, controllers, and servers. Tapes or disks are delivered via telecommunications to the service bureau, and all retrievals are made on-line without human intervention. In any event, either COM or COLD is justified by the elimination of the costs, computer time, space, and paper associated with standard computer hard copy output. And so, the comparison is narrowed to actually comparing the costs and advantages of COLD and COM sys-



tems. In summary, a comparison of the costs of COLD and COM, both in-house and through service bureaus, appears to show that within a few

years COLD technology will replace microfiche, except for specialized or unique situations, or where an adequate network is not available.

## SUMMARY

An imaging system evaluation study has as its objective determining if documents should be imaged. Problems with an existing system, re-evaluation of existing systems, new technology, or even managerial edict may prompt a system evaluation.

Much of the information gathered to evaluate systems has already been collected in the records inventory form. Such a form can serve dual purposes and be used as a guide to analysis. Retention, protection, and volume; labor, equipment, and material costs; and document flow are all significant, in addition to color and condition of the documents themselves.

In defining problems, it is necessary to speak with users of the records. Typical problems are lack or cost of space, lack of speed, delays, lost records, and excessive labor costs in handling records. A simplified flowchart can also be useful in defining a problem and in understanding document flow. After a tentative decision is made on the type of system desired, test runs should be conducted, using time and motion methods. In some instances a pilot system may be installed on a smaller scale.

Cost justification normally involves comparing labor, equipment, space, and materials costs of the present system to those of a proposed system. Sometimes, the new system may cost more than the old and still be justified because the newer system specifies a higher level of efficiency. Feasibility studies indicate comparative costs and identify needs. A request for proposal is prepared by the purchasing department and is sent out to vendors with tentative system specifications, requesting prices and proposed methodology.

After the system has been approved, planning for implementation is finalized. This normally in-

cludes specific plans for training and for facility modifications. Training may include hands-on training on- or off-site for operators and others using the system. It also may involve writing job specifications for operators to ensure that consistency is maintained and that the work methods are universally understood. If a backfile conversion is required, specifics on staffing, staging, and tracking, as well as document preparation, must be finalized and specified in the project manual. If the new system is to run concurrently with the old for a period of time, provisions for maintaining order must be coordinated with all users.

Both COM and COLD are electronic methods to eliminate paper reports. The systems are normally justified by comparing their costs with the cost of printing, distributing, and storing paper output. COLD systems differ from COM systems in that COLD also eliminates the microfilm output and the related distribution costs. Most COLD systems use existing networks and computer display terminals. Unless service bureaus are used, COLD systems normally require a jukebox with drives, which can be relatively expensive. COM utilizes relatively inexpensive microfiche readers, and for this reason can sometimes be less expensive than an all-electronic process.

Service bureaus should be considered as an alternative to in-house imaging, whenever this is feasible, especially where equipment is expensive and volume relatively low.

## QUESTIONS FOR DISCUSSION

1. Explain what is meant by a *satisfactory level of efficiency*.



2. Name at least four events that might *trigger* an imaging systems study.
3. Why would it be unwise to presume that imaging is a cure-all solution?
4. List the four phases of the imaging study.
5. How is a fact-finding survey similar to the records inventory studied in Chapter 2?
6. Why would original documents such as titles, deeds, and negotiable instruments be retained in hard copy form?
7. Why is it important to understand the purpose and use of the record being studied?
8. How are additions to the file accomplished by electronic imaging, and how are they accomplished by micrographic systems?
9. How are annotations handled in a micrographic system and how are they handled in EIM?
10. Why is distribution of work important to consider in a document imaging study?
11. Why is it important to know the retention period early in the study?
12. How does the number of documents impact on the imaging study?
13. What is a backfile conversion, and what are alternate ways to handle it to reduce cost and save time?
14. Why are imaging systems best used in a highly active environment?
15. In an imaging system, is space conservation or labor conservation most important? Why?
16. What is the difference between a duplicate information source and an alternate information source?
17. What is meant by a *point of stability* in document flow, and what is the significance?
18. What problems are frequently found in analyzing document systems?
19. List at least four key indicators that often suggest what type of imaging system to use.
20. Why is a request for proposal prepared?
21. What is a cost justification in simple terms?
22. What is the difference between the request for proposal and the feasibility report?
23. What are the three phases of system implementation?
24. What is the essential difference between COM and COLD systems? In what ways are they similar?

#### PROJECTS

1. Review the form illustrated in Figure 12.1a and b and indicate for each block if the information is applicable to no imaging system (N), to an electronic imaging system (E), to a micrographic imaging system (M), or to both micrographic and electronic (ME) systems.
2. Read three magazine articles that deal with micrographic or electronic imaging systems in specific organizations. Summarize each article in approximately 200 words.
3. Write a 500- to 750-word report on electronic imaging systems. Base your report on at least three magazine articles, which you are to identify in a bibliography at the end of your report.
4. Write a 500-word article on the topic "How a Small Company Can Profit From Applying Imaging Technology to Its Records." The article should be suitable for publication in the monthly newsletter of a local chapter of the Association of Records Managers and Administrators or the Association for Information and Image Management.

#### CASE PROBLEM

The Andress Manufacturing Company has decided to make an imaging feasibility study. As the records manager for the organization, you have been given the responsibility. Identify in outline



form, the step-by-step procedures you would follow in developing a feasibility study.

*NOTES*

1. Insurance Records Services, Inc., 9932 Parkway Drive, St. Louis, Missouri 63137, 800-882-3753.

2. Association for Information and Image Management, *Task Force Report*, AIIM/92-114, Annex C. American National Standards Institute, *Technical Report for Information and Image Management: Performance Guideline for the Acceptance of Records Produced by Information Technology Systems, Part II*, ANSI/AIIM TR31-1993.



## Hewitt Associates

Hewitt Associates LLC is an international firm of consultants and actuaries specializing in the design, financing, communication, and administration of employee benefit and compensation programs. Hewitt Associates was founded in 1940 to render an impartial and unbiased consulting service to its clients.

In rendering outsourcing administrative services, Hewitt Associates offers participant services through the Benefits Center. A caller (participant) interacts with a Hewitt Associates representative who is trained in providing the information necessary to make informed decisions. Many of these inquiries revolve around forms sent in by the participants.

In managing participant information through a Benefits Center, it is necessary to provide a balance between enhanced service and reduced operational costs. Imaging technology enables the electronic routing, distribution, storage and retrieval of participant information from the desk top. In addition, it improves client and participant service by enabling representatives to answer participant inquiries without necessitating a return call. However, imaging technology alone does not address all the requirements of a complex records management system.

Hewitt Associates chose to implement a hybrid solution because it not only addresses the needs of the users, but also meets the long-term records management requirements of the firm. The benefits of the hybrid solution are threefold: automated records management, a single user interface, and flexible archive media. The hybrid solution provides the users with the necessary pieces of information to do their job, regardless of the format or location of the information. Through the hybrid solution, the user can access digitized images, voice, word processing documents, spreadsheet data, or video.

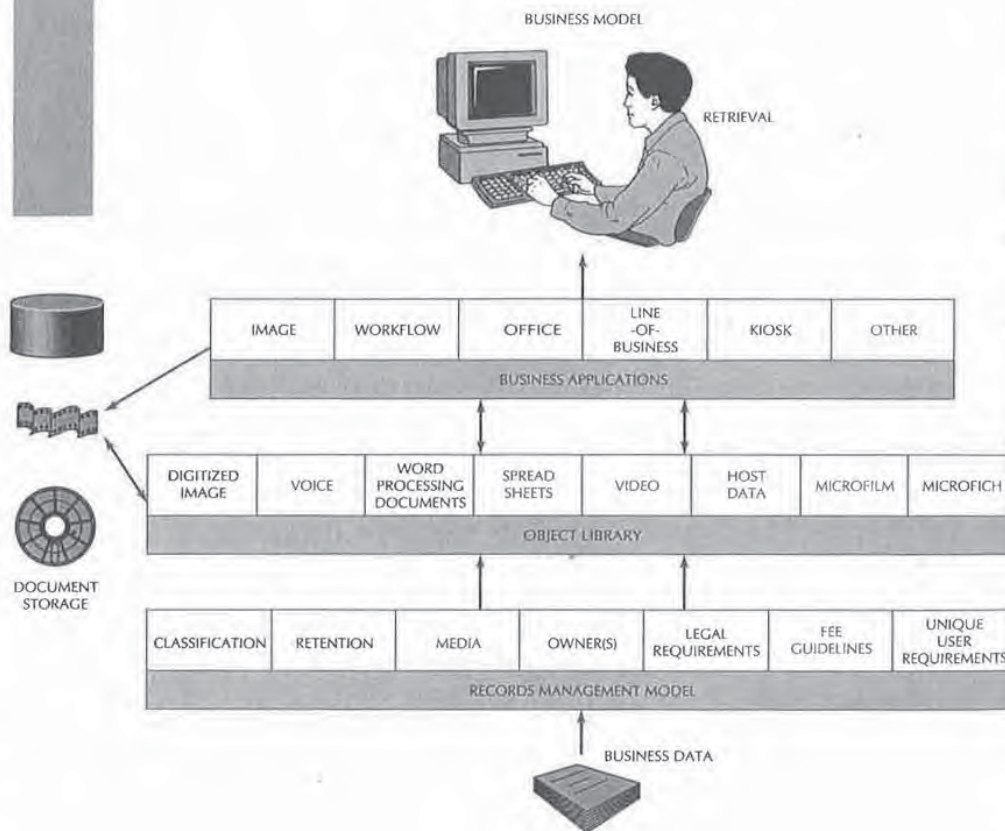
As part of the implementation of the Hybrid solution, a Records Management Model was developed to define the following characteristics for each record:

- Legal requirements
- Record ownership
- Unique user requirements
- Retention characteristics
- Record classification
- Storage media
- Cost structure

This model provides the foundation for managing all records used by the firm's business process. The hybrid solution implements the model through an architecture that utilizes a central catalog. Users will retrieve all information from the same



end-user interface, regardless of the information's storage location. This is an important feature, because depending on the legal life of the data, it may reside in one of a number of storage mediums, such as: microfilm, optical disk, online disk, and paper. The key to the hybrid solution is its ability in meeting the needs of the business process while maintaining the integrity of the Records Management Model.





## Chapter 18

### *Records Center Management*

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#### Learning Objectives

1. To enumerate the duties and responsibilities of records center personnel.
  2. To describe the various types of indexing methods used in records centers.
  3. To explain some commonly used records center search and charge-out procedures.
  4. To identify procedures for an effective reporting system and reference analysis of the records in a records center.
  5. To outline policies and procedures for establishing a records disposal system for a records center.
  6. To describe a general plan for emergency procedures.
- 

#### OVERVIEW OF MANAGING A RECORDS CENTER

Establishing a well-built, conveniently located, and efficiently arranged records center is only part of the records manager's job. The facility must also be managed professionally if it is to provide low-cost storage of inactive records and fast, efficient reference service. To do this, the manager must also have a well-trained and dedicated staff, cooperation of the users, and efficient procedures.

#### THE STAFF

A well-trained and dedicated staff is very important because no system can be better than the people who administer it. Taking shortcuts or ig-

norning procedural steps can, in time, reduce efficiency; and a lack of care or responsibility can transform the system into a shambles. On the other hand, dedicated and properly trained employees with a positive attitude can make even a mediocre system operate reasonably well. The attitude of the records center staff also affects user relations. A disgruntled or uninterested records center clerk or supervisor may offend the user, who, as a result, may be less cooperative. The cooperation of the user is necessary, because adherence to procedures depends to a great extent upon it. A positive and helpful attitude on the part of the records center staff will convince users that the records center is established for their benefit and that its staff is eager to serve their needs.



## THE USER

Customers or users have the right to expect that every care and precaution will be taken with their records, just as they would expect a bank to safeguard their money. A lack of responsibility on the part of the records center staff is likely to result in a reluctance to use the center's facilities. And rightly so, for depositors would be remiss in their own responsibilities if they placed valuable records in an area that was not safe and secure.

In addition to the security of the facility, depositors have a right to expect adequate controls so that their records will be available when they need them. On rare occasions a record will be misplaced and the user may become very concerned. Such losses can be prevented with proper controls, which are covered later in this chapter. In any event, a lost record is a serious incident, and every possible action should be taken to recover it.

Dealing with people is sometimes trying for even the most dedicated person. "Customers" may not always be right, but they usually think that they are; and the surest way to create enemies is to show them they are wrong.

When a user makes an unreasonable demand or complaint, the manager or the center employee should calmly and tactfully explain why the demand cannot be met or the complaint resolved. After reflection, the user will accept the explanation and will exhibit more understanding the next time. When the user's complaint is justified, it should be acknowledged, the situation should be corrected, and an apology offered if warranted. Acknowledging a mistake not only helps to establish and maintain good user relations, but also provides an avenue of improvement. Reasonable criticism should be accepted gracefully, and the user should be thanked for the suggestion.

Common courtesy and a pleasant telephone response will also improve user relations, and everyday good service will provide the image of efficiency that is desired. But no matter how efficient the records center might be, there will be an

occasional mistake. At those times, previously established good relations will make for a more understanding user.

## Efficient Procedures

The extent to which users will cooperate in following procedures depends largely on their awareness that what they are being asked to do is absolutely essential for an efficient operation. Procedures are sometimes established on a theoretical basis, but every effort should be made to ensure that they are practical and efficient.

This can be done by periodic reviews of all procedures, especially those that affect users of the records center. Procedures should also be streamlined to the point of maximum efficiency. Procedures should not be so rigid that they must be followed with military discipline. For instance, although it reduces the workload of the center staff, there is no absolute justification for demanding that users submit *all* reference requests in writing. This does not imply that procedures should not be established, published, and complied with; but they should be practical and reasonable and permit occasional exceptions.

Although judicious flexibility is required, procedures must be published with exacting details and examples to ensure consistency and continuity of the operation. These procedures should also specify conditions of allowable exceptions so that charges of preferential treatment are not made and so that exceptions do not become greater than the rule. Exceptions can be made only for incidental detail and cannot apply to the fundamental requirements of good control. For example, there can be no exception to the rule that all records withdrawn must be charged out.

## ACCESSIONS

*Accessions* is the term commonly used to describe records received into the records center. Since accessions are a daily occurrence in most records centers, the accession procedures must be formal-

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ized. The first step in these procedures is the transfer list.

### Transfer List

Just as a shipper cannot ship without first preparing a bill of lading or manifest, an office cannot send records to a records center without first preparing a list of the records being transferred. Without this list, the records center would be unable to identify the records, thereby making retrieval virtually impossible. Most frequently called a *transfer list* or an *accession list*, this list is prepared by the office transferring the records. (See Figure 18.1.)

Although the list can be typed on plain bond paper, it is far more efficient to use a prescribed form to ensure uniformity and completeness. The form should be prepared with a minimum of two copies. The original is sent to the records center in advance of the records, and the copy is retained in the office. The procedures of an organization may require additional copies that are filed and used for additional control.

In addition to office identification, the form should show at least the official name of the records series, the span of time covered by the records, and the temporary number of the carton in which the records are placed. Other information, such as the retention schedule number and the destruction date, can be helpful but is not absolutely essential. Office workers often have pet names for records, and it is not too unusual for a record to be known by two or three titles in the same office. These titles are frequently nondescriptive. Therefore, the official name of the record should be the name listed in the retention schedule.

A transfer list may contain more than one series of records, although internal procedures may require a separate list for each series. The records series is listed by name, and *subdetail* information is normally required. For instance, the name of the records series might be "Paid Vouchers," and the subdetail might be the voucher

numbers or segments of the alphabet. If the list contains records of the parent organization and subsidiaries, the corporate names would also be required.

Individual files arranged by subject present some problems in preparing the transfer list. The generic name or series is usually listed as "Correspondence Files," and the subdetail is either alphabetic, numeric, or alphanumeric, depending on the file system. But unless the entire series of files is transmitted at one time, the subdetail has little meaning unless each file number or name is listed. Listing of individual files is very time-consuming because there may be as many as 30 to 50 files in one carton. Listing of only the first and last numbers in the carton is not a suitable alternative because some of the intermediate numbers may not be included and may appear on subsequent transfer sheets, in which case there would be an overlap in series. In this instance, the index to the carton contents is best maintained in a separate card or computer file in the transmitting office. Only the file number or name, the date of transfer, and the carton number should be listed in the card or computer index. In such a situation it is necessary that the transmitting office, when requesting these records, provide the records center the carton or space number assigned, as the records center would not have this information in its index.

There is, however, a method of batching that avoids the problem of missing numbers in a file series, e.g., grouping by the year the claim was closed, or by the year in which an employee was terminated or retired, in the case of personnel files. Although there may be missing numbers, they do not overlap with other accessions since this number series is complete and it contains *all files closed* in a particular year. However, it is necessary to know the year the file was closed.

The span of time covered by the records series, shown on the transfer list, is usually very important, not only for identification but most importantly for disposal purposes. The span of time is usually very clear-cut on accounting



records, but for files such as subject correspondence files, claims files, and personnel files the span of time on each file will probably vary greatly within a carton. In this case, usually the oldest date in a carton and the most recent date are shown to give some indication of the age of the files. This, however, *cannot* be used for disposal purposes, but the batch grouping can.

A temporary transfer number is assigned to and written on the carton by the transmitting office. It is used only for identification purposes until the carton is assigned a permanent records center space number. The temporary number on the carton is matched with that number shown on the transfer list when it is accessioned.

### Transfer Approval

When the transfer list is received in the records management office or the records center, the staff reviews it for completeness, continuity, and eligibility. The completeness check involves making sure that all records on the transfer list are physically accounted for, that the correct name of the record is shown, and that the subdetail is sufficient for retrieval. The continuity check entails reviewing past accessions of that records series to verify that all prior records have been received (i.e., the oldest records should be accessioned first). The eligibility check involves checking the record items on the transfer list against the retention schedule to determine if they are eligible for records center storage. It is for this reason that many organizations require the retention schedule number to be shown on the transfer list. Listing this number not only facilitates checking in the records center, but it also serves as a reminder to the sending office that only authorized records may be stored.

### Pickups

When the transfer list has been approved, the shipment is scheduled for pickup. Pickup procedures will vary for each organization; they depend on the location of the records center, union agree-

ments, and organizational structure. Frequently, the mail or messenger department will handle the pickup, but sometimes it is done by records center personnel. The frequency of pickups will depend on the volume and distance. If the records center is located in the same building as the offices, it can be done on a daily basis. If it is some distance away, a truck will be required, and pickup will probably be scheduled on a weekly or semi-monthly basis. The transmitting office should be notified of the pickup date and any changes that are made in the schedule.

### Space Assignments

When the records are received in the records center, they are normally placed in a staging or processing area where they are checked against the transfer lists. If all cartons shown on the transfer list are accounted for, the shipment is ready for space assignment.

Space numbers are normally assigned to, and written on, the carton in the processing area. To accomplish this, the records center must have a complete and current register of space vacancies. Without such a register, space assignment would be practically impossible. Even if all vacancies were visible, a physical inventory of available space would be very time-consuming and inefficient.

A manual register of available spaces can be maintained in several ways, all of them similar. The manual systems described here can also be computerized. The principle of all of these systems is the perpetual inventory. With this system, as spaces become vacant they are added to the register, and as they are filled they are removed. The system varies according to the format of the register. Some registers consist of a page of plain paper for each row in the records center. As a space becomes vacant, the space number is written on the sheet; as the space is filled, the number is scratched off. This is perhaps the most basic method and can be used with success when the vacancy rate is relatively low. However, if there are a large number of open spaces, searching for a

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FIGURE



Dept	Accounting	RECORDS CENTER INDEX and TRANSFER LIST				Control Number		
Sect	Payables					950		
Page	1 of 1							
Box No.	Description of Record(s)	Date		Record Center Space Number	Title Code	Function Code	Retention Period	
		From	To					
	PAID DRAFTS	Jan	Jun		179	55b	6 yrs	
1	00001 - 01578			10014				
2	01579 - 02852			10015				
3	02853 - 04215			10016				
4	04216 - 07514			10017				
5	07515 - 08950			10018				
6	08951 - 10450			10019				
7	10451 - 11917			10020				
8	11918 - 14329			10021				
9	14330 - 16744			10022				
10	16745 - 18009			10023				
11	18010 - 21710			10030				
12	21711 - 23002			10031				
13	23003 - 25119			10032				
14	25120 - 27900			10033				
15	27901 - 30005			10034				
16	30006 - 31074			10035				
17	31075 - 32224			10036				
18	32225 - 34015			10037				
19	34016 - 36310			10038				
20	36311 - 37450			10039				
21	REPORTS OF DRAFTS ISSUED A to L	Jan	Dec	10040	210	55d	2 yrs	
22	M to Z			10041				
For Storage in: <input checked="" type="checkbox"/> General Record Center <input type="checkbox"/> Security Record Center								
Name of Person Transmitting Records <i>John Doe</i>		Phone No. 3353	Room No. 2010	Location Fall Winds	Date 1-3-1994			

FIGURE 18.1 Records Center Index and Transfer List



RECORDS CENTER CONTROL CARD				DEPT.	052 Accounting			
				SECT.	Payables			
				RECORD TITLE CODE	052-179			
Function Code	55b	Record Title	PAID DRAFTS		COMPANY NAME			
Company Retention	6 yrs	Also Known As	Cash Vouchers		XYZ Company			
Dates	Transfer Control Number	Sub Detail	Space Number	Dates	Transfer Control Number	Sub Detail	Space Number	
JAN-JUN 94	950	00001-01578	10014	JUL-DEC 94	954	65075-68921	40402	
		01579-02852	10015			68922-74011	40401	
		02853-04215	10016			74012-77981	40401	
		04216-07514	10017					
		07515-08950	10018					
		08951-10450	10019					
		10451-11917	10020					
		11918-14329	10021					
		14330-16744	10022					
		16745-18009	10023					
		18010-21710	10030					
		21711-23002	10031					
		23003-25119	10032					
		25120-27900	10033					
		27901-30005	10034					
		30006-31074	10035					
		31075-32224	10036					
		32225-34015	10037					
		34016-36310	10038					
		36311-37450	10039					
JUL-DEC 94	954	37451-38319	40221					
		38320-39441	40222					
		39442-40317	40223					
		40318-42211	40224					
		42212-44016	40225					
		44017-45098	40226					
		45099-46980	40227					
		46981-47889	40228					
		47890-48942	40229					
		48943-49820	40230					
		49821-59052	40400					
		59053-65074	40401					

FIGURE 18.2 Records Center Control Card

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particular number could be very time-consuming. A more efficient method is to list all space numbers for a row in sequence on a page. These space listings can be computer-generated using a personal computer and printout. As the space becomes vacant, the number is checked with pencil. As it is filled, the check is erased. This method has the added advantages of placing the numbers in serial order and of showing vacancies in serial order. If all rows contain the same number of spaces, the preparation of the basic form is quite simple, for one form will serve for all rows. However, if the rows vary in the number of spaces, the form must be altered to suit the capacity of each row.

Another method of maintaining a space inventory is to write a vacancy number on a 3- by 5-inch card and to file the card in numeric order. Cards are not maintained for filled spaces. When assignments are made, the cards are simply removed and no search is required. The cards are then taken to the processing area and fastened to the carton. When the cartons are destroyed, the cards are removed and refiled as a space vacancy. Other variations of these methods, including the use of computer databases, can be devised to meet the needs of specific organizations.

Sections of a records center should not be reserved for the exclusive use of a particular department or office. Allocation should be random, and assignment made on the basis of availability. By assigning space on an availability basis, every single cubic foot can be used. However, some discretion should be used in making space assignments. Records that appear likely to be more inactive than average are assigned to less accessible spaces, such as the higher shelves and rear spaces. Records that have more valuable information may be assigned to certain areas where proper protection is afforded. In addition, when possible, the records of the same series should be kept together, because this simplifies disposals and references.

After the space assignments have been completed, the records are placed on the shelf whose number corresponds to the number on the carton.

If the records are not contained in cartons, perhaps because of irregular size, the space number is written on the records as they are placed on the shelves. Finally, the space number is written on the transfer list adjacent to the appropriate item as the records are placed on the shelves.

## MANUAL INDEXING METHODS

Because a records center may serve more than a hundred different offices and contain more than a thousand separate series of records, a good indexing system is essential. The most common manual systems are the *control card system* and the *transfer list system*. There is a third system that combines elements of these two; we will call it the *control card-transfer list system*.

### Control Card System

The control card system consists of a ledger sheet or card for *each records series* held in the records center (see Figure 18.2). These cards are kept in departmental (retention schedule) order in either alphabetic order by records series title, or numeric order by title code. Each transaction (box or space number) shown on the transfer list is posted to these cards. If the transfer list contains 22 boxes, there will be 22 entries on the control card. This operation involves a complete transcription. The transfer list (see Figure 18.1) should include all data necessary for retrieval, such as the date span, the space numbers for each carton, and the subdetail description of the record. Although this system requires the additional task of transcribing, it is still highly efficient, provided transcription errors are minimal. As a precaution against such errors, the transfer lists are usually retained in departmental order. With this system, the burden of locating the space numbers is placed on the records center staff.

A search of the index is conducted by (1) locating the control card for the records series



requested, (2) searching subdetail for the proper space number, and (3) retrieving the records.

### Transfer List System

With the transfer list system, both the department and the records center maintain copies of the transfer list. These lists are searched to secure the space number assigned to a given record. This system works reasonably well if the transfer list is limited to one series per sheet. If more than one series is listed on the same transfer list, searching becomes progressively more difficult as the lists accumulate. The system's chief advantage is that no transcription from the list to the control card is involved (see Figure 18.1).

A search of the index is conducted by (1) scanning copies of all transfer lists submitted to the records center for prior accessions, (2) locating the correct space number by cursory review, and (3) retrieving the record.

### Control Card-Transfer List System

The control card-transfer list system is a marriage of the first two systems. Basically, this system involves maintaining an index to transfer lists that contain one or more series of records. The steps in this procedure are as follows:

1. Maintain a control card or ledger sheet for each series of records, as is done in the control card system.
2. Assign each transfer list an identifying number as it is received.
3. Post to the control card from the transfer list only the date range of that series and the *transfer list* number. This eliminates posting all subdetail and space numbers. (See Figure 18.3.)

Search of the index is done as follows:

1. Scan the record series control card to find the date range and corresponding transfer list number.
2. Retrieve the appropriate transfer list, which is in numeric order by department.
3. Scan the appropriate transfer list for specific record identification and space number.

The advantages of this system are that it reduces transcribing to one entry per record series for any one transfer list and still provides a systematic method for locating the proper transfer list when retrieval is required. Because all retention requirements may be shown on the control cards, they can be used to determine specific destruction eligibility.

### SEARCH AND CHARGE-OUT PROCEDURES

Stack areas should be closed to everyone except authorized records center personnel. Without this restriction, controls and security would be impossible in many areas. If the records center is located within the same building as the offices it serves, it is possible that some work-in-file activity may be allowed for a limited number of outside personnel. If proper instruction and a watchful eye are provided, there may be no serious problems; however, it is best to discourage permitting unauthorized personnel into the stack area.

### Record Requests

Users of the records center may be required or encouraged to request records in writing on a prescribed form and to provide space numbers through an index search previously described in order to reduce work for the records center staff.



RECORDS CENTER RELATIVE INDEX				DEPT.	052 Accounting		
				SECT.	Payables		
				RECORDS TITLE CODE	052-179		
Function Code	55b	Record Title	PAID DRAFTS				
Company Retention	6 yrs	Also Known As	Cash Vouchers				
Dates	Company	Sub Detail	Transfer Control Number	Dates	Company	Sub Detail	Transfer Control Number
JUL-DEC 90	X4Z	50152-95000	650	JAN-DEC 94	ADK	0002-8914	952
JAN-JUN 91	X4Z	00001-48150	704	JAN-JUN 94	UOP	0501-0982	953
JUL-DEC 91	X4Z	48151-97072	744				
JAN-JUN 92	X4Z	00001-54010	801				
JUL-DEC 92	X4Z	55011-92017	892				
JAN-JUN 93	X4Z	00001-42110	907				
JUL-DEC 93	X4Z	42111-78529	925				
JAN-JUN 94	X4Z	00001-37450	950				
JUL-DEC 94	X4Z	37451-79080	954				

FIGURE 18.3 Control Card-Transfer List System

If the requests or charge-out forms are prepared in the requesting office, the time spent will not be significant and can be absorbed without overtime or added personnel. But if all form preparation and space-number lookup is performed in the records center, the workload may require hiring additional personnel. While clerical time required to complete the form is not significant, lookup of the space number in the indexes, can usually be accomplished more easily by the department owning and requesting the record. Other managers will argue that the records center exists essentially to provide reference service and should therefore have a large enough staff to perform that service. The system used is a matter of management policy, which each records manager will have to

decide. In many records centers, telephone requests or electronic mail are encouraged, particularly if there is significant distance involved. Fast service is good service, and anything that will expedite information retrieval should be used, including facsimile transmission, on-line computer systems, teletype, or telephone, as long as it is economically feasible. The charge-out form is frequently used to make a request for a record. If the request is received by telephone, the form is prepared by the person taking the request. Otherwise, it is prepared by the requestor. In a large records center, it often becomes necessary to have requestors furnish a personal identification number to ensure that records are not charged out to the wrong individual.



### Charge-Out System

A fundamental control in records management is the *charge-out system*. In essence, it is simply making a record of a loaned record. The principle of this system is commonly used in many occupational areas other than records management. For example, it is used in lending libraries, equipment rental firms, and banks. In the case of records management, a document is being loaned and the charge-out form is the record of that loan.

The charge-out system is used (1) to keep track of a record while it is outside the records center, (2) to ensure its return, and (3) to provide follow-up analysis. A simple charge-out method is to record the name of the requestor, the record identification, and the date on a cardboard form. The form is then filed in the container in place of the record withdrawn.

Usually, however, the charge-out is a snap-out form, completed in triplicate. The form must contain at least the name, telephone number, and location of the requestor; the name and full description of the record; the space number; and the date. The first copy replaces the record in file, the second copy is attached to the record as a routing slip, and the third is placed in a suspense file for follow-up, if required. Additional copies may be used for reference analysis of various sorts and for other purposes (see Figure 18.4).

Considerable search time can be saved if, instead of making special trips to the stack area for each request, the requests are accumulated and put in space-number order, thus reducing travel time to and from the stack area. However, turnaround time and frequency of requests may not permit this batching.

When the records are located, the routing copy of the charge-out form is attached to the record, transmitting it to the requestor, and the charge-out portion is placed in the carton in lieu of the record being removed; it should be visible from the top of the box. Because the form is often quite small, it should be attached to a sheet of cardboard, 8 1/2 by 11 inches in size, so that it can be seen in the carton. If the record cannot be

located, a "Not in File" notation, the date, and the initials of the searcher are written on the request form, which is returned to the requestor.

If the record is charged out when the search is made, the name of the party to whom the record is charged, the date of the charge, the date of the search, and the searcher's initials or number are written on the request form and returned to the sender. It is a matter of policy whether records center personnel or the requestor contacts the party who has the record. Generally, it is better for the requestor to make the contact, because he or she knows how long the file will be needed or what information is needed. In any event, the charge-out in the file should be flagged so that the second requestor will receive it when it is returned. If the original holder of the record gives it to a second party, the records center should be notified, and a new charge-out should be made to the second party.

In the case of a charge-out or a "Not in File" search, the reference analysis portion of the search request form should be retained in the records center file for future analysis of reference activity, just as though the record had been retrieved. Also, it is usually advisable to notify the requestor immediately by telephone or fax if the records cannot be located or if they are charged out.

### Deliveries

Frequency of deliveries depends on the distance and turnaround time requirements. Because deliveries are smaller in volume than pickups, interoffice messenger service may normally be used on a daily basis. Sometimes, requestors will state "Call when record is ready." In this case, the requestor will pick the record up personally.

### Follow-Up Procedures

Most records are returned to the records center within a week or two after they are charged out. However, there are always a few that are not returned until the holder is reminded that he or she should do so. Usually, the reminder is a form



RECORD CENTER CHARGE OUT					
FORWARD RECORD TO	NAME	JOHN DOE		ROOM	TELEPHONE
	DEPARTMENT/SECTION	ACCTG, PAYABLES		DATE	2-1-93
DESCRIPTION OF RECORD					
RECORD TITLE		Paid Draft			
SUB-DESCRIPTION		12141			
COMPANY NAME		XYZ Co			
DATE OF RECORD		MAY 3 1993			
SPACE NUMBER		10021		<input type="checkbox"/> PERMANENT WITHDRAWAL	
BELOW FOR RECORD CENTER USE ONLY					
<input checked="" type="checkbox"/> RECORD ATTACHED		<input type="checkbox"/> NOT IN FILE			
<input type="checkbox"/> NOT IN FILE-CHARGED TO		NAME	ROOM	DATE	
DATE SEARCHED		2-1-93		SEARCHER #	4/200
DATE REFILED				SEARCHER #	

TO ROUTE

**TO**

**RECORD CENTER**

Room 10, Basement

**CHECK THIS BOX**

☐

(LEAVE FORM ATTACHED)

FIGURE 18.4 Record Request and Charge-Out Form

letter to which the suspense copy of the charge-out is attached.

The suspense copy is filed in a tickler file in the records center office, at time of charge-out, usually to be called 30 to 60 days from the charge-out date. As records are returned, the follow-up or suspense copy is removed from the suspense file. On the final due date, the remaining cards are removed and attached to overdue notifications, which are sent to the holder of the record or the holder's immediate supervisor, depending upon policy. A photocopy of the notification form and attachment is often made so that a second follow-up can be done if the first one brings no results. If all else fails, a telephone call or personal visit may result in a return of the record.

If the holder of the record indicates that the record will be needed for an extended period of time, the suspense copy of the charge-out form should be refiled, and the whole process should be repeated. If the holder claims that the record has been returned, then a thorough search of the processing areas and the office areas should be made

as well as a second search in the stacks. If all these efforts fail to locate the record, a notation explaining the events should be made on the charge-out form in the stack file and the form should remain there until the record is returned. The suspense date for return of charge-outs should be realistic; a time period that is too short will simply mean that more notifications are required than necessary. If a record is reactivated and remains in the office, a permanent withdrawal charge-out should remain in the file for as long as the series is retained in the records center.

#### REFILES AND INTERFILES

Although refiles and interfiles are quite similar, some differences should be noted. *Refiling* is the process of filing records that have been charged out. *Interfiling* is the placing of documents into containers that were previous accessioned in the records center.

The refile process is somewhat faster and easier than the interfiling process because there is



a charge-out form that directs the clerk to the proper place in the carton. When a record is refiled, the charge-out form should be removed from the carton and the routing slip should be detached from the record and matched with the charge-out to ensure correct refiling. This matching is very important: A misfile in the records center is extremely difficult to find because of its random space arrangement.

An interfile, on the other hand, poses several problems. First of all, an index search may be required to determine the correct space number, if that is not known. Secondly, the records center clerk must not only find the proper place in the carton to file the record, but must also be certain that space is available for the record. This latter point is not always easy to judge if some records are currently charged out of the carton. Because of the space problem, files sent to the records center should be complete when accessioned and interfiles should be discouraged.

If a carton is filled and records still remain to be filed, the records are placed in an overflow carton, which has its own space number. A cross-reference that refers the searcher to the overflow carton should be placed in the original carton. One overflow carton will usually serve the overflow of more than one records center carton. Thus documents in the overflow carton should be filed by the space number of the original carton, and the carton should be subdivided by guides indicating row numbers.

#### DISPOSALS FROM THE RECORDS CENTER

The records manager is the custodian of the records in the records center and not the owner. Therefore, the records may not be destroyed without the concurrence of the owner and those authorized to approve destruction. Although the records retention schedule indicates when a record will be eligible for destruction, there are many events, such as pending lawsuits, merger negotiations, hearings, and new laws and regulations, that might cause a hold order to be placed on the records. The final approval of the record owner limits pos-

sible premature destructions and also strengthens the confidence of the user in the records center. This procedure does not weaken the purpose or effectiveness of the retention schedule, but rather complements it. Without such approval, longer retention periods would probably be required because of uncertainty and the "just in case the record is needed" attitude that so often prevails.

Suspensions of the retention schedule should only be made when authorized by the law department or some corporate official. Technically, the owner of the document may for valid reasons recommend that the record be retained beyond the prescribed period. Although only a recommendation, this request is in most cases a valid reason to suspend the retention schedule.

#### DISPOSAL SYSTEM

Even though final approval is required of the owner, the records center initiates the destruction process. To do this effectively and efficiently, a system is needed.

The disposal process actually begins when the records are originally accessioned into the records center. As a part of this process, the future date of destruction is noted on the transfer list and one copy of the list is filed in a suspense file by the earliest destruction date shown. When that date arrives, the descriptive information on the records is transferred to a destruction authorization form either by attachment, transcription, computer, or photocopy. After the form is prepared, it is sent to the originator of the records transfer for approval to destroy. Figure 18.5 is a sample disposition authorization form.

If there is more than one destruction date shown on the transfer list filed in the suspense file, the records destroyed are crossed off that list after disposal and the transfer list is refiled by the next upcoming destruction date shown. In lieu of retyping the description on a destruction form, the transfer list can be converted to a destruction form by using a form overlay and an office copier.

Another system, which is based on the same principle, uses 5- by-8-inch cards that are filed by



RECORDS DISPOSITION AUTHORIZATION				
		NO. 80001		
		Page 1 of 1		
<input checked="" type="checkbox"/> XYZ COMPANY <input type="checkbox"/> OTHER COMPANY				
NAME & TITLE: John Jones, Supv, Records Center		DATE: January 4, 19 9-		
LOCATION: Fall Winds Campus		APPROVED: John Doe, Mgr Acctg <small>(Signature of person responsible for records)</small>		
		APPROVED: Georg Bishop, RM		
The above individual is authorized and directed to destroy the following records:		APPROVED: SSP Kennedy <small>Concurrence</small>		
FORM #	NO.	PERIOD		RETENTION SCHEDULE ITEM #
		FROM	TO	
	Paid Drafts #50152 - 95000 /////NOTHING FOLLOWS/////	Jul 1 199-	Dec 31 199-	052-179
I disposed of records listed on this form by: <input type="checkbox"/> Burning <input type="checkbox"/> Shredding <input checked="" type="checkbox"/> Salvage				
Signature: John Jones Date: Jan 10, 19 9-				
RETURN ORIGINAL FORM TO RECORDS MANAGEMENT OFFICE-ST. LOUIS AFTER DISPOSAL				

FIGURE 18.5 Records Disposition Authorization Form

year and month. When a transfer list is received, the number assigned to the list (or its date and source) is transcribed onto the card. When the due date arrives, the card is pulled; it refers the records manager to the proper transfer list. The advantage of this system is that it eliminates filing the transfer list in the suspense file. A personal computer may serve the same purpose as the card file, using fairly common packaged software such as a calendar or date file. The file need contain only the transfer list number, so that it can be retrieved and converted to a disposition authorization form on a given date.

#### Authorization Form

When the destruction authorization is prepared, it is sent for approval to the office where the records

originated. If some records are to be held for a longer period, the reason should be stated in writing, a new destruction date should be assigned, and these items should then be deleted from the authorization. When the authorization is returned to the records center, the space numbers covering those records approved for destruction should be listed separately on 3- by 5-inch cards and the cards should be arranged in numeric sequence. With these cards used as a pull list, the records are removed from the shelves and the appropriate card is attached to the carton with tape. The attached card can be used as a check to ensure that the proper carton has been removed.

After the accuracy check, the cards should be removed from the carton and filed in a space-availability file, if such is the system, or used to post entries on a space-availability register. Also,



there is an obvious change in work flow patterns. This analysis will enable the records manager to know the following:

## FIG

- How many references are made for any given records series.
- The age of the records that are being referenced.
- The number of records that cannot be located or charged out.
- Who uses the records center.
- When the records are used.
- How old records are when they cease to be used.
- Where high-activity records are located in the records center.

To make this analysis, statistics are accumulated on a per-action basis by filing a copy of the charge-out form in a reference analysis file or through computer data entry. This file is designed to accumulate data in a functional manner and may be arranged or sorted in one or more of the following ways.

	Sat
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	Pro 07-
	15-
	Lau
	Ope
	Tra
	Tra
	Tra
	Tra
	Pur
	Inus
	Miso
	API
	C&E
	Q2 -
	Add:
	Judg
	Fin.
	Gene
	Slav
	Tenn
	Fibb
	Dish
	Dist
	Fibt
	Fut 2
	Pass
	Pass
	Mail
	ECE
	Car A
	Royal

1. *By record series.* To determine the number of searches, the time span of the records searched, the number of "cannot finds" and charge-outs, and the source of the request for this records series.

2. *By user or owner of the record.* To determine the types of records used, the age of the records used, the number and frequency of requests, and the number of follow-ups required by this user.

3. *By date.* To determine the source of the requests and periods of high or low activity on a particular records series.

In addition to this reference analysis file, a work sheet can be prepared directly from the charge-out slips that are in the file. On a daily



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basis the clerks who conduct the searches can tally the number of searches per day, per month, and per year. This can produce an aggregate total or be analyzed by department, division, or unit. Figure 18.6 shows an annual and monthly breakdown of the number of searches by departmental user.

### Projections of Space Needs

Most records centers show at least a gradual growth in volume due to hold orders, mergers, and increased business. As the demographer projects the population of the world, so must the records manager project the records "population."

FIGURE 18.6 Reference Analysis Report

Department	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOT
Secretary - 01	0	0	0	0	0	1	0	2	0	0	3	0	6
Treasurer - 02	0	0	0	0	0	1	0	0	0	0	0	0	1
Executive - 10-11-12-13	42	5	6	3	4	7	4	1	4	9	41	15	141
Profit Planning 07-08-09	1	3	16	10	4	1	1	16	1	6	2	0	61
Info & Con Sys 15-16-17	0	0	0	1	2	4	3	1	0	0	3	2	16
Law - 20-21-22-23-24	10	22	13	10	11	4	6	7	8	15	6	6	118
Operating - 30 - 43	27	33	23	9	12	26	12	8	13	20	19	11	213
Traffic Analysis - 44	2	1	0	0	0	1	3	0	0	3	0	0	14
Traffic Commerce - 45	14	18	17	10	4	7	10	3	10	5	3	4	105
Traffic Corresp - 46	0	0	0	0	0	0	0	0	1	0	26	0	27
Traffic Divisions - 47	40	28	23	31	12	8	17	21	37	30	21	15	285
Traffic Rates - 48	136	185	254	154	238	224	150	153	170	148	196	124	2137
Traffic - Sales - 49	0	0	0	0	0	0	0	0	0	0	0	0	0
Pur & Mails - 55	47	24	39	19	12	21	19	30	8	9	347	15	590
Truck Lines - 59	21	6	6	4	14	4	2	26	7	59	3	2	156
Missouri Imp Co - 60	0	0	0	0	1	0	0	0	0	0	0	0	1
APT Co - 61	8	2	0	1	197	1	2	0	3	9	19	3	245
CAEI Sec & Trans 03 - 04	11	0	0	0	0	0	0	0	0	0	0	0	11
Auditing - 65	788	1877	1590	621	1441	340	893	2724	1072	847	1768	1645	25536
Budget - 66	37	34	2	13	0	1	9	72	0	1	0	0	229
Fin Acctg - 67	0	0	0	3	0	0	0	0	0	3	0	0	6
General Accts - 68	0	1	1	1	7	3	1	0	0	1	0	0	15
Statistics - 69	0	0	0	0	8	3	0	24	0	0	0	0	35
Texas - 70	416	517	8	379	1512	7	10	135	5	0	26	115	2133
Dist - Bills - 74	27	14	14	12	15	13	9	17	26	13	13	8	181
Dist - Mtl - 75	0	2	5	0	0	0	0	0	0	1	0	0	8
Dist Payables - 76	995	20	26	169	49	65	314	583	56	242	55	43	9617
Dist Payroll - 77	1	1	19	4	2	4	1	2	11	4	1	0	50
Ext Rev Acctg - 80	67	71	54	91	87	85	91	79	110	67	77	52	931
Personal Station - 85	17	38	39	29	37	78	50	66	44	36	34	33	501
Passenger - 88	0	0	0	0	0	0	0	0	0	0	0	0	0
Mail Acctg - 89	0	0	0	0	0	0	0	0	1	0	0	0	1
ECE - 90	110	60	133	187	118	187	113	120	159	55	143	79	564
Ger Accounting	17	4	8	18	0	1	1	10	0	0	1	2	65
TOTAL FOR MONTH	2834	3026	2296	1579	3788	1098	2721	4100	1746	1783	2807	2179	29957



of the records center. Waiting until there is no more space indicates a failure in advanced planning. At that point, the records center cannot accept any new accessions, and consequently, records transfers back up in the offices and create chaos in the office records systems.

Statistical analysis for this situation is primarily concerned with accession and disposal ratios. If the volume of records taken into the records center exceeds disposals from the records center, sooner or later, if nothing changes, the records center will be filled to capacity. The challenge is to determine when this is likely to happen and to prevent it. To estimate the full date, it is necessary to look at typical accession and disposal volumes from the past few years and apply those historical numbers to the future. If the full date appears to be a year or more in the future, plans should be made immediately to provide a remedy. If it is less than that, you are in an emergency situation and action should be initiated as soon as possible to eliminate or reduce the problem. Possible solutions to the problem include:

1. Review the retention schedule to try to reduce retention periods to provide for additional disposals.
2. Review the hold-order file to see if some of the records being held beyond normal retention periods can be destroyed.
3. Perform a reference analysis to determine high-volume, low-reference records that may be considered for a reduced retention period or off-site storage.
4. Contract with a commercial records center to provide a quick and inexpensive solution, particularly for hold-order records or other high-volume, low-reference records.
5. Look into additional in-house space through expansion or a larger records center. This is the least desirable alternative, but it may be necessary.

#### INTRACENTER TRANSFERS

Once records are accessioned into the records center, it is generally best to leave their space

assignment number unchanged. Changes sometimes become necessary, however, because of unexpected reference activity, the threat of water damage, facility modification, transfers to a commercial records center, or some other reason. When this occurs, all indexes, such as control cards, transfer lists, the space registry, and the cartons themselves, must be altered to reflect the new space numbers. This pebble-in-the-pond effect can create a stifling work load, so changes should be made only under the most urgent circumstances. Changing the space numbers on the various indexes is not only time-consuming, but is often difficult unless assisted by other indexes.

If the system is computerized, a listing of the records being moved can easily be provided in space-number order together with descriptions of the records. With this listing, the new space number can be written adjacent to the old on the listing as the carton is placed on the shelf. At the same time, the space number written on the carton should be changed to the new space number. Later, the new space number can be entered into the computer database to update the system. In the meanwhile, the temporary listing in old space-number order can be used as an index from the old number to the new for search purposes.

If the transferred carton has the department name, record title, transfer number, and space number written on the outside of the box, as required by many organizations, that information together with the new space number can be entered onto a transfer list as the records are being accessioned into the new space. The old number should also be noted on the list so that other indexes can be updated later.

If neither of the above situations exists—completely labeled cartons or a computerized system—then it is necessary to identify the records and their owners. From this information, the transfer list used to transmit the records to the records center can be located and used to accession the cartons to the new space. At this point, the reaccessioning procedures are the same.

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#### MOVING A RECORDS CENTER

Moving a records center involves not only transferring the records from one place to another but also reassigning space numbers. When an entire records center is relocated, the changing space-number assignments is much more critical and time-consuming than with intracenter transfers. This is so because the volume of records is greater and also because *all* search, refile, and interfile activities are affected.

If a straight sequential numbering system is used in the old records center and will be used in the new, there is no space assignment problem because the cartons are simply moved to their like-numbered space in the new center.

#### Space-Number Conversion Table

If new space numbers are to be assigned in the new center, a table should be developed that will serve as an index to convert the old number to the new. In addition, this table must be completed as the records are moved so that the new records center can be completely operational upon occupancy. The table should list the old carton number in numeric sequence and, adjacent to it, the new number. This is done as the cartons are placed on the new shelves, with the result that the conversion table index is created at the exact time the change of space actually occurs. From this table, indexes can be changed and new locations determined quickly by referring to the old number to determine the new.

If new shelves are to be installed and numbered, this should be done prior to the transfer of the records to minimize interruption. If the old shelves are to be moved with the records and reinstalled, it will be necessary to have a temporary staging area until the records can be moved to

the new shelves. This can be done in phases, so that only a portion of the records are in the staging process at one time. For example, the contents of ten rows of shelves can be staged on pallets as the shelving housing them is partially disassembled, moved to the new records center, placed in its proper place, and numbered according to the new plan. When the shelving is ready, the staged records can be moved and accessioned. The process repeats the procedure until all records have been transferred.

#### ACTIVITY REPORTS

Specific work quotas for records center personnel are usually not recommended because employee pressure has been known to cause misfiling and inaccurate reports. In addition, time requirements for records center actions are so variable that equitable quotas are not feasible. Although quotas cannot be applied to an individual's output, statistical projections, based on production reports, can be used to justify staffing needs; to compute the backlog of personnel work hours; to estimate time requirements for accessions, disposals, and indexing; and to estimate cost savings through use of the records center.

In addition, a weekly or monthly report of overall records center activity will provide valuable statistical information to the records manager as previously described. The report, prepared by the records center supervisor, should contain the number of references, refiles, and interfiles; the number of cubic feet accessioned and destroyed; and the amount of vacant space available. These data are accumulated from the daily reports of the records center clerks and from the accession and disposal activities.

It is important that the calculation method be standardized for the various records center actions. Usually, each record or file requested is counted as a search. If the record is not in the file because of a previous charge-out or cannot be located, it is still counted as a search. If different records requested happen to be in the same carton,



they are still counted separately. However, if an entire carton is requested, without reference to specific records in it, the request is counted as only one search. Refiles and interfiles are counted on the same basis.

The special search should be defined and counted separately. Usually, a special search is conducted when a record cannot be located through the normal procedures. It should only be conducted with the approval of the records center supervisor. Often a call to the requestor will reveal that the information can be found elsewhere or that the record was never sent to the records center. If the call to the requestor indicates that the record is essential and that it was sent to the records center, a special search should be conducted. Even when a special search is warranted, there are only so many reasonable possibilities that can be tried. When these have been exhausted, the search should be ended.

#### EMERGENCY PLANNING

The first consideration of emergency planning should be the protection of lives. Emergency planning must be tailored to the individual circumstances since each records center has its own peculiarities and dangers. In the case of fire, the employees should know if and when they should call for help, whether they should attempt to extinguish the fire or should evacuate, and in what order they should do these things. Similar procedures should be established for explosions, earthquakes, power failures, and civil disorders. Expert advice on these matters is available from civil defense agencies, the local police and fire departments, and the organization's safety officer. Once the procedures are established, employees should be instructed and quizzed periodically to make sure they remember the procedures.

Fire department, police department, ambulance service, and other emergency numbers should be clearly posted by all telephones in the records center office and in the stack areas. The

home telephone numbers of records center personnel, particularly the records manager, should be posted prominently and should be made available to night crew personnel in the event of a night emergency.

Post-emergency plans should also be made. Tentative facilities for temporary storage, review, and reorganization of the salvaged records should be designated. A plan for relocating the records to the new facility should be worked out in advance. Valuable records should be designated and locations noted so that they can be given priority treatment. A computer-generated space-number-to-records-title index is helpful in identifying damaged records and in notifying their owners for advice and assistance.

Every detail cannot be worked out in advance because the type or extent of damage will never be known until it occurs. But broad directives will greatly assist recovery, particularly if the records manager is not available for some reason. Such directives can be developed through planning sessions with the records management staff and safety personnel. The "ifs" should include the type of emergency and the various degrees of damage; the "we shoulds" might include specific suggestions for action and possible alternatives.

#### COMPUTERIZATION

Many records managers now use computer technology to assist in managing the inventory of records stored in their records centers. As with any technological tool, the computer should be carefully evaluated on a cost-benefit basis before being used. The first step in the study is to establish and clearly define the objectives of the proposed system.

If the objectives and efficiency levels are identical to those presently achieved with a manual system, the records manager needs only to quantify present clerical effort and compare it to the clerical effort in the proposed computer system. If the proposed clerical effort is equal to

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or greater than the present clerical effort and there are no increased benefits, there is no need to proceed any further: Computerization is not justified. If, on the other hand, the proposed labor cost, plus the costs of data entry, programming, program maintenance, computer time, and hardware, is less than the present comparable cost, computerization is very likely cost-justified. Computerization usually requires a considerable amount of standardization of data to be successful, as it is less forgiving of errors than manual systems are. Of course, even a manual records center system requires standardization and systematizing to operate efficiently. In most situations, computerization is only applied to the records center after the center has been operational for some time and all procedures have been field-tested. Even so, all computer-driven pilot projects should be tested prior to full implementation.

Sometimes, a records manager may want to do tasks with the computer that are not presently being done manually. In this case, the benefits of the proposed task should be clearly defined and evaluated. This evaluation can be a cost comparison or just a simple value judgment.

The following is a list of tasks or objectives that may be handled by a computerized records center system, based on procedures described in this chapter:

- Space-number inventory
- Shelf labels
- Record-title-to-space-number index
- Retention schedule
- Destruction authorization lists
- Space-number-to-transfer-list-number index

- Charge-out and follow-up system
- Available-space inventory
- Projected-space-availability reports
- Reference-analysis statistics
- Automatic space assignment
- Carton label preparation

Most people familiar with the needs and problems of operating a records center would agree that the majority of the listed tasks would benefit from computerization. When costs are calculated for each, the experienced records manager would quickly separate the essential needs from the peripheral. It is not unusual for the least beneficial computer application to be the most costly in terms of computerization and data entry and other conversion costs and, conversely, for as much as 80 percent of the total benefits to be derived from 20 percent of the system capabilities.

However, the proliferation of low-cost, fast, and high-capacity personal computers, modems, and networks makes feasible today applications that were not so, even a few years ago. In addition, many records management consultants and computer software specialists have written and market software packages designed to meet almost all the needs of the records manager. To select the proper commercial system, one must first know what is required of the system. One should select a system that meets those requirements with minimum cost and conversion disturbance.

Additional and more detailed information on using the computer to automate records management systems is furnished in Chapter 9.

## SUMMARY

Efficient operation of the records center requires a well-trained and dedicated staff, the cooperation of the users, and efficient but flexible procedures.

Records are normally transmitted to the records center by means of a transfer list. Only

records authorized by the retention schedule and described on the transfer list should be accessioned into the records center. When the records are placed on the shelves, the space number is recorded on the transfer list adjacent to the



description of the records in the carton. A control-card system, a transfer-list system, or a combination of these is used as an index to the stored records. The latter provides the simplest and least costly method in terms of indexing and retrieval.

All records retrieved from the records center should be charged out to the user, and follow-up controls should be used to ensure the return of records. Disposal of records from the records center must be authorized, and indexing and inventory controls changed when the records are removed.

Space-need projections are made regularly to ensure adequate space. Intracenter transfer of records should be avoided, if possible, because of the indexing changes involved. Moving a records center can be greatly facilitated by creating a space-number conversion table as the records are being moved.

The computer is often used for indexing records center holdings and for providing other inventory and statistical reports. A cost analysis of computer versus manual systems should be made before a computer program is inaugurated. Regular activity reports, made to provide statistical data, are essential for staffing and space planning. Emergency planning is required for the safety of personnel and the protection of records.

#### QUESTIONS FOR DISCUSSION

1. Why is a dedicated and well-trained staff of importance in the operation of a records center?
2. Who are the "customers" of a records center?
3. What responsibility does the records center staff have to the user?
4. Why is it necessary for the staff of a records center to provide its users with the published operating policies and procedures of the records center? How much flexibility can there be in carrying out established policies concerning use of the records kept in the center?
5. Explain the origin and content of the transfer list that accompanies records transferred to the records center.
6. Why is it necessary for the records management office or the records center staff to review the transfer list before records are actually sent to the records center?
7. How are space locations determined for records received by the records center?
8. Identify and distinguish between the indexing methods commonly used by records centers.
9. What factors must be taken into consideration when establishing records center search and charge-out procedures?
10. Why is it necessary to establish a follow-up policy? Explain the various procedures that can be used when follow-ups must be made.
11. Explain the procedural differences between refiling and interfiling.
12. Why and how often should the records center staff make a reference analysis?
13. What are some common arrangements for establishing and maintaining a reference analysis file?
14. How are disposals of records handled by the records center staff?
15. How can future space needs be adequately and accurately projected?
16. Why is it desirable to establish policies and procedures for intracenter transfers of records?
17. What basic clerical operations should be reviewed when determining whether to computerize records center indexing procedures or not?
18. What records center reports can be processed by a computer?
19. What records center activity reports should be made to management on a regular or periodic basis?
20. What plans should be established for con-

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ducting records center operations in the event of unforeseen emergencies?

4. Prepare an annotated bibliography of five periodical articles on the topic "Records Center Operations."

#### PROJECTS

1. The Houston chapter of the Association of Records Managers and Administrators is sponsoring a two-day seminar, "Improving Records Center Operations." As the program chairperson of the Houston chapter, you are in charge of preparing a tentative 16-hour seminar program featuring a variety of activities—speakers, panel debates, discussion groups, and so on. The Houston chapter anticipates attendance of from 150 to 175 people. A committee will assist you in securing program participants. Your job is to decide on the topics that will be addressed at the seminar.
2. Construct a questionnaire that could be used to gather data concerning all aspects of records center operations. Assume that the questionnaire will be sent to all members of the Association of Records Managers and Administrators.
3. Prepare an outline for a speech entitled "The Disposition of Obsolete Records from a Records Center" that is to be delivered at the regular monthly meeting of the St. Louis chapter of the Association of Records Managers and Administrators.

#### CASE PROBLEM

You have just completed your first year as records center supervisor of the Griffen Manufacturing Corporation, which was established 20 years ago. The records center was planned by your immediate superior, the organization's records manager, just before you were employed by the company. The first annual report of the records center's operations must now be prepared for submission to the records manager. Prepare an outline of the report, which shall include cost savings. Use the following data in preparing your report:

Records on Hand: 38,550 cubic feet  
 Accessions: 5,210 cubic feet  
 Disposals: 5,350 cubic feet  
 Reference requests (searches): 15,958  
 Refiles and Interfiles: 29,750  
 Available space at end of year: 2,005 cubic feet  
 Floor space used—stack area: 10,690 Sq. Ft.  
 Floor space—nonstack area: 1500 square feet  
 Cost of floor space (and utilities): \$5.00 square foot (stack area)  
 Cost of office space: \$20.00 square foot (nonstack area)  
 Number of records center clerks: 2  
 Total annual payroll and fringe: \$88,400  
 Cartons and other expenses: \$12,800



## Chapter 19

### Archives Management

#### Learning Objectives

1. To define archives management and explain its goals, its objectives, and its relationship to records management.
2. To explain the types and functions of archives.
3. To identify the criteria for appraising the value of archival records.
4. To explain the basic principles for the arrangement of, access to, and use of archival records.
5. To describe the principles of conservation of archival materials to ensure their permanent preservation.
6. To explain the justification for establishing an archives and to explain its operation and use.
7. To explain the various methods of archival automation to facilitate the retrieval of archival records and enhance their use and value.

#### INTRODUCTION

Archives management programs are often operated as a part of records management programs, and the records retention schedule is frequently used as the means of identifying records possessing permanent archival or historical value, and scheduling them for transfer to the organization's archive at a point in their life cycle when they have no further value for operational, legal, or other business purposes.

The U.S. National Archives and Records Administration defines *archives* as "the noncurrent records of an organization preserved because of their continuing, or enduring, value," while *per-*

*manent records* are defined as those having "sufficient historical or other value to warrant continued preservation beyond the time they are needed for administrative, legal, or fiscal purposes."<sup>1</sup>

#### Goals and Functions of Archives Management Programs

Archives management programs play a very important role in the life of an organization. Unless the organization's archival records are properly



preserved and accessible, the organization's history and culture will ultimately be lost. An understanding of this history and culture is important to a business enterprise and is perhaps even more important to agencies of government, which are legally or otherwise obliged to preserve archival records for their value to posterity in elucidating the history of communities, states, and the entire nation.

Although different types of archival repositories serve different groups and thus may vary in their specific mission and character, all share a common purpose: to acquire, preserve, and make available for use records having permanent business, research, or historical value. More specifically, a formal program for the management of archives usually includes the following six basic functions:

1. *Appraisal*—The process of determining the value and thus the final disposition of records and designating records as either temporary or permanent, which may be accomplished as a part of the process of developing records retention schedules or as a separate act.
2. *Accessioning*—The transfer of the legal and physical custody of archival records from their offices of origin to the archival facility; also the creation of records documenting receipt and acceptance of the records into the archives.
3. *Preservation*—The specific steps undertaken to maintain, repair, restore, or otherwise conserve archival records in appropriate facilities and equipment.
4. *Arrangement and description*—The process of determining an appropriate method of organizing archival records and of developing *finding aids* (indexes or other lists, whether manual or automated) to describe the records and to facilitate their retrieval and use.
5. *Access and use*—The implementation of policies and procedures governing the access and use

of archival records by employees of the organization which owns them or by the general public.

6. *Reference and staff services*—The provision of facilities and a staff of *archivists* having professional training in archival administration to assist researchers or other persons in the use of archival records. In some particularly proactive archival programs, these services may include outreach activities to market the use of the program to persons or professional groups throughout the community, the state, or the entire nation.

Each of these six basic functions of an archives management program will be discussed in greater detail later in this chapter.<sup>2</sup>

### Relationship Between Archives and Records Management

The relationship between archives and records management has been the subject of much discussion and debate in professional circles for many years.<sup>3</sup> The records management field evolved from the archival profession during the 1950s and in subsequent years achieved a separate professional identity with its own community of vendors, educational courses of study, professional association, and certifying body. Nevertheless, the two professions still share much in common, and records managers need a good understanding of archival principles and practices in order to develop a comprehensive records management program. We shall begin this discussion with some observations concerning the similarities and differences between archives and records management principles and practices.

1. *Primary objectives*. Archivists are primarily concerned with the permanent preservation of historically valuable records in order to serve the ends of researchers or other users of original



source materials. The principal objectives of records managers are more directly related to the core objectives of their organization's business: improving administrative efficiencies, reducing costs, and improving the productivity of information users.

**2. Media management.** Archives management and records management are both concerned with managing the same types of record media: information in all forms and formats. Archivists, however, usually begin their hands-on management of these media at the last stage of their life cycle — after they have been judged worthy of archival preservation and are transferred to the archival repository. Records managers, on the other hand, are concerned with the management of all record media from the earliest phases of their life cycle.

**3. Condition and value of records.** Archivists and records managers share a common interest in the quality of recordkeeping systems and the value of the information they contain. Records managers work to improve the quality of both active and inactive recordkeeping systems, while archivists have a strong interest in receiving archival records in good order when they are accessioned into the archives. Moreover, the interests of both groups directly intersect during the records appraisal process, when decisions are made about which records series possess archival value and thus will be transferred to the archives.

**4. Indexing and retrieval systems and techniques.** The systems and techniques used to organize, index, and retrieve common office records are quite similar to those used for collections of archival material. The major differences are that most archival records will not be retrieved and used nearly as frequently as active office records or even as frequently as most inactive records stored in a records center. Both archival and nonarchival records require indexing capabilities that support *precise* retrieval, but archival retrieval does not usually need to be as rapid or *timely*.

The records manager is responsible for managing the "archives of the future." Hence, the records manager must understand the functions and basic techniques of the archivist so that he or she can recognize and preserve archival material in usable form.

### The Archivist

The professional archivist usually has a background in history and social or library science. (As used here, the term *professional* means that the archivist has completed academic work and has experience in the management of archives and the appraisal of archival material.) A business archivist's background may be in history, economics, or business administration. It is not unusual for an archivist to hold advanced degrees and to have had specialized training in archival theory and techniques. An archivist may also pass examinations and become a Certified Archivist, as designated by the Institute of Certified Archivists.

The Society of American Archivists is the professional association through which archivists exchange information about developments and techniques. This organization has contributed significantly to the progress being made in standardizing terminology, methods, and techniques, and in improved training programs. It has provided the incentive to research and to publish information about technical developments in the preservation and use of records. The society's flagship publication is the *American Archivist*, but it also publishes a variety of books and other types of archival reference materials.

### TYPES AND FUNCTIONS OF ARCHIVES

Archival repositories (or *depositories*, as they are sometimes called) are of three general types: public archives, private archives, and manuscript repositories.

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### Public Archives

Federal, state, and local governments create many records in the ordinary course of business. Some of these records are of the average business variety and are treated like any other business record. Other records that have served their primary purpose have permanent value and are retained in the archives. These records document the history of the government, its agencies, and the citizens it serves. Among the many types of records maintained in public archives are census records, tax assessments, land records, and mortgages. Some of these records are maintained for administrative and legal as well as historical purposes.

### Private Archives

Private archives are established to preserve the history of an institution, a corporation, or a family. Many churches, businesses, and associations maintain a private archive to provide evidence and information of their organization's functions, policies, procedures, and operations. This chapter is concerned, for the most part, with private business archives.

### Manuscript Repositories

In addition to their own private archives, many universities maintain archives of other records. These manuscript repositories often contain collections of unpublished manuscripts or records of a particular activity or function not related to the university. For example, Wayne State University in Michigan maintains the archives of labor history and urban affairs. In its collection are the records of several labor organizations, including the United Auto Workers. There are also personal papers of individuals associated with the labor movement and with urban affairs.

The difference between a private archives and a manuscript collection is that, in the case of the former, the scope of the holdings is limited to an

organization and its affiliates, whereas the latter is devoted to the records of an outside organization or individual that has a common function or was involved in a common activity.

### BASIC ARCHIVAL TECHNIQUES

Basic archival techniques include records appraisal, archival arrangement, preparation of finding aids, and development of policies governing access and use.

#### Archival Appraisal

Archivists, like records managers, do not want to preserve useless records. They are selective in choosing material for permanent retention in the archives, and the material they choose must serve the purpose for which the archives was created. This selection process, referred to as *archival appraisal*, is the process of determining the value and thus the disposition of records based upon their current or future administrative, legal, and fiscal value; their evidential and informational research value; or their relationship to other records.

The archival appraisal of records is perhaps the most difficult and important task any archivist must accomplish. This task determines what will be preserved for posterity and what will be discarded. These decisions must be made on the basis of predictive judgments relative to the probable future use and value of record material. These judgments are irrevocable: Once destroyed, archival records cannot be re-created; they are gone forever.

A detailed discussion of administrative, legal, and fiscal values of records appears in Chapter 3. However, the archival appraisal process must also consider other characteristics of records; their evidential and informational values.

**Evidential Value.** Records have evidential value when they document how an organization came into being, how it developed, how it was organized, what its function has been, and the results



of its activities. Thus, archivists must be concerned with the relative importance of each department or agency within the organization, the function it performs, and the activities it is engaged in.

The amount of documentation generated by any office or department depends upon the relative importance of the organizational unit. Offices that make policy or important decisions will usually produce more documentation of archival value because their functions are more significant than those of other offices or operational units.

The activities of an organization are of two types: substantive and facilitative. *Substantive* activities contribute directly to the functions of the organization. For example, if the function of an organization is to produce automobile electronic parts, engineering activities would be substantive. Substantive activities usually produce at least some documentation that would be appraised as possessing archival value. *Facilitative* activities, on the other hand, contribute indirectly to the function of an organization and are common to many organizations having different functions. For example, an in-plant printing department, while very necessary, is a supportive operation and does not contribute directly to the mission of the parent organization. Because this type of activity is not unique, it may be expected to produce very little in the way of archival documentation.

In documenting both the substantive and facilitative activities of an organization, it is necessary to consider the transactions that constitute those activities. Transactions are of two types: policy making and operational. Policy-making transactions will usually generate more documentation of archival value than will operational transactions because they have a greater overall effect on the organization and because operational transactions are generally routine in nature.

**Informational Value.** While records with evidential value document the life span of an organization, records with *informational value* simply, as the name implies, provide information. Informational value is often called research value. Be-

cause the value of a record is intrinsic, the record should be evaluated on its own merits. An appraisal of records with informational value requires a knowledge of research needs and methods. It also requires a knowledge of the discipline to which the records pertain. If the archive contains documents covering a wide scope of interests, professional assistance will be needed because archivists cannot be expected to be knowledgeable in all fields. But if the records are retained primarily for historical research or if their scope is narrow, most archivists, by virtue of their training, can do the appraisal without outside assistance.

There are no absolute standards by which informational value appraisals can be made. In appraising records, archivists normally use their own professional judgment. However, what one archivist may consider important, another may consider worthless. T.R. Schellenberg, perhaps this century's leading archival theorist, said regarding this diversity of judgment: "Diverse judgments, in a word, may well assure a more adequate social documentation."<sup>4</sup> Still, there are some standards upon which the judgment can be made. For example, age alone can be a factor in appraising records for historical use. Records 100 years or older are usually retained regardless of content. Also, the uniqueness of the information is a factor considered in appraisal process. Regardless of the particular approach to appraisal decision making that the archivist may employ, it is critically important that the archivist preserve documentation showing the appraisal criteria utilized and the reasons or justification for the preservation or disposal decisions that are made.

Records pertaining to a noted or historical person usually have informational value, especially if the individual originated the records. Records pertaining to significant historical events, such as wars, disasters, and political innovations, will frequently have historical or research value.

Business archives normally consist of papers of company presidents and other policy-making

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### Appraisal Gu

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officers and generally offer valuable insight into the reasons for corporate actions. These records have informational value.

### Appraisal Guidelines

The records appraised as possessing archival value and accepted for permanent retention in the archives should have at least some of the following attributes:

1. The records document the creation and organization of the company or its subsidiaries.
2. The records document or provide evidence of the company's activities and the consequences of those activities.
3. The records are noncurrent, that is to say, all references pertaining to the subject activities have ceased.
4. The records provide information relative to significant technical questions regarding the company's operations.
5. The records meet possible scholarly needs for the information that is incidentally or accidentally contained in them.
6. The records contains marginally written notes of significance by company officials.
7. The records contain original signatures of officers of the company or other prominent persons.
8. The records have continuing legal or operational value to the company.

The National Archives and Records Administration maintains vast quantities of personnel records of both military and civilian personnel of the federal government, chiefly to substantiate the rights of individuals or their heirs, should such information be needed. In the case of local and state government archives, records pertaining to vital statistics, property rights, and corporate activities are preserved for the benefit of the local community and also for use by researchers for, say, sociological studies.

Archivists cannot retain all material that comes into their possession. They must be selec-

tive and preserve only the material that has evidential or informational value. In many instances, it would be sufficient to retain only a sample of the series rather than the whole series. Further, in some instances an overabundance of records only serves to make the entire collection more difficult to use effectively. In cases where the sheer volume is a problem, the originals can be micro-filmed and then, if they have no value, they can be discarded. In these cases, it is the information that is valuable, not the documents themselves.

### ARRANGEMENT OF ARCHIVAL RECORDS

An archives exists to be used. Efficient use of an archives requires that the records be arranged according to the principles of provenance and original order. In addition, storage techniques, locating systems, and finding aids must be developed so that the records can be easily retrieved when needed.

#### Levels of Arrangement

*Archival arrangement* is the process of organizing archives, records, and manuscripts in accordance with accepted archival principles. These principles serve as guidelines for indicating the best method of physically arranging archival records into logical groupings. Normally, archival records are organized into one or several levels in a hierarchical fashion, from broad to more specific groups or categories, so that the information can be retrieved efficiently. The following levels of archival arrangement are commonly recognized and used.

1. *Record group level.* This highest level of archival arrangement usually refers to the records of an entire institution, agency, or company. Sometimes referred to as a *fond*, particularly in European archival practice.
2. *Subgroup level.* A body of related records



within a record group, usually consisting of the records of a primary subordinate unit of a major organization, such as a subsidiary company. A division, or other primary subordinate unit, a subgroup of archival records may, in turn, be divided into as many groupings as are necessary to reflect the successive organizational units of the organization's hierarchy.

3. *Collection level.* In archival practice, this term is similar in meaning to the terms *record group* and *subgroup*, although it is most often used in reference to the private papers created by individuals or families rather than those of organizations and institutions. The term *collection* also refers to artificial accumulations of manuscripts assembled by a person, organization, or archival repository and devoted to a single theme, event, or type of record. In the plural, *collections* refers to the total holdings—accessions and deposits—of an archival repository.

4. *Records series level.* As defined in Chapter 2 and applied here, the records series consists of separate file units of documents arranged in accordance with a filing system established by the office which created the records. The records in the series are maintained as a unit because they relate to a particular subject or function, result from the same activity, or have a particular form, or because of some other relationship arising out of their creation or use.

5. *File unit level.* A group of related documents or other items of information usually maintained in file folders organized in some logical sequence within a records series is a file unit.

6. *Document or item level.* The smallest unit of record material which accumulates to form file units within a records series, the document or item usually consists of a single record, letter, memorandum, report, form, or manuscript sheet.

This hierarchical concept of archival arrangement and the various levels that constitute the hierarchy are the basis for the manner in which

archival records are organized. However, to complete our understanding of archival arrangement, it is necessary to explain two other basic concepts—provenance and original order.

### Provenance and Original Order

*Provenance* means that archival records should be maintained in an archival repository in groups that correspond to their source of creation. Therefore, records that are received from an agency or a department should remain as a distinctive group and should not be intermingled with those of other offices or arbitrarily rearranged under other groups. The reasons for this principle are as follows.

1. The records provide better evidence of the activities of an organization when they remain intact.
2. The records of one organization constitute an integrated whole. If the records are arranged in another order, such as by subject, research becomes more difficult, if not impossible.
3. Records arranged by unit of organization make description and location easier.

The principle of *original order* is nearly synonymous with that of provenance. It means that the records are left in the order that existed when they were in current use, provided there is enough semblance of order to assure easy retrieval. Rearranging records in good order would be time-consuming and probably fruitless because the new arrangement would serve an undefined need. If the records are entirely without order, however, a simple plan of arrangement should be devised. Because archival records are created in the normal routines of an office, the best way to preserve them is to retain their original order. The original order of the records can often tell the researcher the importance of the records, the importance inherent in certain topics, and the intrinsic value of the records.

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der apply most often to records that have evidential value. Records that are retained for informational value are usually arranged by subject or other category that will assist the researcher.

### Indexing and Retrieval Techniques

Archival indexing and retrieval techniques consist of creating various types of *finding aids* to index, list, or otherwise describe the holdings of the archival repository in order to facilitate their use. Finding aids consist of descriptive media—published and unpublished—created by the repository to establish physical and intellectual control over the records. Common types of archival finding aids include inventories, guides, and registers, described as follows:

1. *Archival inventory.* The basic archival finding aid, an inventory generally includes a brief history of the organization or person whose records are being described and a descriptive list of each records series within the record group or subgroup. The inventory may also include such detailed descriptive data as file titles, inclusive dates, quantity, arrangement of each records series, relationship to other series, and a description of the significant subject content of the records.
2. *Register.* Similar to the inventory, the register is an archival finding aid which was developed by the Manuscript Division of the Library of Congress to describe groups of manuscripts, collections, and records by indicating their provenance, scope, and content, including inclusive dates, biographical notes about the person, family, or organization reflected in the records; their arrangement; and other descriptive data. Sometimes registers are general in nature; other times their coverage is detailed to include a list of events, letters sent and received, and so forth.
3. *Guide.* This archival finding aid is a more

general description of the holdings of an archival repository; it usually describes and indicates relationships between holdings, with record groups, papers, collections, or comparable bodies of materials as the units of entry.

Other common types of archival finding aids include shelf lists, catalogs, index cards, accession folders, and various types of record indexes and listings. Technologies and systems for automating these basic, manual archival finding aids are discussed later in this chapter.

The archivist must make very important decisions relative to the level of detail that should be employed in preparing finding aids to describe each record group, subgroup, or collection. These decisions are so important because the process of preparing finding aids is usually very time-consuming and thus expensive. Finding aids can be prepared to any level in the hierarchy of records: from a general narrative description of the records of an entire record group or collection to a detailed description of each individual document or item in the collection. Decisions concerning the depth of finding aid descriptions are usually made on the basis of factors such as the size and value of the collection, its probable future use, and the resources available to prepare the finding aids. Of course, very detailed finding aids will certainly facilitate the use of a collection, but item-level descriptions are not always essential (indeed, they are seldom justified), especially for very voluminous collections.

In addition to finding aids, archival storage and retrieval systems include shelf-numbering systems and box or container labeling and numbering techniques. Many of these systems share certain common features with the numbering systems used in records centers.

Typically, archival storage cartons are labeled with, at least, the record group name, records series, and other levels in the hierarchy of arrangement, and the box number. Also, the description on the finding aid will show the address of the container. Finally, the finding aids are usually filed



by record group, such as the department agency or number.

The following plan is illustrative of a common scheme for arranging various types of archival material in an archival repository:

1. Corporate and financial records
  - By name and company
  - By name of record
  - By date
2. Biographical records
  - By name of individual
  - By date
3. Biographical photos
  - By name
  - By title
  - By date
4. Facility photos
  - By location
  - By name
  - By date
5. Maps and prints
  - By company
  - By type
  - By date
6. Movies and film clips
  - By title
  - By subject
  - By date
7. Publications
  - By title
  - By date
8. Organizational records
  - By name of organization
  - By date
9. Administrative and operational records
  - By type of technology or discipline
10. Equipment and product data
  - By type of equipment
  - By date
11. Advertisements and marketing
  - By product name
  - By date
12. Sampling of selected records
  - By name of record
  - By date

### Storage Techniques

Archival records are usually maintained on stationary or movable steel shelves, using acid-free (not under a pH of 5.6) containers that are usually constructed of 40- to 60-pound pressboard. The type of carton used in an archives is quite different from that used in a records center. The archives container is of either the horizontal or vertical variety (see Figure 19.1). That is, the records are either laid flat or placed on end. These containers are designed with hinged lids that protect the records from dust and help to reduce moisture or fire damage, and they are usually much smaller than standard records center cartons.

### Access Restrictions

Every archive should have a statement of policy that establishes general rules for access to the records. This protects the records from damage and prevents pilferage and disruption; also, the owners or creators of the records have certain rights of privacy, which must be respected. Sometimes the depositor may impose additional restrictions on use. It is extremely important that the archivist respect and enforce these restrictions with the highest professional ethics because a breach of trust would destroy the confidence of future depositors and possibly do great harm.

### Conservation of Archives

The preservation of records from deterioration is not an exclusive function of the archivist. But because archival records always demand the greatest possible care to prevent their deterioration, this subject is worth discussing.

**Nature of Paper.** The longevity of a paper document depends upon the quality of the paper. Paper consists primarily of cellulose fibers which are held together by sizing agents such as glue, rosin, and starch. The two types of fibers commonly used in the manufacture of paper are rags and wood. Of these, rag provides the highest-quality

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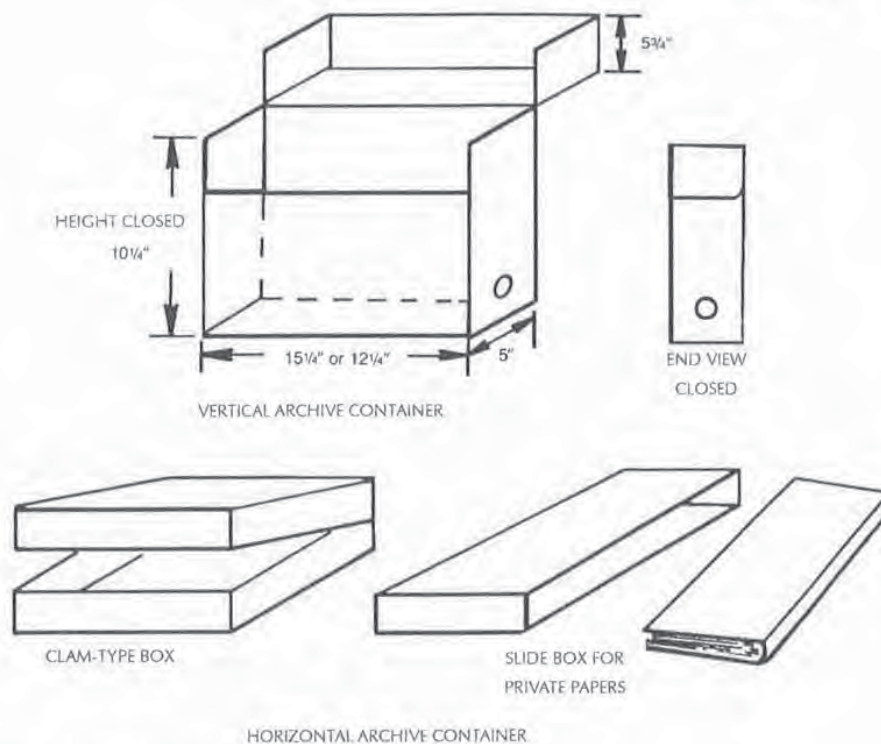


FIGURE 19.1 Archive Containers

paper; however, the amount of acid material or rosin used in the process decreases its permanency.

**Nature of Writing Medium.** India inks, type-writer inks, and printing inks are considered permanent and will not fade over the years. Iron gallotannate inks are the black and blue-black record inks used today; they have relative permanence. Pencil graphite and carbon paper are permanent unless erased or smudged. However, so-called washable inks and the modern-day dye inks, which are available in many colors, do not have the permanence of the iron gallotannate inks and will completely fade in time. Nutgall ink, which

was used on many old records after 1830, was a forerunner of the present-day iron gallotannate inks and exhibits many of its properties. Nutgall ink fades with time but leaves an iron-salt residue that can be read with ultraviolet light or when photographed with infrared techniques, even though it is not legible to the naked eye.

**Environmental Dangers.** The deterioration of paper records can be caused by many factors other than physical abuse. Both natural sunlight and artificial light high in ultraviolet rays will cause low-grade paper to yellow and become brittle and high-grade paper to bleach and become brittle. Yellowing and brittleness are also caused by ex-



posure to high temperatures, even for a short period of time.

For the best preservation of all types of paper, temperatures should be kept at a constant 65°F to 70°F. Humidity should remain at about 50 percent because readings below 30 percent can cause drying and brittleness, while readings above 75 percent can cause molding, discoloration, and weakening of the paper. Air conditioning, with proper air filtration, is the best protection against deterioration from fungi, acid, and other agents harmful to paper.

Insects and rodents are also a source of danger to paper because many varieties will eat the paper. Fumigation and pest-control devices should be used to deal with this type of danger. Some archives have fumigation tanks, which they regularly use when accessioning new material to prevent infestation and spread of the vermin.

**Handling of Archival Records.** Unless records are given reasonable care when handled and stored, they can be damaged. Large volumes should be laid flat on the shelves, but smaller volumes can be set on end properly braced with book-end-type equipment. Cartons should have covers to protect the records from dust and moisture. The records should not be packed so tightly in the carton that they are damaged when inserted or removed, nor so loosely that they fold or bend. Loose documents should be placed unfolded in an envelope before being placed in a carton. Folded documents should be flattened and placed in acid-free folders. Rubber bands should not be used and should be removed because the rubber deteriorates and adheres to the paper. Twine is recommended as a substitute. Paper clips will rust with time and mar the surface of the paper; they should be removed before storage. Plastic paper clips can be used if it is absolutely necessary to clip documents together.

**Lamination, Encapsulation, and Microfilming.** Because archival repositories often contain large

quantities of old records in a deteriorating condition, archivists are confronted with the problem of how to prevent further deterioration and provide for the permanent preservation of valuable documents. Three methods are commonly used: lamination, encapsulation, and microfilming.<sup>5</sup>

**Lamination** involves using a chemical process to deacidify documents by soaking them in chemical solutions to neutralize the acid content of the paper. Then, the document is sealed between two sheets of plastic. This document conservation technique originated in the National Archives during the 1930s, was later refined by William J. Barrow, a professional manuscript conservator, and was for many years widely used in archival repositories. However, the technique is seldom practiced today because it is expensive and it irreversibly alters the original state of the documents.

**Encapsulation** is a document conservation technique developed by the Library of Congress. The process involves encapsulating a document in a sandwich of two sheets of polyester film. Encapsulation is generally less expensive than microfilm and preserves the documents in their original condition.

**Microfilming** is frequently used to capture a photographic image of archival records on a permanent photographic medium. In addition to its value as a preservation and conservation medium, microfilm has several other significant advantages to the archival repository: savings in space, enhancements in the accessibility of the document, better security, and ease of distribution. Microfilm requires a fraction of the space needed to store paper records. If the microfilms are well indexed, the retrieval of archival records can be significantly enhanced, and duplicate copies of the microfilms can easily be made and distributed to other repositories or to an offsite location for security purposes. Archivists who wish to use microfilm as a document preservation medium must, however, take care to produce and store the film so that it retains its properties of archival permanence.

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## ESTABLISHING AND OPERATING THE ARCHIVES

Most of the principles and methods of maintaining an archives discussed earlier in this chapter can be applied to a business archives. The records manager will often require the assistance of an archivist in making appraisals. Assuming that the program would be operated as an adjunct of the records management office rather than as a separate entity, the archives will often be located in the records center. A specific and suitable section of the records center should be allocated to archival material. The space-numbering system and control systems can be the same as for the records center. However, an additional index and set of finding aids should be established as though the archives was a separate facility. The index should be in addition to the regular index, because some of the records in the archives section may still have business value.

If some archival material is to be retained in offices, such as public relations or engineering offices, notations of the location of this material should also be included in the finding aids so that the researcher will have one central source to retrieve the records. Although it is desirable that all archival material be retained in the archives, this may not always be the practice.

Although there is nothing to prevent the records manager from simply setting aside archival material and following archival practices, it is best to have formal recognition of an archival program from top-level management. This recognition is absolutely essential if the program is to be funded separately and is beneficial if the archives is to be used fully.

When the program is established, a statement of policy and procedures should be drawn up and approved by top management. First, the policy should outline the scope of the archives, thereby limiting the material accessioned to those records that serve the needs of the company and the purpose of the archives. Second, it must prescribe access policies and the authority of the archivist.

This statement must be tailored to the organization, recognizing the practices and needs peculiar to the company. Figure 19.2 shows a sample statement of policy and procedures for a company archives.

## BUSINESS ARCHIVES

There are two types of business archives.<sup>6</sup> The first consists of records maintained as part of a research collection of a university; the second is a private archives, maintained by a company to provide historical documentation of its organization and activities. This section deals primarily with the latter type, but the factors involved in appraisal may be identical in both cases.

Because a primary function of any business is to make a reasonable profit for its owners, it is often difficult to justify expenditures for nonprofit activities such as the establishment of a formal archives, particularly because a full- or part-time archivist would have to be employed. For this reason the function of the archivist is often performed by the records manager. Some organizations have recognized the public relations, research, and legal values of a well-managed archives and have employed a full-time, professional archivist to perform this activity. Whether the archivist performs the added duties of a records manager or the records manager performs the added duties of an archivist depends for the most part on the emphasis desired by the organization.

### The Value of Business Archives

Though company officials may not recognize it, a certain amount of archival material is preserved through the records retention schedule. This material can include the records that have been assigned a permanent retention period, such as the minutes of board and stockholder meetings, general ledgers and journals, articles of incorporation, annual reports to stockholders and regulatory agencies, records of capital investment, au-



STATEMENT OF POLICY AND PROCEDURES  
THE ARCHIVES  
OF  
XYZ COMPANY, INC.

1. *General Purpose:* The purpose of the archives of the XYZ Company is to preserve the documented history of the company, its subsidiaries, and predecessor companies for the benefit of advertising, public relations, the scholar, and posterity, as well as for operational use.
2. *Funding:* The archives program is to be funded separately and is under the jurisdiction of the archivist.
3. *Location of Archives:* Archival records may, depending on the rate of reference, the need for special security, or other factors, be housed in any one of the following three locations:
  - a. Archives room of the records center
  - b. Private vault
  - c. Public relations office
4. *Scope of Collection:* The collection will include items such as the following.
  - a. Corporate and financial records
    - (1) Minute books and charters
    - (2) Annual reports
    - (3) General ledgers and journals
    - (4) Records of significant litigation and legislation
    - (5) Records of mergers and acquisitions
    - (6) Records of bankruptcy proceedings
  - b. Biographical records
    - (1) Papers of former company presidents
    - (2) Papers of any policy-making officer
    - (3) Oral history tape recordings
  - c. Photographic and cartographic records
    - (1) Still and movie photographic material
    - (2) Maps and plans
  - d. Publications
    - (1) House organs
    - (2) Histories
    - (3) Others (selective basis)
  - e. Organizational records (selected)
    - (1) Professional and trade associations
    - (2) Employee organizations
    - (3) Regulatory agencies
  - f. Administrative and operational records
    - (1) Computers
    - (2) Management information systems
    - (3) Major improvements

FIGURE 19.2 Statement of Policy and Procedures for a Company Archives

FIGURE 19.2

thority to issue franchises, and records are pre ing, or fiscal p research. They but eventually the best evide and activities.

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- g. Product and equipment data
  - h. Samplings of other significant records and document-type memorabilia
5. *Access and Restriction Policies:*
- a. Access to any archives, manuscripts, or private papers will not be allowed until twenty-five (25) years have elapsed, without special approval of the president, vice-president(s), secretary, treasurer, director of public relations, or the archivist.
  - b. Certain records or papers, designated as restricted, will not be available for access, even though twenty-five (25) years have elapsed, without express approval of the officers named in paragraph 5a.
  - c. Special considerations will be given by the officers (named in 5a above) when the researcher is especially qualified to examine these records or when the best interest of the company demands it. To be properly qualified, the nonemployee researcher shall:
    - (1) Be a college or university professor and supply a statement of research objectives.
    - (2) Be a student in good standing at a college or university and submit proper attestation of qualification by his or her instructor.
    - (3) Be a nonacademic researcher and supply a statement of objectives and references.
  - d. The director of public relations will have access at any time, and other company employees may research those archival records that still have operational value when they are properly authorized.
  - e. Photographic reproductions may be made only with the express approval of the director of public relations or the archivist, and the researcher is not authorized to deposit these reproductions with another organization or person without permission.
6. *Accessions and Appraisal:*
- a. Accessions—Accessions will normally be from the following sources.
    - (1) Records center transfers and disposals
    - (2) Persons or officers within the company
    - (3) Persons outside the company
  - b. Appraisals—All records will be appraised by the archivist, upon receipt or transfer to the records center and before destructions are authorized, to determine suitability for retention. Regardless of sources, accessions will be limited to the scope of the collection.

FIGURE 19.2 Continued

thority to issue stocks and other securities, deeds, franchises, and many engineering records. These records are preserved principally for legal, operating, or fiscal purposes and for possible scholarly research. They may not be archival when created, but eventually they will be, because they provide the best evidence of an organization's function and activities.

When a corporation is dissolved and loses its corporate identity through a merger, many of these records cease to have business value, but their archival value remains. Such records may include

correspondence files of corporate executives; photographs of facilities, products, or equipment; records of corporate involvement in community affairs; records of employees and pay schedules; noteworthy litigation; or marketing plans and product development. The preservation of such archival materials by a business may be based on a sense of responsibility to posterity or on a desire to encourage business history and research. There is a very fine line between appraising records for retention scheduling purposes and appraising for archival purposes; many highly respected records



managers, who serve dual roles, maintain that there is no significant difference.

George David Smith and Laurence E. Steadman<sup>7</sup> have pointed out the practical value of a corporate archives:

*A history of the company is an important though generally unexploited corporate resource. It has many values extending well beyond the celebratory function of the conventional "company history," in either its publicity brochure or anniversary-book form. . . . Once managers recognize the value of the corporate past, they can enhance their ability to diagnose problems, reassess policy, measure performance, and even direct change.*

All of these benefits that accrue from an appreciation of an organization's history ultimately can translate into better management and increased profits.

Convincing management to invest a small portion of its resources in a formal archival program is not an easy task, but a visionary management that appreciates the Smith-Steadman concept of business archives would very likely direct that the program be implemented. The first such visionary was Harvey S. Firestone, Jr., in 1943. Since then, many companies in the United States have established archives. Even so, the number represents only a small percentage of corporations that have recognized the value of business archives. The litigious environment in which corporations operate today makes the selling job more difficult because many executives believe that the information in the archives could be more harmful than helpful to the company in the event of litigation.

Records managers should remember that even in the most receptive business environment, the development and continued existence of corporate archives will depend on a program justification based on costs, benefits, and risks. Such a justification should be based on the uses to which the corporate archives can be put in the ongoing life and operations of the firm. It will usually not be enough to justify the existence of the archives

based on the intrinsic historical value of old records.<sup>8</sup>

## ARCHIVAL AUTOMATION

Archivists have been engaged in efforts to automate the finding aids of the holdings in their repositories since the early days of electronic computing.<sup>9</sup> Basically, these efforts have focused in three areas:

1. The development of national standards for archival automation so that the finding aid data of individual repositories can be electronically shared with other archival repositories throughout the country.
2. The automation of the finding aids of individual archival repositories, so as to facilitate access and use of the holdings.
3. The preservation and use of electronic archives—records of historical value which reside on various types of computer-processable storage media.

### National Standards for Archival Automation

During the mid-1960s, the Society of American Archivists established the Committee on Automated Techniques for Archival Agencies. During the same period, the National Archives initiated its first major automation project called Spindex II, a continuation of an earlier project sponsored by the Library of Congress. Both of these efforts were concerned with creating a computer system that could be used by archival repositories throughout the country. This required the standardization of finding aid structures, terms, data fields, and other format elements used to describe collections of records. This was a difficult undertaking since archival repositories maintain unique collections that are described in various levels and

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depths and that utilize finding aids of widely diverse types and formats. Nevertheless, these efforts continue even today; their ultimate objective is to establish uniform format standards for finding aids that can be used with any computer and its software programs, and permit the electronic exchange of finding aid data between repositories.

More recent efforts at developing national standards for archival automation resulted in the RLIN and MARC-AMC projects. The RLIN (Research Library Information Network) is a service of the Research Library Group, which operates an on-line catalog for rare books and other research materials. Archivists and manuscript curators realized that this on-line service could be utilized as a national database for archival holdings, so they began to contribute descriptions of their holdings to it.

Another effort at establishing a national database of archival holdings was co-sponsored by the Library of Congress, the Committee on Archival Information Exchange of the Society of American Archivists, and a similar group within the American Library Association. These organizations developed the *machine readable cataloging* format for archival and manuscript control—MARC-AMC. Once data from finding aids is entered into this database, it can be transmitted electronically to national networks such as RLIN, OCLC, and others.<sup>10</sup> These systems greatly enhance researchers' ability to determine whether remote archival institutions contain holdings that are relevant to their research interests.

#### Automation of Finding Aids for Internal Repository Use

Just as librarians were eager to use computers to automate their card catalogs, archivists were also eager to use these machines to automate their finding aids. From the earliest days of computing, it was obvious that computer automation of find-

ing aids could offer greatly enhanced search capabilities to the use of archival materials. Paper-based finding aids are frequently bulky and cumbersome to use, and they have very limited cross-referencing capabilities to enable the researcher to locate relevant information which may exist in many record groups or collections, or in many records series of a large record group or collection. With the ability to perform keyword searches in all data fields, computerized finding aids can greatly facilitate the use of the holdings of virtually any archival repository.

#### Mainframe-Based Systems

Prior to the advent of microcomputers, the first efforts to automate archival finding aids utilized mainframe computers. Since they are usually located within universities, government agencies, or large businesses, most archival repositories have access to mainframe-based computing resources.

A well-known example of an early mainframe-based archival automation system uses the Paradigm system installed at the University Archives of the University of Illinois at Urbana-Champaign. As originally designed, this system contained the automated finding aids of the approximately 2,700 collections in the archives, of which over 400 were private manuscripts (personal papers of faculty members). For each collection, the following data were entered into the university's mainframe computer: collection name, accession number, inclusive dates, dates of accessioning, type and quantity of documents, access restrictions, several name and subject descriptors indicating the nature of the collection, and shelf location data. It should be noted that this level of finding aid automation is relatively general; as originally configured, the Paradigm system did not include file folder or item and document level data.<sup>11</sup>

Although this mainframe-based approach to



archival automation has its advantages, it suffers from many of the disadvantages of many main-frame computing applications: custom programming is required to produce the software to run the applications, long lead times are usually required to develop the applications, and the archival repository is dependent on the computer department's staff for all system development and support functions. This situation began to change during the 1980s with the advent of the micro-computer, the development of the DOS operating system and database management technology, and the creation of thousands of applications software programs to run on these small computers, including some programs specially designed to automate the finding aids of archival repositories.

### PC-Based Software for Archival Automation

Beginning in the mid-1980s, archival automation software products were developed for operation on microcomputers. During the ensuing years, the prices of both the PC hardware and the archival automation software have become much more favorable, to the extent that the tools for archival automation are affordable for virtually any repository. This software is easy to install and use, and it provides a convenient method of computerizing many basic types of archival finding aids in most small to medium-size and some larger repositories.

Archivists who want to install this type of computer system should define their requirements carefully, evaluate a number of competing products, and select the product that comes closest to satisfying their requirements. The best products have a substantial base of successful installations, provide flexibility for customization, have powerful data retrieval capabilities, and are sold by reputable software companies which can provide good after-the-sale product support. Chapter 9 contains a more detailed discussion concerning evaluating software products.

### Electronic Archives

Businesses and government organizations have been creating significant quantities of records in electronic (machine-readable) format for many years, and some of these records possess archival value. The archivist is therefore faced with the responsibility of how to preserve and manage these electronic archival materials.

The following are some guidelines which should prove helpful to both records managers and archivists in planning and implementing policies and programs for machine-readable archives:

1. *Computer media containing machine-readable records are generally not considered to possess qualities of archival permanence in the same sense as paper and microfilm media.* As noted in Chapter 8, if an organization wishes to retain computer records for many years and be assured of being able to read them, it must usually rely on paper or microfilm output to meet its archival needs. High-quality paper records and archival microfilm can be expected to have a readable life span of several hundred years if these media are stored properly, but the guaranteed readability of computer media is much more problematic. Even if the data on the computer media retain their integrity for, say, a hundred years, the archival repository must maintain the proper hardware and software to read the records. Such maintenance is very problematic because these system components have a relatively short service life. Many organizations address these problems by preserving the electronic records in ASCII format, which provides the best and most flexible option for processing the records on a variety of computer platforms.

2. *Unless computer-based archival records need to remain in a computer-processable format in order to support ongoing research requirements, it may be difficult to justify the cost of preserving them in this format.* Most historical research is accomplished using static rather than dynamic

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3. *Electronically transferred records which are not archived on film (COM) archival records properly preserved (microfiche) cycle of the remain in a require archiv*

### SUMMARY

Archives are an organization continuing, or one that never loses its present preservation programs archival record programs. The more archivists frequently play a role in selecting the organization's the facility itself.

Archives number of basic important are appropriate or conservation reference service



data. Only very specialized computer databases would need to be preserved in computer-processable format in order to support sophisticated research requirements. Some examples might include census data, medical research data, and space exploration data.

3. *Electronic archival records can often be transferred to COM or COLD media, both of which are better and more practical for permanent archival storage.* Computer-output microfilm (COM) often provides a better medium for archival retention than magnetic media. If it is properly produced and stored, COM can offer excellent archival properties for the permanent preservation of computer data. The microfilm (or microfiche) can be produced at a point in the life cycle of the records when they no longer need to remain in a computer-processable format but require archival retention. At a more sophisticated

level of technology, computer-based archival records can sometimes be preserved on COLD (computer-output-to-laser-disk) media, which would provide better archival properties than magnetic media, but still may not be sufficient to ensure the same degree of permanent usability as hard copy or microfilm media.

The archives of most organizations constitute a very small percentage of the records holdings, usually not over 1 to 2 percent and seldom more than 5 percent. However, this small quantity of records is extremely important to the life and culture of the organization, and the records manager must be both intellectually and technically equipped to manage these archival records. Otherwise, the corporate memory will be lost to history.

## SUMMARY

*Archives* are defined as "the noncurrent records of an organization preserved because of their continuing, or enduring, value." These are records that never lose their value and thus require permanent preservation in an archival repository. Formal programs for the preservation and use of archival records are called archives management programs. These programs are often run by one or more archivists, although records managers frequently play the primary or a secondary role in selecting the records that will be preserved in the organization's archival repository, or in managing the facility itself.

Archives management programs consist of a number of basic archival functions; the most important are appraisal, accessioning, preservation or conservation, arrangement and description, and reference services for archival records.

The records management profession evolved from the archival profession in the United States during the 1950s, and today the two professions have separate and distinct identities. In the government arena, however, the relationship between archives and records management is still quite close. The two professions share much in common: they manage the same records media; both are concerned with the quality and condition of records; and both use similar systems and techniques to facilitate their access and use.

There are three types of archival repositories: public archives, private archives, and manuscript collections. An archival record is one that has evidential value or informational value. *Evidential value* means that the record documents the function and activities of an organization. *Informational value* means that the record provides



unique or valuable information for research and is not necessarily associated with the function or activity of an organization. These record values constitute the essence of the archival appraisal function—making the critically important decisions about which records to retain for posterity and which ones to destroy.

Activities of an organization are either substantive or facilitative. They are substantive when they contribute directly to the organization's functions and facilitative when they are supportive in nature and are common to many organizations that have different functions. Substantive activities usually produce a larger quantity of archival documentation than facilitative activities. These factors must be considered in the archival appraisal process.

Archival records are arranged according to the principles of provenance and original order. These principles mean that the records should be grouped according to their origin and that the order which was used during their active life should be retained. Under these principles, the records of an organization will usually be preserved in hierarchical groupings that correspond to their provenance and original order. These groupings are the record group level, the subgroup level, the records series level, the file unit level, and the document or item level.

Archival indexes, or finding aids, consist of inventories, registers, guides, catalogs, shelf lists, and other types of indexes used to describe the records of individual record groups or collections of manuscripts, so as to facilitate access and use of the records.

Archival records should be preserved in facilities and equipment designed to ensure their permanent life, to arrest further deterioration, and to ensure that the records will remain in a usable condition. Encapsulation and archival microfilming are common preservation techniques; lamination is seldom used as an archival preservation method today.

The business archives is established to preserve the history of corporate organizations and to serve the needs of scholarly research, public rela-

tions, and posterity. The records manager frequently serves as the archivist and must make appraisal decisions as part of the retention program. The business archives is frequently a part of the records center.

Archival automation programs are used to computerize the finding aids of a repository, so as to facilitate access and use of its holdings. In a larger context, these programs are also concerned with developing national standards for archival automation, so that the finding aid data of individual repositories can be electronically shared with other repositories throughout the country. Finally, archival automation is concerned with the preservation and use of electronic archives—records of historical value which reside on various types of computer-processable storage media. In recent years the development of PC hardware and applications software specially designed to automate archival finding aids has provided new opportunities for archival repositories to take advantage of computer technology to improve access and use of their holdings.

#### QUESTIONS FOR DISCUSSION

1. Why is it important for the records manager to have an understanding of archives management?
2. List and describe briefly four basic archival functions.
3. At what time in the life of records are they usually appraised for their archival value?
4. What are the three general types of archives? What are the purposes or functions of each?
5. What is the difference between the substantive activities and the facilitative activities of an organization?
6. What are the distinguishing differences between the evidential value and the informational value of records?
7. Explain the difference between provenance and original order.

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#### PROJECT

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8. Why must restrictions be placed on the use of, or access to, archival materials?
  9. Identify the archival values possessed by business records.
  10. Identify the steps involved in establishing and operating a business archives. Why is each step essential?
  11. What factors must be considered in the preservation and care of material stored in an archives? Explain the importance of each.
  12. Describe one of the several major projects undertaken at the national level to develop national standards for archival finding aids.
  13. Electronic archives will often be impractical for all but the largest and most specialized archival repositories having sophisticated research requirements. Explain why.
  14. Describe the principal advantages of PC-based archival automation programs over their mainframe-based counterparts.
- b. Write a report to the vice-president of administrative services
    - (1) explaining the need for an archives management program within your organization and (2) requesting authority to establish the program.
  - c. Attach an annotated bibliography (approximately 60 words per article) to support your request.
4. Outline a 40-minute speech, to be presented at the annual convention of the Society of American Archivists, on the topic "Appraisal Criteria for Archival Records."
  5. Prepare a plan for archival automation of your organization's archival repository. Indicate the objectives and benefits of the program and the basic approach for computer technology to be employed.

#### PROJECTS

1. The Association of Records Managers and Administrators' board of directors has asked you to make a survey of its membership to determine the status of business archives. Prepare a questionnaire, which is to be sent to all members of the association, to gather the appropriate data.
2. Write an article on the topic "The Influence of Automation on Archives Management" for publication in *American Archivist* magazine. Your article should be between 1,000 and 1,200 words. It should include a bibliography consisting of at least five periodical references.
3. As the records manager in a large organization, you have decided to seek permission to establish an archives management program.
  - a. Read at least three periodical articles that will provide you with background

information for justification of your request.

#### CASE PROBLEM

The Life Insurance Company of North America (LICNA) has just completed an inventory of all of its records. Many of the records found in an old warehouse date from 1910, when the company was founded. LICNA's management feels that many of the records may have historical value, but it does not want to retain all to preserve a relative few. About one half of the records pertain to LICNA, and the other half pertain to several smaller insurance companies that have been merged into LICNA over the years. The archivist is asked to make a tentative appraisal of the records for historical value from a skeletal list provided. If the tentative appraisal warrants, a detailed appraisal will be commissioned. You have been assigned to assist the archivist. From the following list, which represents records from all companies, indicate which records would most likely *not have* historical value and explain why. Of those records that are to be preserved, which do you think would be essential to reconstruct a basic history of the company?



Register of canceled bonds, 1910-1925  
 Minute books of directors meetings, 1910-1946  
 General ledgers, 1945-1946  
 Journal entries, 1910-1946  
 Annual reports to policyholders, 1910-1946  
 Salary schedules for officers, 1910-1935  
 Personnel files (incomplete series): clerks and operating personnel, 1919-1934  
 Reorganization proceedings (bankruptcy), 1932  
 Bills of lading, 1941-1945  
 Trial balances (accounting records), 1927-1940  
 Canceled stock certificates, 1951-1956  
 Correspondence files of corporate secretary regarding legal matters, 1920-1955  
 Canceled property leases, 1960-1975  
 Album of advertising clippings, 1923-1935  
 Box of photos, unidentified, dates unknown but obviously old  
 Miscellaneous correspondence files of the president's office dealing with various financial matters, 1945-1955  
 Payroll records, 1923-1937  
 Reports of state insurance examinations, 1910-1927; 1975 to present  
 Acquisitions of other companies, 1965 to present  
 News releases, 1985 to present  
 Videotapes, 1988 to present  
 Purchase orders, 1985 to present  
 Accounts payable files, 1985 to present

## NOTES

1. National Archives and Records Administration, *A Federal Records Management Glossary* (Washington, D.C.: U.S. Government Printing Office, 1989).
2. For further readings on each of these basic archival topics, see the books published in the "Archival Fundamentals Series," published by the Society of

American Archivists, Chicago, Illinois. See particularly: James M. O'Toole, *Understanding Archives and Manuscripts*, 1990; Frederic M. Miller, *Arranging and Describing Archives and Manuscripts*, 1990; Thomas Wilsted and William Nolte, *Managing Archival and Manuscript Repositories*, 1991; F. Gerald Ham, *Selecting and Appraising Archives and Manuscripts*, 1993; and Mary Jo Pugh, *Providing Reference Services for Archives and Manuscripts*, 1992.

3. See T. R. Schellenberg, "Archival Interests in Records Management," in *Modern Archives: Principles and Techniques* (Chicago: University of Chicago Press, 1956), pp. 26-43; Frank B. Evans, "Archivists and Records Managers: Variations on a Theme," *American Archivist*, Vol. 30, 1967, pp. 45-58; Richard H. Lytle, "The Relationship Between Archives and Records Management: An Archivist's View," *Records Management Quarterly*, April 1968, pp. 5-8; Bill Walker, "Records Managers and Archivists: A Survey of Roles," *Records Management Quarterly*, January 1989, pp. 18-20; Robert L. Sanders, "Archivists and Records Managers: Another Marriage in Trouble," *Records Management Quarterly*, April 1989.

4. Schellenberg, p. 149.

5. Kenneth W. Duckett, *Modern Manuscripts* (Nashville: American Association for State and Local History, 1975), pp. 101-107.

6. See Edie Hedlin, *Business Archives: An Introduction* (Chicago: Society of American Archivists, 1978); "Business Archives: A Special Issue," *American Archivist*, Vol. 45, No. 3, Summer 1982.

7. George David Smith and Laurence E. Steadman, "Present Value of Corporate History," *Harvard Business Review*, November-December 1981, pp. 164-173.

8. David O. Stephens, "The Records Manager's Role in Archives Management." Paper presented to the Diamond State Chapter, ARMA International, Wilmington, Delaware, November 15, 1983.

9. See Charles Dollar, *Archival Theory and Information Technologies: The Impact of Information Technologies on Archival Principles and Methods* (Macerata, Italy: University of Macerata Press, 1992). Available from the Society of American Archivists, Chicago, Illinois.

10. Duckett, p. 161.

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## Lockheed Corporation

### The Corporate Records Center

The Lockheed Corporation, Calabasas, California, recognized the value of a records center as one of the most important components of an effective records management program and built its own corporate records center in 1965.

Lockheed ranks among the top 45 industrial companies in the United States and the second largest defense prime contractor. It employs 70,300 people around the world, of whom more than 20 percent are scientists and engineers. Lockheed is preeminent in the fields of spacecraft, space systems, fleet ballistic missiles, and aircraft for airlift, reconnaissance, antisubmarine warfare, and other special missions. The corporation is a major producer of tactical weapon systems, electronics and communications systems, marine systems, and ships, and is a major provider of scientific, engineering, and technical support services.

As Corporate Director, Management Support Services, for Lockheed, William Benedon is responsible for corporate administrative services, including word processing, graphic arts, and office layouts, and for coordinating and directing the records management efforts of the multidivision company operation involving all aspects of records administration and office automation applications. He is a Certified Records Manager and holds a master's degree from New York University Graduate School of Business Administration. Before joining the Lockheed staff in 1954, he was Records Administrator for the state of New Jersey. In 1980, Mr. Benedon received the Silver Anniversary Special Services Award from the Association of Records Managers and Administrators (ARMA) for 25 years of outstanding service and contributions to the association and to the records management profession. He is also editor emeritus of the association's magazine, the *Records Management Quarterly*. The "William Benedon Professional Achievement Award" was established in his honor in 1994 by the Greater Los Angeles Chapter/ARMA.

The Lockheed records center was planned as part of the total corporate records management program under the leadership of Mr. Benedon. He believes "when scientifically designing for housing records, a records center provides maximum capability for economy, rapid processing and retrieval, and security."

Located in Lockheed's Kelly Johnson Research Center Facility in Saugus, California, the center was designed to provide the optimum in the maintenance of inactive, archival, and vital records.

### Basic Structure

The center is a single-level, square building with a loading dock area. The exterior walls are 6-inch, tilt-up concrete slab, and the interior walls are 8-inch concrete block. The building is 17 feet of clear height in storage and service areas, and there are no windows. It is a class B vault with two 2-hour doors. A vital records



vault is located underground below the office area. This is a class A vault with a 4-hour door and 12-inch reinforced concrete walls.

### **Size and Capacity**

The building has a total of 57,127 square feet. It consists of the main area, 49,478 square feet; the vital records area, 3,434 square feet; the processing area, 1,372 square feet; and the office area, 2,743 square feet. Administrative space is provided for the supervisor and other personnel, for a conference room, for a reference room, and for a lobby. The building can house 244,769 cubic feet of records. It has built-in expansion capacity. Since it was first occupied in November of 1965, two additions have been completed in 1970 and 1981. The present holdings of the center are 235,000 cubic feet.

### **Shelving and Containers**

All steel, 30- by 42-inch and 32- by 42-inch bolt-assembly shelves on 23-inch centers are used. They are placed back-to-back with 4-inch space on the 30- by 42-inch units to prevent overhang. A combination of T- and L- shaped uprights are used for support. Standard corrugated containers are used—12- by 10- by 15-inch double wall, 125 lb., hand holes, shoe lid cover. X-ray and magnetic tape containers are 6 by 16 by 15 inches. Engineering drawing containers are 4 by 4 by 45 inches with tuck-in ends. Aisles between shelving are 32 inches. In the engineering area, however, they are 45 inches. The main aisles are 6 feet, 7 inches, wide.

### **Servicing and Handling Equipment**

Equipment used in the Lockheed records center includes steel 9-step pulpit ladders, a hydraulic lift platform with 500-pound capacity, a forklift to handle 2,000 pounds, conveyers, jacks, library trucks, a pickup van for special delivery of records, a dumbwaiter that operates between the main floor and the underground vault, and a laser copier and fax for reference needs. There are also 5 area telephone reference stations in the main area with direct dialing to all Lockheed facilities and a two-way, on-spot communication system.

### **Air Conditioning and Humidity Control**

Because appropriate atmospheric conditions are critical in effective maintenance of records, the Lockheed center has air conditioning throughout the entire building with 16 units on the roof. This design prevents the entire system from ever going out at one time. The vault, as well as the two additions, are humidity controlled at a 60 percent maximum level to protect microform and magnetic records.

### **Fire Prevention**

Because fire is a threat throughout the main area, security is provided. Clearance is a event of a dis.

### **Microfilm and**

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### **Records Destruction**

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### **Automated Control**

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### **Personnel**

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### **Fire Prevention and Security**

Because fire is always a major threat to records, the center has a sprinkler system throughout. A fire hose as well as extinguisher stations are also provided. Because the main area is a class B vault and the underground section is a class A, maximum security is provided. There is also 24-hour guard service at the facility. Security clearance is also a requirement. Emergency lighting is available at the center in the event of a disaster.

### **Microfilm and Magnetic Tape Storage**

Microfilmed vital records are maintained in the underground vault. Motion picture film is stored in the vault and also in the main storage area. Data processing tapes for vital record rotation and retention are kept in the vault as well as in the main storage area.

### **Records Destruction**

A majority of Lockheed's records are recycled. The bulk of the classified records are destroyed by a commercial disintegration company. Small volumes are destroyed by a pulping machine.

### **Automated Control System**

The center uses a fully automated on-line system for control. It is the LARCS (Lockheed Automated Records Control System), which was designed and developed in-house. It operates on NOMAD 2 database on the MDAL 1400A mainframe computer. The system covers all aspects of records center operations as well as company-wide retention scheduling, vital records, and other areas of records management. It operates via PROF terminals, which also provide electronic mail and word processing capability.

### **Personnel**

The efficiency of the center is reflected in the minimal number of employees required to operate it. There is a center supervisor, one records center control clerk, and three records center clerks.

All aspects of the Lockheed Corporate Records Center show that the goals of a facility of this type are being met: economy, efficiency in processing and retrieval, and security.



## Glossary

- Accession** A shipment of records received into the Records Center or archives for storage and retrieval.
- Accession book** A control device used in numeric filing to keep track of new files as they are created.
- Accessioning** The conveyance or transfer of the legal and physical custody of archival records from their offices of creation to an archival repository; also, the creation of records documenting receipt and acceptance of the records into the archives.
- Access restrictions** In archives management, the policies imposed by an archival repository to limit or restrict open access to and use of some or all the holdings of the repository to certain persons and/or for certain periods of time.
- Access time** The interval between the time records are called for or requested and when delivery to the requesting party is completed.
- Accuracy ratio** A measure of how many of the requested documents were actually found.
- Acid** A chemical substance capable of forming hydrogen ions when dissolved in water. Acids can weaken cellulose in paper, board, and cloth.
- Acid-free** In chemistry, any material with a pH of 7.0 or higher. Acid-free paper refers to paper that is free of active acid during its manufacture. However, over time, acid may form in some papers and boards.
- Acid migration** The transfer of acid from an acidic material to a less acidic or neutral one. This can happen when an acidic material and a less acidic material come into contact with each other, such as the cover of a book or pamphlet to the less acidic paper of the inside text.
- Activity (reference) ratio** A measure of file activity. It is calculated by dividing the number of records requested each month by the total number of records in the system.
- Administrative value** In records appraisal, the usefulness of a record in the conduct of an organization's business; the value of a record for the purpose for which it was created. Also referred to as *operational value*.
- Adverse inference** A finding by a court that information contained in records that were inappropriately destroyed by a person or party is incriminating or unfavorable to that party, even though the information is not available to the court.
- Air drying** A method of drying damp (but not completely soaked) paper records by placing the records in a cool, dry room, and exposing them to maximum air flow, frequently aided by the use of fans.
- Alkaline** Having a pH greater than 7.0. Alkaline substances may be added to materials to neutralize any acids present. They may also be added during manufacturing (as of paper) to form a buffer against the later formation of harmful acids. Some common buffers are magnesium carbonate and calcium carbonate.
- Alphabetical filing** Arrangement of records in accordance with the alphabet. The records may be arranged by subject, name, organization, or place.
- Alpha classified** Subject files without the use of codes.
- Alphanumeric** A filing system combining alphabetic and numeric symbols to develop codes for classifying information.
- American Standard Code for Information Interchange (ASCII)** A widely utilized coding scheme which specifies bit patterns for computer-processible information. The ASCII coding scheme is utilized in virtually all minicomputers and microcomputers and in many non-IBM main-frame computer systems.
- Analog copier** A copier that can transfer the image from the original to the copy using the same general principle as a camera.
- Analog image** A non-electronic image; non-digitized.
- Analytical index** An index that isolates single items or concepts, as in an index of specific topics of information included under broader headings.
- Aperture card** A tab-size card with a rectangular hole cut into it which is designed to hold a frame of microfilm.
- Appraisal, records** The process of determining the value and thus the disposition of records, and designating them as either temporary or permanent, which may be accomplished as a part of the pro-



cess of developing records retention schedules or as a separate act. The evaluation of a document's worth or value for retention or archival purposes, based upon its current or predicted future use(s) for administrative, legal, fiscal research or historical purposes.

**Archival, archivally sound** Durable, permanent, and suitable for preservation in archives. Although no specific standards exist for labeling a material archivally sound, it is understood to suggest that the material is very durable.

**Archival value** In records appraisal, the determination that records possess current or future value in elucidating the history of an organization and are thus worthy of permanent preservation. Also referred to as *historical value*.

**Archives** The noncurrent records of an organization preserved or appropriate for preservation because of their continuing, or enduring value. A place in which archival records or other important historical documentation are permanently maintained.

**Archivist** A person responsible for or engaged in one or more of the following activities in an archives: records appraisal and disposition, accessioning, preservation, arrangement, description, reference service, and exhibition or publication of archival materials.

**Areal density** The number of bits of data that can be recorded in a given space on a particular medium.

**Arrangement, archival** The process and results of organizing archives, records and manuscripts in accordance with accepted archival principles, particularly the principle of *provenance*, at as many as necessary of the following levels: record group, subgroup, collection, records series, file unit, and individual document or item. Arrangement of archival materials into logical groupings based on these general to specific levels of arrangement is designed to establish physical and intellectual control over the records and facilitate their access and use.

**Association of Records Managers and Administrators, Inc. (ARMA International)** A professional association representing records managers and records management interests throughout North America and in other countries. Membership is approximately 11,000.

**Authority list** Relative index showing key words by which subjects are classified, also known as a thesaurus.

**Authorization** Signatures of top management who approve a particular project.

**Automatic teller machines (ATM)** Terminals that enable depositors to deposit and withdraw funds and transfer funds from one account to another without human assistance.

**Automation, records** A general term referring to the application of a wide variety of computer-based systems and technologies to improve the management and performance of recordkeeping systems.

**Auxiliary file** A synonym for random file or a file of supporting documents.

**Backup** In vital records protection and disaster recovery planning, the act of creating an extra copy of vital data resident on the internal storage device of a computer and placing that copy in a secure location remote from the site where the computer is located.

**Bar code** A type of coding used in automatic identification systems consisting of lines or bars and spaces of varying widths positioned in a vertical format to create an optical code field which, when read by an optical reader, can be converted into computer-processable data. In records management applications, bar codes can be affixed to loose paper documents, file folders, records storage cartons, microfilm, or other record media to provide an enhanced level of item tracking and inventory control over a collection of stored records.

**Bar code sorters** A machine reader that sorts readable mail quickly and accurately by bar codes printed on the mail.

**Baud** A unit of transmission speed in electronic communications; generally, a baud equals a bit of data per second.

**Billing report** A report that includes rent, maintenance, taxes, installation and removal charges, prompt payment discounts, and copy credits.

**Bit** Abbreviation for binary digit; the smallest unit of information recognized by a computer. Also used as a unit of measurement of a computer chip's memory capacity.

**Bit mapping** A process of scanning a document to convert it to binary codes, representing either black or white pixels, which are recorded on an optical disk or magnetic media for electronic display of the document image. Also called *raster scanning*, *digitizing*, or simply *scanning*.

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- Bits Per Inch (BPI)** A measure of the density of data on magnetic tape.
- Bleed** To run off the edge of the trimmed printed sheet.
- Block numeric** Consists of assigning a block of numbers to each of the major functions of the organization.
- Body of the form** A part of a standard business form consisting of grouped or sequenced items calling for the information desired.
- Boolean logic** In electronic recordkeeping systems, a search technique in which the terms *and*, *or*, or *not* are used in a search statement for the purpose of expanding or limiting the scope of the search, thereby providing more precise retrieval of required data.
- Box design** A set-up that includes printed captions located in the upper left corner of the form.
- Break** Subdivision in a file classification system.
- Bulletin boards** Multiple conversations take place on the computer at the same time and the user can choose in which conversation to participate.
- Business archives** The historically valuable records of a private business corporation.
- Business form** A document with a fixed arrangement of captioned spaces designed for entering and extracting prescribed information. The most widely used type of business record.
- Business reply mail** Envelopes provided to customers to facilitate orders, payments, and subscriptions.
- Byte** A sequence of adjacent binary digits that are operated upon as a unit and constitute the smallest addressable unit of data in a computer system.
- Calcium carbonate** A commonly used buffer. See *alkaline*.
- Caption** Information that appears on the label of a guide, folder, or file drawer.
- Carousel file** A file which rotates horizontally like a lazy Susan and may house letter-size documents or cards.
- Cartridge, film** The container that facilitates loading and unloading a reel of microfilm.
- Cathode ray tube (CRT)** Device similar to a television tube, used to display text in computer systems.
- Centralized files** Records of common interest to many employees that are placed in one location under the control of one supervisor.
- Central processing unit (CPU)** The part of the computer that contains the main storage, arithmetic unit, and special register groups; Performs arithmetic operations, controls instruction processing and other basic computer operations.
- Central reproduction** A location housing sophisticated copiers and/or printing equipment geared to volumes of from 100,000 to 450,000 copies per month at speeds exceeding 90 cpm.
- Certified mail** Mail for which the Postal Service provides a mailing receipt. A record of delivery is maintained at the recipient's post office.
- Chain index** An index that links subjects in a hierarchy to their direct relations.
- Charge-back** A system of charging whereby total costs of the copier are divided by total number of copies produced to determine cost per page. This cost per page is then charged to each department for the number of copies it produced.
- Charge-out** A record made of papers removed from the file; the act of removing papers from a file for loan purposes.
- Checklist** A list contains step-by-step procedures on the job, lists of equipment and materials used, and/or questions to be asked in completing tasks.
- Chemical stability** The characteristic of a material that indicates its resistance to degradation and decomposition. A necessary characteristic of materials used in preservation. See also *archivally sound*.
- Chief information officer** A senior executive position established in many organizations whose primary responsibility is to coordinate, manage and integrate the many disparate information-related functions of the organization.
- Chips** Microprocessors that are complete computers on a single chip of silicon.
- Chronological filing** Arrangement of documents in order of date, usually for follow-up of activities or information.
- Cine mode** A manner of positioning an image on microfilm when the data line run the width of the film. This is also referred to as *portrait mode*.
- Classification** A process of putting like things together. Also, a group of records related by common characteristics.
- Classified filing** A system in which related material is filed under a major subject heading. Also known as the *encyclopedia system*.
- Client/server architecture** A term used to describe how the user (client) works with and uses the various servers (PCs) on a telecommunications



- network. Other network servers are: File Servers, Database Servers, Image or Optical servers, OCR, FAX and Print Servers, and Scan/Work Station Servers.
- Close of the form** A space on a standard business form for approving signatures.
- Code** A piece of information such as a number, an alpha abbreviation that is easily remembered, or nonsignificant alpha letter or letters.
- Coded classified** Subject files classified with the use of codes.
- Coding** Marking the indexing units on the document to be filed.
- Color coding** A system in which a color is used to represent a number, a word, or a group of words.
- Comic mode** A manner of positioning the image on microfilm when the data lines run the length of the film. This is also called *landscape mode*.
- Commercial records center** A business that provides off-premises records service to various businesses through storage, retrieval, and disposition of inactive business records, and other related tasks for an established fee, or contractual arrangement.
- Compact disk, read-only memory (CD-ROM)** A compact laser disk with read-only memory, designed for recording document images and information for mass distribution.
- Compression** A process of eliminating the zero codes (white spots) on the disk in order to increase storage capacity of the optical disk. A compression ratio is a relative indication of the amount of compression used.
- Computer-assisted retrieval (CAR)** System that uses on-line digital data to locate microfilm images arranged in random order, usually on a reel format.
- Computer conferencing** A method of sending, receiving, and storing typed messages within a network of computer users.
- Computer output microfilm (COM)** Process of recording computer digital output directly onto microfilm.
- Computer output to laser disk (COLD)** Process of transferring computer output to and optical disk (See also *COM*).
- Conservation** In archives management, the specific steps undertaken to maintain, repair, restore or otherwise conserve archival records. Basic archival conservation techniques include encapsulation, fumigation, and microfilming. Also called *archival preservation*.
- Contact printing, microfilm** A process of film image duplication requiring the emulsion of the original film to be placed in contact with the emulsion of the copy film while exposed to a light source, followed by development.
- Contempt of court** A finding by a court or administrative tribunal where the court or tribunal orders documents to be produced by a person or party for use in legal proceedings and the party defies the order by failure to deliver the requested documents to the court.
- Continuous forms** A group of forms consisting of strips of connected forms that can be separated by perforations. Also known as *fanfold*.
- Control card** An index card used to locate and retrieve a record stored in the records center.
- Convenience files** Files located near the point of usage.
- Convenient copier** A copier that usually operates at speeds ranging from 10 to 45 copies per minute and is used in installations generating between 1,500 and 20,000 copies per month.
- Conveyers** A type of electromechanical filing system that can bring carriers or folders to the point of reference or can be used to move documents either horizontally or vertically.
- Coordinated index** An index in which each document or item is numbered as it is received and words are extracted directly from the text and are used without change for index terms (uniterms).
- Copy center** A dedicated area or remote operation designed for reproduction.
- Copy film** The film used to duplicate an original film through contact printing.
- Copy management** The system of supervision that determines how reprographics equipment is used, identifies the requirements for duplicate records, and provides control over copier purchase and production costs.
- Copying** Process of making copies either with an office copier, offset, or other type of duplicator.
- Correspondence** Interoffice letters, letters, memorandums, postal cards, printed information slips, and so on.
- Correspondence manual** A manual used as a means of standardizing the methods and products of a correspondence department in a large organization.

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- Cost-avoidance justification** A method of proving the value of new equipment or procedures by demonstrating that other costs can be avoided.
- Cost/risk/benefit analysis** In records retention decision-making, the concept that records should be retained based on the cost, risks, and benefits of retaining or destroying the records and how these factors decline, expire or increase during their life cycle.
- Cross index** An index that lists the records series in alphabetical order, cross-referenced to their alphanumeric codes.
- Cross reference** A notation showing that the records may be filed elsewhere.
- Customer** A user of records center services.
- "Cut" sheets** Single-copy form which may also be referred to as a *flat form*, *flat sheet*, or *single sheet*.
- Data** A general term used to denote raw facts and figures from which conclusions may be inferred.
- Database** In electronic recordkeeping systems, a set of computer data, consisting of as least one file or group of related files, usually stored in one system or subsystem and made available to one or more users for various applications.
- Database management system** Software that integrates data files into a database and then integrates it with application programs and computer hardware.
- Database server, optical disk system** A server that controls and processes the indexes to the optical disks on a telecommunications network.
- Data dictionary** Broadly, a compilation of significant data elements in a database, the standards for them, and the procedures for processing them. In records management, a listing of document indexing terms which are designed to provide consistency in identifying documents and files in an electronic recordkeeping system so that the records may be effectively retrieved.
- Data element** In electronic recordkeeping systems, a combination of characters or bytes referring to one separate item of information, such as a name, address or age, in a database. Also referred to as a *data item*. Standard means for information defined in EDI.
- Data files** Computer-processible files which store numeric data (and sometimes data in text format) as quantitative values, which permits the numbers to be manipulated using arithmetic computations.
- Data range** The period of time covered by records in the file.
- Data set** A separate, discrete body of computer data (text files, data files, or image files) that is maintained within a computer system, subsystem or database and is logically related, serves a common purpose or function, and can thus be considered as a separate unit for records management purposes. Also referred to as an *electronic records series*.
- Data validation** The process of verifying the accuracy of all data entered into an electronic recordkeeping system, so as to ensure the integrity of the system.
- Decentralized files** Records that are made and used by a single organizational unit and that are maintained and controlled at the point of origin.
- Decimal-numeric coding** A numeric coding system for subject filing systems.
- Decollator** A machine that separates copies of computer printouts and removes the carbon paper.
- Deleting** In electronic recordkeeping systems, the process of removing or erasing recorded information from a medium, especially from a magnetic disk, diskette or tape. Sometimes called *scratching* or *erasing*.
- Descriptor** A broad subject heading that stands for an idea or concept.
- Desktop publishing** The use of a personal computer to format documents to appear as if they are typeset.
- Destruction authority** A formal authority to destroy records.
- Destruction, records** The process of obliterating or otherwise rendering illegible, irretrievable, or unusable information contained in a record.
- Destruction suspension** The procedure to cease the routine destruction of records when it is determined that those records may be relevant to foreseeable or pending litigation, a government investigation, or a regulatory audit.
- Diazo film** A contact print film with a diazonium coated emulsion used to duplicate microfilm images.
- Digital copier** A type of copier that scans and transfers digital impulses to paper.
- Digitize** The process of electronically converting an analog image or document to a bit map image by electronic scanning.
- Digitizer** An alternate name for an electronic image scanner which "digitizes" or "raster scans" a document image.



- Direct-access filing** A system that permits access to files without reference to an index.
- Directive** A written instruction communicating policy and/or procedures in the form of orders, regulations, bulletins, circulars, handbooks, manuals, notices, numbered memorandums, and similar issuances.
- Directory** A method of organizing and managing PC-based electronic records into logical groups, with an index or table of contents listing all files contained within the directory to facilitate their access and use.
- Disaster** A sudden, unplanned calamitous event that creates an inability on the part of an organization to perform critical business functions for some period of time.
- Disaster preparedness** A set of policies and procedures to make sure employees are aware of how to handle potential disasters, as well as actual implementation of such procedures.
- Disaster recovery manual** A manual consisting of a disaster recovery plan, information about disaster preparedness, procedures for disaster-in-progress, and plans for disaster recovery.
- Disaster recovery plan** A plan consisting of information about structures, occupants, and hazardous materials, as well as procedures to safeguard records.
- Disaster recovery planning** The advance planning and preparations necessary to minimize loss and ensure continuity of the critical business functions of an organization in the event of a disaster.
- Discovery** The legal process that permits parties involved in a legal proceeding to obtain records and information relevant to the proceeding that are in the possession of another party.
- Disk drives, optical** Devices used to drive, record, and read optical disks.
- Diskettes** Platter-shaped devices used for the storage of electronic records in computer systems. Also termed *floppy disks*; these magnetic storage devices are commonly used for off-line storage of electronic records in PC computing environments.
- Dispersal** In vital records protection, the act of placing copies of vital records in locations other than those housing the originals. Dispersal may be "built in" as a part of existing procedures, or "improvised" by creating an extra copy of the vital records for storage in a secure location, usually remote from the organization's primary place of business.
- Disposal** In records retention programs, the process of destroying obsolete records.
- Distribution list** A file that identifies the location of every recipient of the document.
- Document** A record which constitutes the smallest unit of filing, generally a single letter, report, form, or other item contained within a recordkeeping system. Also, the smallest unit of filing. Sometimes called a *page*.
- Document production** The process of retrieving and producing a record for use in a legal proceeding.
- Drawer file cabinet** Vertical file cabinet, also called standard filing cabinet which usually houses correspondence.
- Duplex numeric filing** A system in which numbering consists of two or more parts separated by a dash, a space, a period, or a comma, such as 85-1.
- Duplicating** The process of making duplicate copies.
- Electronic archives** Historically valuable records that exist in machine-readable or computer-processible form.
- Electronic data interchange (EDI)** A standardized method of electronically transmitting and processing data from one computer to another.
- Electronic filing** The storage and retrieval of information in digital, computer-processible form.
- Electronic form** Any form designed for use with electronic equipment. May take the form of electronic forms composition, template electronic forms, full electronic forms, machine-readable forms, electronic data interchange, and electronic funds transfer.
- Electronic forms composition** The design of camera-ready copy for paper-based forms.
- Electronic funds transfer (EFT)** A subset of EDI which permits the transfer of funds from one account to another and to verify account balances around the world.
- Electronic mail (E-mail)** A message that is transmitted electronically from one computer terminal to one or more locations via telephone lines.
- Electronic records** Records containing machine-readable, as opposed to human-readable information and consisting of character-coded electronic signals that can be processed and read by means of computers.
- Electronic records series** A separate, discrete body of computer data (text files, data files or image files) that is maintained within a computer system subsystem or database and is logically related, serves



- a common purpose or function, and can thus be considered as a separate unit for records management purposes. In data processing terminology, referred to as a *data set*.
- Emulsion, microfilm** The silver halide coating on one side of the microfilm that retains the image photographed.
- Encapsulation** An archival conservation technique designed to assure the permanent preservation of valuable documents by "encapsulating" them between two sheets of polyester film, thereby arresting further deterioration.
- Encapsulation, polyester** Encapsulation using polyester film.
- Encyclopedic filing system** Topics are subdivided so that several folders may contain information pertaining to the main topic.
- Ergonomics** Science concerned with the design of an effective work space for people working with machines.
- Evidential value** The usefulness of records in documenting the functions and activities of an organization or institution; how it came into being, how it developed, how it was organized and the results of its activities. A primary criterion used in appraising records to determine their archival value.
- Exception report** Listing of those machines performing out of their recommended volume range.
- Expense-reduction justification** A method of proving the value of new equipment or procedures by demonstrating that current costs will be less.
- Express mail** Overnight mail service of the United States Postal Service.
- Extended binary coded decimal interchange code (EBCDIC)** A coding scheme which specifies bit patterns for computer-processible information for electronic records created on IBM mainframe and other large computers.
- External communication** The structured communication that is conducted with people and groups outside the organization.
- Facility management** Practice of coordinating the physical work place with the people and work of the organization.
- Facsimile (FAX)** A remote photocopying system which scans and transmits images to a receiving printer via telephone lines or satellite.
- FAX server, optical disk system** A server that controls all FAX Functions in the imaging system.
- Federal Records Act of 1950** A law enacted by the United States Congress that defined the term *records management* for the first time in any federal statute. This law also required all agencies of the federal government to establish a records management program.
- Fiberboard** A kind of paper board consisting of laminated sheets of pressed fiber.
- Field** A category of information that contains data items in a database. Also referred to as an *attribute*.
- File or files** A group of related documents. In paper-based recordkeeping systems, the singular form often refers to one or more documents contained within one file folder. The plural form is a general term which denotes a collection of records, or a group of related documents or file folders which have been arranged in a predetermined manner in order to facilitate their retrieval and use. In electronic recordkeeping systems, refers to a single or group of related computer-processible data resident on some type of electronic records storage device.
- File integrity** Accuracy and completeness of the records.
- Filename** In PC-based electronic recordkeeping systems, the name assigned to an individual document filed within the system, which serves as the means of retrieving it. May be combined with a "filename extension" to provide a more descriptive document identifier.
- File plan** A logical order of documents or files; an arrangement or scheme by which all documents may be stored.
- File server** A computer dedicated to processing and storing data in a network computing environment. Sometimes called a *network server*.
- File server, optical disk system** A server that controls information traffic on the network and provides necessary files and software.
- Filing** The process of arranging and sorting records so that they may be retrieved rapidly when needed.
- Filing manual** A manual that identifies the requirements and procedures for proper filing.
- Filing unit** Each word, abbreviation, or initial used to file information.
- Finding aids** In archives management, refers to a wide variety of archival indexing and retrieval systems and techniques to describe the holdings in an archival repository in order to facilitate their use.
- Fire-resistant file cabinet** A file cabinet or other



record container constructed with special insulation for the purpose of reducing the risk of loss of its contents from elevated heat conditions usually produced by fire.

**First-class mail** A service of the United States Postal Service used for letters, postcards, postal cards, and for sending checks and money orders weighing less than 11 ounces.

**Fiscal value** In records appraisal, the usefulness of a record in serving as documentation of the financial transactions of an organization, or as evidence of the organization's tax liability.

**Fixed magnetic disk drive** A magnetic disk drive with non-removable, rigid platters; the most common type of hard disk drive. A direct access storage device.

**Flat filing** Wide, shallow shelves or drawers are housed in counter high units that provide a working surface.

**Floor load** The capacity of a floor area to support a given weight expressed in terms of pounds per square foot.

**Flowchart** A graphic illustration of the procedural steps in an operation.

**Fog index** A measure of readability based on length of words and length of sentences.

**Footprint** Space that is required for the item to stand on.

**Format** See *Layout*.

**Forms analysis** The process of determining what information should be provided on specific forms.

**Forms analyst** Person who determines the need for each type of form used by an organization and makes recommendations concerning cost reduction and efficiency improvements.

**Forms catalog** May range from a simple listing of forms by number only to comprehensive catalogs with detailed information.

**Forms control** Routines for designing, procuring, storing, distributing, reviewing and disposing of all of the organization's forms.

**Forms design** The process of assembling the required data into a logical format that satisfies recommendations made as a result of the analysis of forms.

**Forms distribution chart** A chart showing the existence of copies and the backtracking of copies.

**Forms inventory** A survey of all forms used to identify problems such as duplication or improper application of technology.

**Forms management** The function that establishes

standards for the creation, design, analysis, and revision of all forms within an organization and assures that they are designed, produced, and distributed economically and efficiently.

**Fourth-class mail** A service of the United States Postal Service used for packages weighing one pound or more; parcel post.

**Freeze drying** A method of drying wet paper records by quick-freezing and subsequently drying the records in a vacuum chamber.

**Fumigation** A method of conserving valuable documents by exposing them to a poisonous gas or vapor, usually in a vacuum or other airtight chamber, to destroy insects, mildew, or other hazards that may endanger them.

**Functional classification file** A forms control file that brings together forms serving a similar purpose so that they may be studied for possible combination.

**Functional filing** A method of filing that describes the records series by the functions they perform.

**Geographic file** A file in which records are arranged alphabetically according to location.

**Guide** In archives management, a type of finding aid that includes a general description of the holdings of an archival repository. Also, a divider used in files to identify sections of the file and to provide physical support for records.

**Guide tab** A projecting portion of a guide that shows the filing caption.

**Handbook** A publication consisting of established rules to be followed by employees in performing their individual tasks.

**Hard disk crash** The failure of a microcomputer's internal storage device, resulting in the instant destruction of all documents and data residing on the disk.

**Heading** The facilitative part of the form that includes a title and a form number.

**Hierarchical index** An orderly arrangement of items, or concepts, such as in a classified index.

**Hierarchical filing system** A filing system that uses a classification system to bring related material together.

**Historical value** In records appraisal, the determination that records possess value in elucidating the history of an organization and are thus worthy of permanent preservation as archival materials. Also referred to as *archival value*.

**HVAC** Heating, Ventilation, Air Conditioning.

**Image count** A method of retrieval of a microfilm

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- image, that optically counts the images on a roll of microfilm, using an external computer index to determine the image number.
- Image files** Electronic files that contain computer-processible images of documents for storage on magnetic or optical media.
- Imaging** A term used to describe the process of recording an image of a document on either microfilm or optical disk.
- Imaging, document** The process of creating an exact image of a document utilizing either electronic or photographic technology.
- Important records** Records containing information that is essential to operate an organization and protect its assets, but which could be re-created or replaced if destroyed. Decisions to take special measures to protect these records from loss should usually be based on a determination as to whether the cost of replacement exceeds the cost of protection.
- Improved dispersal** The creation of additional copies especially for dispersal.
- Inactive records** A series of records with a reference rate of less than one search per file drawer per month.
- Index** An arrangement of names or topics in either alphabetic or numeric order. A listing of the headings (titles, captions) of the files showing their locations.
- Indexing** In manual filing, determining the name or number under which a document is to be filed. In electronic filing, identifying the keyword under which a document may be retrieved.
- Indirect access filing** Reference to the code under which the material is filed must be made before the file can be referenced.
- Information** Generally, knowledge communicated by others or obtained by study and investigation. Intelligence which can be communicated in either graphic form or by alphanumeric characters. Facts or data communicated or received. Data placed into a meaningful context for users.
- Informational value** The usefulness of records in documenting the persons, things, or other matters dealt with by an organization, in contrast to documenting the organization's functions and activities. A primary criterion used in appraising records to determine their archival value.
- Information management** The administration of information, its use and transmission, and the application of theories and techniques of information science to create, modify, or improve information handling systems.
- In-House** Performing a function within the organizational structure, rather than through an outside source. Opposite of **Out-sourcing**.
- Ink-jet printing** A printing method using tiny drops of ink that are sprayed onto specially coated paper.
- In-plant** Refers to a printing facility set up inside an organization whose primary business is not printing.
- Input** Data entered into a computer system, usually for future retrieval and manipulation.
- Inspection** The process of checking records to be sure that they are released for filing.
- Institute of Certified Records Managers** An organization which administers a program for professional certification of records management specialists. Certification is awarded based on satisfactory completion of a written examination, as well as review of professional credentials.
- Instructions** A list that explains how to fill in the form and what to do with the form.
- Intelligent character recognition (ICR)** A data capturing process that can capture data from any size, shape, or type of paper, without the restrictions typically associated with other such processes.
- Intelligent processing unit** Computer interface that permits a copier to be used as both a printer and a scanner.
- Interfile** The process of putting documents in their proper sequence and place in a file when they have not previously been withdrawn.
- INTERPOST** International facsimile message service available between the United States and more than 40 foreign countries.
- Inventory, archival** In archives management, a type of finding aid used to describe collections or groups of records in a manner that facilitates their retrieval and use.
- Inventory, records** An identification, description, and qualification of all of the records possessed by an organization.
- Job interrupt** A device that permits the operator to stop a job in progress to allow another job to be completed.
- Job recovery** A device in the copier's memory that tells the operator how to restack the originals so that the copy job can be completed without missing any pages.



- Jukebox** A multi-disk computer-controlled device used to store and robotically retrieve the optical disk and to mount the disk on a drive with rapid on-line response.
- Keyword searching** In electronic recordkeeping systems, the ability to search for any single word within certain or all fields of a computer database, thereby providing more precise retrieval of required data.
- Lamination** An archival conservation technique involving the deacidification of paper documents, which are then sealed between two sheets of plastic. The technique is not widely practiced today because it alters the original state of the documents.
- LASER** An acronym from its descriptive name, meaning Light Amplification by Stimulated Emission of Radiation. It is an extremely narrow and coherent beam in the visible light spectrum. Among other uses, it records and reads bit-maps on optical disks.
- Latent image, microfilm** An undeveloped image on the emulsion of exposed microfilm.
- Lateral file** Side-open file cabinet; may also mean shelf filing.
- Layout** The shape, size, style, and general makeup of a particular form. Also called format.
- Legal retention considerations** A term that refers to a number of legal issues that may indicate how long an organization should retain certain of its records so that it can successfully defend itself against litigation actions, enforce its legal rights, or meet its other legal obligations and needs.
- Legal retention research** The process of identifying and interpreting the laws and regulations promulgated by all jurisdictions which contain records retention requirements applicable to an organization.
- Legal value** In records appraisal, the usefulness of a record in complying with statutes and regulations, as evidence in legal proceedings, or as legal proof of business transactions.
- Life cycle** The life span or time period from the creation or receipt of a record through its useful life to its final disposition. The five stages in the life cycle of a record include the creation stage, the distribution and use stage, the storage and maintenance stage, the retention and disposition stage, and the archival preservation stage.
- Lignin** A plant substance generally responsible for the strength and rigidity of plants but considered a detriment to the stability of manufactured paper and board. The term *lignin-free* indicates that the majority of lignin has been removed during the manufacture of paper.
- Limitation of assessment** The period of time, after a tax return is filed or the tax becomes due, during which the taxing agency can determine or modify the tax owed. This time period is often considered to be a relevant factor in making records retention decisions concerning various types of financial records which may be subject to audit.
- List index** The simplest kind of index to compile—an alphabetical list of words or phrases.
- Local area network (LAN)** The interconnection of computing devices within a defined and relatively limited geographical area, thus permitting the sharing of electronic records and other computing resources by all users having access to the network.
- Locator report.** A monthly inventory of copier equipment, including make, model, serial number, location, monthly volume, volume by user.
- Magnetic disk** A platter-shaped device used for the storage of electronic records in computer systems; generally used in high performance computing environments requiring very rapid, on-line access to electronic records. A direct access storage device.
- Magnetic ink character recognition (MICR)** Specially shaped numbers are printed in horizontal bands on checks with magnetic ink containing iron oxide. MICR can be used as computer input or to facilitate sorting.
- Magnetic media** A general term which refers to a variety of devices on which computer-based records are stored. These media are constructed with a ferromagnetic recording material on which the electronic records reside. The most common electronic media are magnetic disks, diskettes, and magnetic tapes.
- Magnetic tape** A strip of plastic film coated with a magnetic recording material and wound onto reels of various sizes; used for the off-line storage of electronic records in computer systems.
- Magneto optical disk** A re-writable optical disk (MO)
- Mail** Letters, postcards, electronically transmitted messages, documents, publications directives, forms, packages, or any other written communication received for distribution or dispatch.
- Mail center** Location where mail operations take place
- Mailgram** Electronic message service of Western



- Union which provides next-day delivery in the United States.
- Mail handling** The process of getting the written word from one point to another.
- Mail manual** A manual that gives specific instructions in all phases of handling both incoming and outgoing mail.
- Mail operations** A series of tasks performed by action officers, mail room personnel, secretaries, clerks, and others in moving an organization's written communications.
- Mail robot** An unmanned, self-propelled vehicle that follows an invisible guideway to move from office to office.
- Mail supervision** Activities that ensure that the written word is moved from the point of origin to its destination in a manner that meets stated organizational goals.
- Mainframe** The central processing unit of the largest size computer system or a large centralized host computer used on a corporate-wide basis.
- Majors** Divisions that represent the major functional areas of an organization.
- Manual** A published control device under which an organization or a group within an organization functions.
- Manuscript repository** An archival facility established for the purpose of preserving collections of historically valuable records, usually from sources other than the organization which operates the repository. University archives that preserve archival records covering many fields of study and which were created by many disparate organizations and individuals are a prime example of manuscript repositories.
- Mapping** The process of programming each data field of an electronic form to control the efficient fill-in of variable data by assigning definitions, formulas, and restrictions to these data fields.
- Microcomputer** The smallest computer size; usually synonymous with *personal computer*, or PC. This class of computers includes desktop and portable units, referred to as *notebook* and *subnotebook* microcomputers.
- Microfiche** A sheet of microfilm containing multiple microimages in a grid pattern, usually 4 x 6 inches in size.
- Microfilm** Photographic film, with specially designed emulsion, used primarily to photograph documents and other information material. The term is also used as a verb to describe the process of microfilming.
- Microfilm image transmission** An automated system that robotically retrieves cartridges of microfilm, locates requested image or images, raster scans the image, and transmits it over the telecommunications system to the requestor who reads the documents on a display monitor.
- Microfilm jacket** A unitized microform similar to the microfiche in appearance and function, constructed of two clear sheets of polyester acetate material, a header strip, and sealed on the edges and at 16mm intervals forming channels for strips of microfilm.
- Microform** A term describing the format in which microfilm may be utilized, such as a reel, cartridge, microfiche, film jacket, or aperture card. A generic term for any form, either film, paper, or plastic, that contains microimages.
- Micrographics** The art of producing or reproducing information in miniature form.
- Microimaging** The process of imaging documents onto microfilm. A synonym for microfilming.
- Microprocessor** A term for the central processing unit of a computer, particularly those installed in microcomputers or PC's.
- Microsoft disk-operating system (MS-DOS)** An operating software system developed and marketed by Microsoft Corporation which controls the basic operating functions of IBM and compatible microcomputers or PC's. These basic functions include the electronic signals between the computer and various applications software programs, such as word processors and spreadsheets.
- Middle-digit filing** A system in which predetermined or consecutively assigned numbers of units (or documents) are divided into groups of two digits, with placement made into the major section of the file according to the middle digits of the identifying numbers.
- Minicomputer** A computer of medium size and capacity.
- Mobile aisle file** Movable sets of file shelves. They are moved, either manually or by motor on a carriage that is either imbedded in the floor or contained within a special platform.
- Model** A representation of a subject of inquiry, used frequently in systems analysis to evaluate alternatives.
- Monitor** An electronic image display device, consist-



- ing of a cathode ray tube (CRT) and various internal electronic boards and controllers.
- Multifunction device** A device that combines laser printing, facsimile, digital scanning and photocopying.
- Narrative style** A detailing of events in prose form.
- Near-line storage** The storage of optical disks or other computer media in a jukebox or other retrieval device which provides rapid, unattended access to the electronic records resident on the media.
- Neutral** Having a pH of 7.0. Neither an acid nor an alkaline substance.
- Non-perforated microfilm** Microfilm that does not have sprocket holes on each edge.
- Nonrecords** Extra copies of documents kept solely for convenience of reference. In government usage, records not usually included within the scope of the official records of an agency or governmental organization.
- Non-recurring costs** One-time costs, such as purchase price, transportation costs, and installation charges.
- Non-removable media** Magnetic or optical disk storage devices which are "fixed" within the disk drives which are used to record the information residing on them. These media provide very rapid, on-line processing and retrieval of electronic records.
- Numeric filing** Arrangement of records in ascending order or sequence (i.e., 1, 2, 3, 4, 5, and so forth).
- Numeric history file** A form control file consisting of copies of each form used by the organization, placed in a visible file in numerical order.
- Obstruction of justice** A deliberate and malicious act to interfere with a government investigation or judicial proceeding.
- Office landscaping** The arrangement of production units within an open area separated by equipment or other dividers, based on the needs of work flows, traffic patterns, and communication networks.
- Off-line information** Information stored on media located apart from the computer device on which it will be retrieved and processed.
- Offset** A process or the equipment used for high-volume duplication of copies from a specially prepared master.
- Off-site protection** The protection of vital records by storage of the original or a copy of the records in a facility remote from the organization's place of business.
- On-line help screens** In electronic recordkeeping systems, operating procedures that can be accessed on-line while using the system, so that the user does not have to refer to a user manual.
- On-line information** Information stored on media housed on magnetic or optical disk drives within a computer system, thus permitting very rapid access and continuous processing.
- On-site protection** The protection of vital records which are maintained in facilities and equipment located on the organization's premises, at or near the point of creation or use of the records.
- Open shelf filing** Storage of records on open shelves rather than in closed drawers.
- Operating procedures manual** A manual that deals with the internal policies, organization, and processes of one department or function of an organization. Such a manual can emphasize the performance of individual tasks and jobs, departmental practices, or general practices in a specific field.
- Operational value** In records appraisal, the usefulness of a record in the conduct of an organization's business; the value of a record for the purpose for which it was created. Also referred to as *administrative value*.
- Optical character reader (OCR)** A machine for reading a bar code that is displayed on the mail representing the zip code for that address.
- Optical character recognition (OCR)** A method of entering data into a computer by using an optical scanning device to read the contents of documents.
- Optical character recognition server (OCR)** A server that processes all OCR (Optical Character Recognition) functions on an Electronic Imaging Network.
- Optical disk** A platter-shaped device for the storage of very large quantities of electronic documents and data in computer systems. Optical media utilize high concentrations of laser light as the method of recording the information on the disk platters. In records management applications, optical disks are typically utilized for the storage of high volumes of electronic documents and data requiring very rapid on-line or near-line retrieval. Optical disks are available in erasable and non-erasable formats. Initially called an Optical Digital Disk, but now most frequently referred to simply as an Optical Disk.

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- Optical or object (image) server** A server that directs all functions of the jukebox, on an electronic imaging network.
- Order of entry** First unit to be considered in filing.
- Organizational manual** A publication that identifies the executive structure of an organization, unit, or department.
- Original order** A principle of archival arrangement that holds that archival materials should be arranged in the order and sequence in which they were maintained when they were in current use in the office that created them, rather than in accordance with some arbitrary scheme, provided their original order is sufficient to permit easy access and use.
- Occupational Safety and Health Administration (OSHA)** A federal agency supervising health and safety of workers.
- Out-guide** A guide to indicate what material has been taken from the file and by whom.
- Outsourcing** The practice of a business contracting or buying support services, supplies, or parts from outside sources rather than performing the services or manufacturing the parts themselves within their own organization and with their own employees.
- Owner** The originating office of a record that has been transferred to a records center.
- Packing density** The amount of data or images that can be recorded in a given area of a medium. See also *areal density*.
- Password protection** A method of providing security for computer-based records against unauthorized access using special codes or "passwords" assigned to designated users to permit them access to the records.
- Pegboard forms** The pegboard has a row of pegs affixed down the side of the board. The objective is to hold two or more forms in perfect alignment (registration), and to provide duplicate copies in one writing operation.
- Pen plotters** Fiber tip, felt tip, or ballpoint pens used for printing engineering and drafting applications.
- Permanence** The characteristic of a material that makes it able to last. See also *chemical stability*, *archivally sound*.
- Permanent records** Those records having sufficient historical or other value to warrant permanent or continued preservation beyond the time they are needed for administrative, legal or fiscal purposes.
- Records considered so valuable or unique in documenting the history of an organization that they are preserved permanently in an archive.
- Personal copier** Desktop copier that produces up to 10 copies per minute. It is usually used to produce fewer than 400 copies per month.
- pH** In chemistry, a measure of the acidity or alkalinity of a solution. The measure is compared to a scale from 0 to 14 with 7.0 being the neutral point. Acids fall in the range below 7.0 and alkaline substances fall above 7.0.
- Phonetic index** Keywords (subject and name type data) are converted by the computer into a phonetic code to minimize both computer storage requirements and the occurrence of sorting errors due to spelling and terminology ambiguities.
- Phonetic systems** File arrangements based on a numerical code that represents certain key letter sounds in the alphabet.
- Phrase searching** In electronic recordkeeping systems, the ability to search two or more consecutive words within certain or all data fields of a computer database, thereby providing more precise retrieval of required data.
- Pixels** A word meaning "picture elements," or more frequently "bits" or "dots." The smallest segment of a document that can be digitized.
- Planetary camera** A type of microfilm camera in which the film and document remain stationary during filming and the lighting is from an overhead source. Sometimes referred to as an overhead (lighted) or flatbed camera.
- Playscript format** A format that defines procedures by identifying workers and the required action of each.
- Polarity, microfilm** The characteristic in a film image that is either "positive" or "negative," that is, sign reversing. A negative image is the opposite of the original and a positive is the same as the original.
- Policy** Broad guidelines for operating an organization. A basic guide to action that prescribes the boundaries within which activities are to take place.
- Policy manual** A publication that states the course of action to be followed by an organization, unit, or department in conducting its activities.
- Polyester** A strong, colorless, transparent plastic (polyethylene terephthalate). Commonly used in preservation and to make covers, folders, and so on. Commonly used in *encapsulation*.
- Polyethylene** A flexible plastic used to make covers for



- photographic materials and other items. It can be transparent or translucent.
- Polypropylene** A hard plastic used in making stiff holders or containers.
- Polyvinyl acetate** A colorless transparent plastic solid used in adhesives. Abbreviated as PVA. Some PVA adhesives are commonly used in preservation.
- Polyvinyl chloride (PVC)** A fairly unstable plastic abbreviated PVC. Generally considered unsuitable for use in preservation.
- Precise retrieval** The ability of a recordkeeping system to consistently deliver to its users exactly the records and information they request—no more and no less.
- Preface** Includes the organization's definition, purpose of the manual, purpose of the program, advantages to be derived from the proper use of the manual, and a request for suggestions for improving the manual.
- Pressboard** A tough paper board with a high glaze on it for strength and stiffness. Used in notebook covers.
- Primary categories** Primary-level headings, the most important categories within each major heading (function).
- Primary value** In records appraisal, the value of information contained in records in support of the purpose(s) for which the records were created.
- Printer** Device used to print electronic images or data, which may be displayed on the monitor screen, onto paper using various technologies, such as ink-jet, bubble-jet, or dot matrix.
- Printing on demand** Information is available in computer files that can be shared by any number of users.
- Print server** A server that controls all print functions on an imaging network.
- Priority mail** First-class mail weighing 11 ounces or more.
- Private archives** An archival repository containing the records of private businesses, associations, institutions, or other organizations adjudged worthy of permanent preservation as archival materials.
- Procedures** A group of methods, consisting of all the steps that are taken to record, analyze, transmit, and store information needed to serve a single, specific purpose. Procedures usually provide detailed instructions of how policy is to be carried out.
- Procedures audit** An examination of all standard procedures used to accomplish standardized tasks.
- Procedures manual** A source of instruction and reference for the personnel responsible for creating, preparing, processing, storing, and disposing of records.
- Processing** The various procedures and chemicals required to develop the latent image on the emulsion of microfilm. Film developing.
- Processing area** The area set aside for accessioning, interfiling, or refiling.
- Productivity** The value of measurable output compared to the value of input.
- Provenance** A principle of arrangement of archival records that holds that archival materials should be arranged in groups that correspond to their source or office of creation, and that they should not be intermingled with records created by other offices or sources of creation.
- Public archives** An archival repository containing the records of agencies of government adjudged worthy of permanent preservation as archival materials.
- Public data network** A network that offers third-party access to large databases and serves as a clearinghouse for electronic messages of subscribers.
- Random access memory (RAM)** Computer memory used to process and store data that can be rapidly accessed directly rather than sequentially.
- Random filing** A process of storing documents as they are created in random or nonsequential order.
- Range searching** In electronic recordkeeping systems, the ability to limit the scope of a search of numeric, date and other fields by using range symbols, such as *greater than* or *less than* to provide more precise retrieval of required data.
- Reader-printer** A microimage projection device which optically enlarges and displays the image on a screen and which also prints a copy of that image on paper, using office copier technology.
- Reading file** An extra copy file of outgoing correspondence, usually arranged chronologically. Also call a *day file*.
- Read-only memory (ROM)** A solid-state memory for programs that is inflexible and unalterable.
- Reciprocating file** A power file where the whole file remains intact and one shelf takes the place of another in front of the worker, and rotates as in a Ferris wheel.



- Record** Recorded information, regardless of medium or characteristics. Any paper, book, microfilm, card, magnetic tape, disk, map, or any copy or printout that has been created or received by an organization and has been used by that organization or its successors as evidence of its activities or because of the information contained. In databases in electronic recordkeeping systems, a collection of related data fields.
- Record copy** The copy of a record or document that is placed on file as the official copy and therefore provides evidence of the organization's official position on a matter. In governmental organizations, a record having the legally recognized and judicially enforceable quality of establishing some fact.
- Recordkeeping requirements** Statements in statutes and regulations which require a regulated party to maintain certain records for some period of time.
- Records analyst** Specialist in the analysis and evaluation of systems and procedures involved in the creation, processing, and storing of records.
- Records appraisal** The analyses of records with the objective of establishing retention policy.
- Records center** An area in a building or a separate building for storing inactive records.
- Records Disposal Act of 1943** A law enacted by the United States Congress which, for the first time in U. S. history, legally authorized the records retention schedule as a means of disposing of records of agencies of the federal government.
- Records disposition** The process of elimination or destruction of records, usually under a records retention program.
- Records inventory** An identification, description, and quantification of all of the records possessed by an organization.
- Records management** A professional discipline that is primarily concerned with the management of document-based information systems. The application of systematic and scientific controls to recorded information required in the operation of an organization's business. The systematic control of all organizational records during the various stages of their life cycle: from their creation or receipt, through their processing, distribution, maintenance and use, to their ultimate disposition. The purpose of records management is to promote economies and efficiencies in recordkeeping, to assure that useless records are systematically destroyed while valuable information is protected and maintained in a manner that facilitates its access and use.
- Records management manual** A publication that defines the scope of the records management program, its authority, the services it provides, and an introduction to the concepts to enhance its understanding and acceptance.
- Records manager** The individual within an organization who is assigned the responsibility of systematically managing the recorded information generated and received by the organization in accordance with accepted records management principles and practices.
- Records recovery plan** A plan for restoring damaged vital records to a useable condition following a disaster. Usually a part of a comprehensive vital records protection or disaster recovery plan.
- Records retention** The act of maintaining or holding records for future use, often under policies and procedures of a formally established records retention program.
- Records retention and disposition manual** A manual that includes information about controlling designated records and information so that the organization will be in compliance with government requirements.
- Records retention program** The component of a records and information management program which provides policies and procedures specifying the length of time that an organization's records must be retained. The program provides for the systematic destruction of records that no longer serve any useful purpose, and is implemented by effecting the destruction of records on a scheduled basis, as specified in the organization's records retention schedule. The retention program is one of the organization's major tools for controlling the growth of its records, and it also minimizes the legal risks that can be associated with maintaining and destroying business records.
- Records series** A group of identical or related records that are normally used and filed as a unit and which permits evaluation as a unit for retention scheduling purposes.
- Recurring costs** Items such as supplies, power, insurance, taxes, and direct labor.
- Recurring data chart** A chart showing items common to all forms in the group; common to some, but not to all; and found only on one form in the group.



- Reduction ratio** The ratio of the size of an original document to its size on filing.
- Reference copy** A copy of a record used primarily for information purposes. The term is often used to denote records consisting of duplicate rather than official copies of documents.
- Reference time** Length of time taken to examine the document or file.
- Refile** The process of returning a record to its original place in a file after it has been withdrawn.
- Register** In archives management, a type of finding aid used to describe manuscript collections and other archival records in a manner that facilitates their retrieval and use.
- Registered mail** A mail service providing tight security from the point of mailing to the delivery of office.
- Relational database** A database design that allows direct relationships between any two data elements.
- Relative index** A dictionary-like listing of all possible words and combinations by which material may be requested. Satisfactory performance reliability of equipment can be measured by the number of copies between service calls (CBSC) and service-call frequency (SCF).
- Remote diagnostics** A device that informs a host computer that some sort of part or supply failure will occur in the copier.
- Remote encoder** A device that allows any and all mail to be bar-coded and processed mechanically.
- Remote storage** Off-site storage of records in company-owned, commercial, or cooperative records centers.
- Removable media** Magnetic or optical storage devices which may be removed from and stored apart from the disk drives on which they are recorded and read.
- Reports manual** Provides writers of reports with standard practices and instructions in a form that is convenient and easy to use.
- Reprography** Facsimile reproduction of graphic material.
- Requirements analysis** An analysis of an organization's recordkeeping systems to determine whether and where records management automation is needed, the type of automation required, and other elements that are relevant to the process of applying various forms of computer automation to solve recordkeeping problems. Sometimes called a *needs analysis*.
- Resolution, EIM** A mathematical indication of a planned readability factor, such as "x" dots per inch, with 200 dots per inch (dpi) considered adequate. Image sharpness.
- Resolution, microfilm** A measure of the sharpness of the image, expressed in lines per millimeter, using a resolution test target as a standard.
- Retention period** The period of time during which records must be retained in a certain location or form because they are needed for operational, legal, fiscal, historical, or other purposes. A retention period may be stated in terms of months or years, and is sometimes expressed as contingent upon the occurrence of an event.
- Retention schedule** A document prepared as a part of a records retention program that lists the types of records maintained by each department of an organization, and specifies a period of time after which destruction is authorized as a matter of policy. The retention schedule also identifies the organization's archival records and mandates their permanent retention, and it may provide for the transfer of semi-active or inactive records from prime office space to a records center or other facility for continuing retention. Also called *retention and disposition schedule*.
- Retrieval** The process of locating and withdrawing a document from a collection of records.
- Retrieval system** A method or index used to locate and withdraw a record from a given group of records.
- Retrieval time** Time spent retrieving documents is divided by the total number of records retrieved for one month.
- Reversibility** The quality of being able to be undone or reversed back to its original state without any harm to the object. Used in some preservation.
- Risk assessment** In vital records protection and disaster recovery planning, the process of determining the risks to which an organization may be exposed in the event of loss of some or all its vital records, and whether it would be in the organization's best interest to take certain measures to reduce these risks to a level that is considered to be acceptable.
- Rotary camera** A microfilm camera that photographs moving documents.
- Sampling test** Test made to determine the scan speeds and image quality, using random samples of documents and random timings.



**Scanner** A device used in electronic imaging, that raster scans a document to record the image on an optical disk or tape, using binary code.

**Scan/workstation server** A server that processes all scanning and workstation activities.

**Screening** The elimination of material before it is filed.

**Search** The act of locating and/or withdrawing a record from a group or collection of files. In electronic filing, examination of a series of items for those that have desired properties.

**Secondary categories** Subdivisions of primary headings.

**Secondary value** In records appraisal, the value of information contained in records which reflects the actual or potential uses to which the information may be put for purposes other than the purpose for which it was created.

**Second-class mail** A mail service available only to publishers and registered news agents.

**Server** A computer on an electronic image network designed to serve a specific need.

**Service report** A service history of all equipment.

**Sizing** A substance added to paper to hold fibers together and to make it less absorbent so that inks will not bleed.

**Slant file** The file module is shaped like a parallelogram and is a variation of the traditional mobile aisle shelving system.

**Software, applications** Computer programs designed to process data and perform functions and applications required by end users, as opposed to software designed to operate the computer's basic functions. In PC computing, word processing and spreadsheet software programs are common types of applications software.

**Software, document management** In large, multi-user network computing environments, a family of packaged software products designed to facilitate the management of documents and files stored in the PC's and file servers connected to the local or wide area network.

**Software, files management** In PC-based electronic recordkeeping systems, a family of packaged software products designed to facilitate the management of the documents and files resident on the system.

**Software, records management** A general term which refers to a family of packaged software products designed to provide computer enhancement over a

wide variety of records management functions; the major functional applications include indexing, tracking and monitoring file folders in active recordkeeping systems and storage cartons containing inactive records in records center environments.

**Solid board** A paper board made of one material only. Board made of two or more types of fiber in layers is called *combination board*.

**Sorting** Process of arranging records in the order in which they will eventually be filed.

**Soundex** A phonetic file arrangement based on a numerical code that represents certain key letters and consonant sounds in the alphabet.

**Space planning** Coordination of the physical components to provide maximum efficiency within the available floor space in the most attractive arrangement.

**Special delivery** A mail service that provides delivery beyond normal delivery hours and on Sundays and holidays.

**Specialty forms** Includes various types of forms, such as pegboard forms, bank checks, or office supplies, such as tags, labels, mailers, and envelopes.

**Spirit process** A process that uses alcohol as a solvent to transfer images from a carbon master. Also called "ditto," "liquid," or "fluid" process.

**Stack area** That portion of a records center or archive that contains the records holdings.

**Staging area** An area used for intermediate or temporary storage of records awaiting accessioning or disposal processing.

**Standalone system** A computer system that contains its own processing and memory units so that it can operate independently of other computers.

**Standard** A rule or principle established to measure quality or value.

**Standard operating procedure (SOP)** Instructions for the performance of individual tasks and jobs.

**Statutes of limitations** Laws containing provisions specifying the period of time during which a party can sue or be sued on a matter. Records are often considered to possess varying degrees of legal value during this time period, and decisions to retain them are often based on this value. Also referred to as *limitations of action*.

**Straight numeric filing** A system in which consecutively numbered folders are placed in a file in exact sequential order.

**Strategic plan** A plan that impacts directly on the



- success of the organization's primary purpose or goal. A plan that affects substantive rather than facilitative activities.
- Subdirectory** A method of organizing and managing PC-based electronic records into logical subgroups under each directory, in cases where the file contents and structure of the directory become too large or cumbersome for effective processing and retrieval.
- Subpoena duces tecum** A court order requiring a witness to appear in court, produce relevant records, or provide testimony.
- Supersession notice** A notice that shows dates of revision, consolidation, or elimination.
- Suspense file** A file organized chronologically in which documents or data are entered or filed by a future date of recall.
- Synthetical index** An index that brings together like items or concepts, as in a coordinate indexing system or keyword subject index.
- System** An array of components that interact to achieve some objective through a network of procedures that were integrated and designed to carry out an activity.
- System conversion** The tasks associated with implementing a new or upgraded recordkeeping system by conversion of the existing records to the new system's format and structure. The term applies to both manual and computerized recordkeeping systems.
- Tab** A projection above the guide or folder body upon which the caption appears.
- Tabbing** The process of applying small adhesive pieces of paper (tabs) to keep the ends of folded mail pieces together.
- Tape rotation backup system** A method of protecting vital computer-based records by periodically storing copies of magnetic tapes containing the updated vital data in a secure facility remote from an organization's computer processing facility.
- Targets and certifications** Sheets of paper which are microfilmed together with documents to serve as index points or to make the certification a part of the microimages.
- Teleconferencing** A form of communication that permits people at different locations to conduct meetings together and includes computer conferencing and videoconferencing.
- Template electronic forms** Forms for which only the variable information needs to be keyed into a form template or blank form, and a hard copy can be made of the entire record.
- Terminal-digit filing** A system of filing in which the numbers are read, right to left, in groups of two, three, or four digits, or in combinations of two and three digits.
- Tertiary heading** Subdivision of secondary heading.
- Text files** A collection of computer-based electronic records typically consisting of character-coded alpha-numeric and graphic symbols commonly encountered in typewritten documents. Text files may be created by word processing software programs, electronic messaging programs, or other computer software.
- Thesaurus** In electronic recordkeeping systems, a display of the content and structure of indexing terminology; a listing of document indexing terms designed to provide consistency in identifying documents and files so that the records can be effectively retrieved.
- Third-class mail** A mail service for bulk business mail or advertising mail weighing less than 16 ounces.
- Tickler** A memory aid; a file set up as a reminder to "tickle" the memory.
- Timely retrieval** The ability of a recordkeeping system to consistently deliver to its users the records and information they request within time frames sufficient to enable them to perform their work in a productive manner.
- Toner** Colored (usually black) carbon-like substance used to form images in copiers and printers.
- Topical filing** A system in which one file follows another in alphabetical order. Also known as a *dictionary* system.
- Transaction set** The grouping of data elements needed to provide information in the document.
- Transfer list** A list of the contents of a group of records that are being transferred from one holding to another, usually from active files to a records center.
- Trustworthiness** The degree to which records containing evidence introduced or proposed for introduction in legal proceedings may be relied upon as being factual or otherwise what they purport to be.
- Turnaround ratio** Average time it takes to retrieve a document and get it to the requester divided by the total number of requests.
- Turnkey** A sale of equipment or a system that provides for installation that is ready to use by the buyer with no further action required, except for "turning the key."

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- Ultraviolet (UV) filter** Any material that filters out UV ultraviolet rays. Such rays are harmful to preserved materials. Some exhibition spaces use UV filters on the windows and over fluorescent lights.
- Uniform file classification** A classification system that preserves the set order of records and establishes common titles.
- Uniform Photographic Copies of Business and Public Records as Evidence Act** A United States federal statute (adopted by many of the U. S. states) which holds that duplicate copies of documents are considered to have the same legal status as the original documents from which they were reproduced, provided the duplicates are accurate reproductions of the original documents.
- Unitized microform** A microform that is used to display a single frame of film, such as an aperture card, or a group of related images in a jacket, thus unitizing (uniting) an image or group of images that are related.
- User** A patron of records center services or computers. (See also *customer*.)
- User-defined reports** In electronic recordkeeping systems, the ability of the user to create system-generated reports that are customized to meet specific needs. This capability is sometimes provided in applications software programs.
- Vacuum drying** A general term which refers to several methods (freeze drying, thermal vacuum freeze drying, vacuum drying) for removing water from wet paper records by placing them in an airless chamber which vaporizes the water, which is then expelled from the chamber as steam, leaving the records dry.
- Vault** A fire-resistive and highly secure enclosure constructed within an office building or other workplace and used for the protection of large quantities of vital records. Vaults are designed to provide a high level of protection against fire and other hazards and are usually designed to be structurally independent from the building in which they are located.
- Vaulting, electronic** A method of protecting vital computer-based records by periodically transmitting updated data to a remote computer or tape drive. The transmission occurs in an on-line, electronic mode over telecommunications links.
- Video conferencing** A type of telecommunication. It is a variation of computer conferencing with cameras so that participants are visible to each other and the conference is on videotape.
- Videodisc** A laser disk which records and plays motion pictures.
- Vinyl** A group of plastics generally considered inappropriate for use in preservation. Often refers to *polyvinyl chloride (PVC)*.
- Virus, computer** A computer program that is capable of inserting a copy of itself into another computer program, thereby corrupting the integrity of the data in the program.
- Visible file** Arrangement of strips, cards, or other documents in specially designed equipment so that one line of each record is visible to serve as an index.
- Vital records** Records containing information required to re-establish or continue an organization in the event of a disaster; records containing unique and irreplaceable information necessary to recreate an organization's legal and financial position and preserve the rights of the organization and its employees, customers, shareholders and other constituent groups. Vital records include records whose informational value to the organization is so great, and the consequences of loss are so severe, that special protection is justified in order to reduce the risk of loss.
- Vital records center** A commercial or user-owned facility dedicated to the storage and protection of vital records. The facility is usually equipped with special fire detection, suppression and other security systems, and is generally located remote from the organization's primary place of business.
- Vital records manual** Includes procedures of the vital records protection program, explains the vital records master list, and provides instructions for reconstructing vital records in the event of a disaster.
- Vital records master list** A document that provides each department with a listing of all vital records for which it is responsible.
- Vital records program** That component of a records and information management program that manages the protection of vital records from loss or damage.
- Voice mail** A message that is digitized and can be reconstructed in audio or visual format.
- Wheel file** Usually an upright file which rotates like a Ferris wheel and holds cards.



**Wild-card searching** In electronic recordkeeping systems, the ability to use wild card symbols to represent multiple prefixes or suffixes of words (e.g. *automate, automation*), or alternate word spellings (e.g. *labor, labour*), thereby providing more precise retrieval of required data.

**Workflow program** A multi-step procedure of processing documents or completing transactions, where a document flows from station to station.

**WORM** A type of optical disk that permits recording only once while having the capability of being

read many times. An Acronym meaning "Write Once, Read Many".

**X-Y grid** A coordinate used to locate a specific area on a plane or map. X representing the vertical columns and Y representing the Horizontal Rows.

**ZIP code** A five-digit number designed to expedite mail delivery in the United States

**ZIP code + 4** A nine-digit number that identifies a geographic segment within the 5-digit area, such as city block, an office building, or a high-volume mailer.

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