

The background of the slide is a faint, light gray line drawing of a classical architectural interior. It features a series of tall, fluted columns supporting a series of pointed arches. The perspective is looking down a central aisle. In the lower left, there is a small, seated figure, possibly a statue or a person. The entire scene is rendered in a sketchy, architectural style.

# Fundamentals of the Cost of Unreliability

Fred Schenkelberg

# Design





A conceptual image showing four rolled-up US dollar bills standing upright in dark, rich soil, resembling seedlings. A small black trowel and a red-handled pencil are also in the soil. The word "Testing" is written in a stylized orange font across the bottom.

Testing





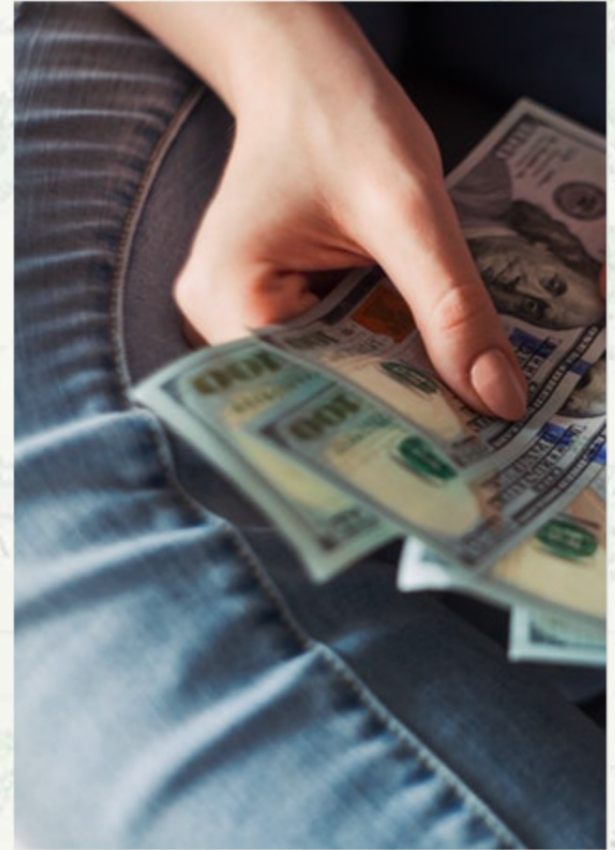
# Customers



What is the most  
expensive part of

your reliability  
program?

# So, Something Fails...



Prototypes

Warranty

Customers



# A Prototype Fails



Cost of prototype

Experimental results

Discover additional failure mechanisms

what else?

Do you consider this an  
opportunity to learn?

# A Warranty Claim



Cost of warranty claim

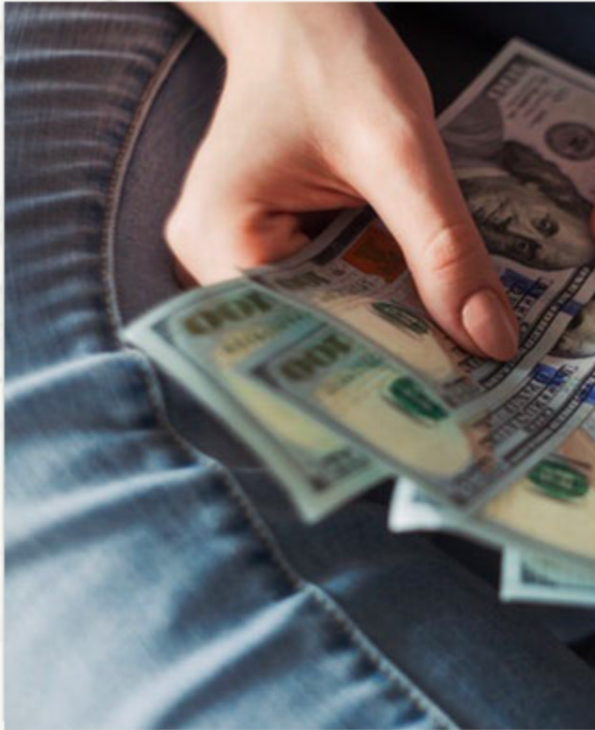
- phone call
- shipping/handling
- parts/repair
- replacement

what else?

Is your organization  
surprised by what fails?



# Customer Loss



Show me the data

Loss of function

Loss of value provided

Loss of capital, production, efficiency

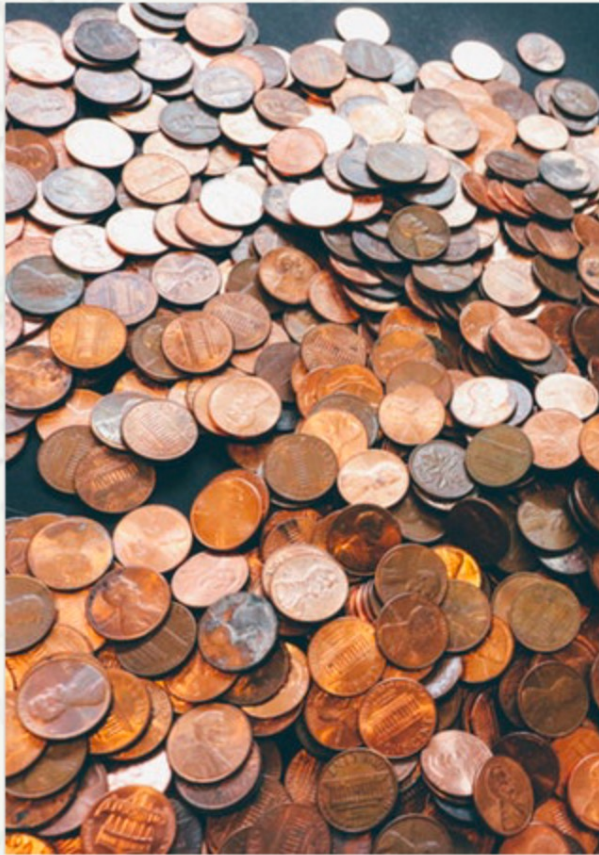
what else?

What happens when

your product fails?



# Consequences



Internal

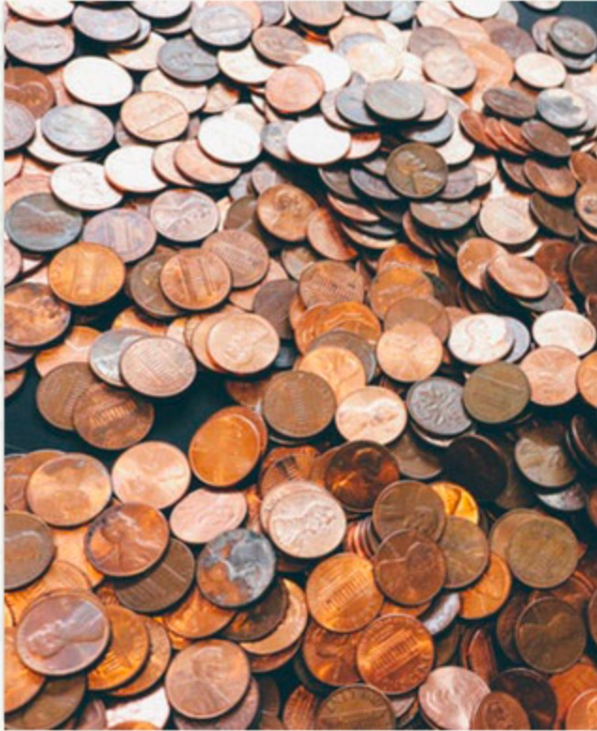


Brand



Use

# The Internal Costs



Does your organization  
celebrate or hide failures?

failure analysis

redesign

vendor visit expenses and time

re qualification costs

what else?



# Loss of Brand



How much is one point better in customer satisfaction worth to your organization?

How is a brand valued?

# Loss of Use



Why does someone buy  
your product?

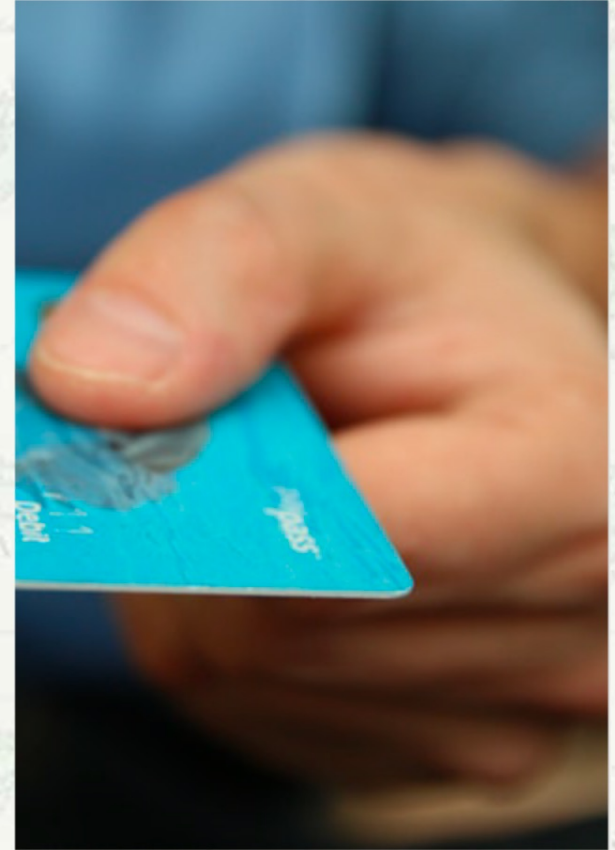
Do you understand the ROI your product  
provides your customers?

Think about the solution your product or  
service provides.



How can we use  
this information?

# Cost of Unreliability



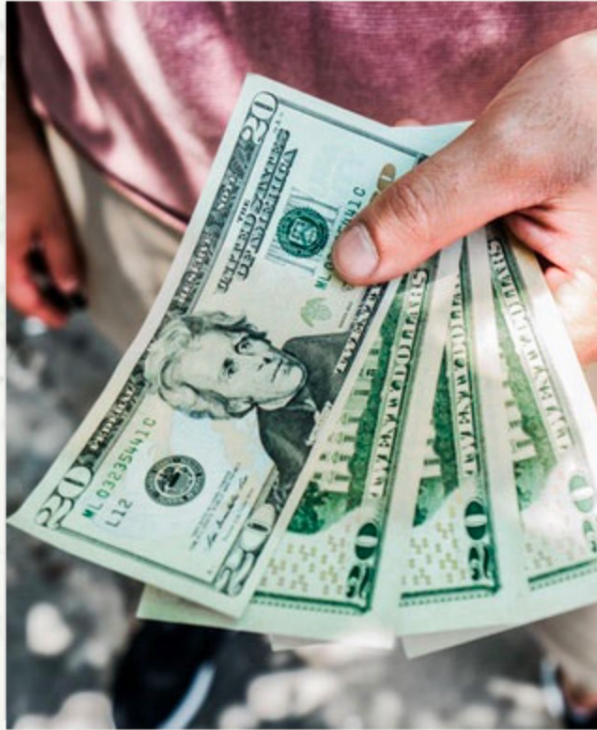
Calculate

Connect

Teach



# Calculate the Costs



Even a rough estimate is better than not creating an estimate.

Internal

Warranty

Customer

Quantify all three levels

# Business Connections



cost per failure  
cost per unit shipped

Not all costs hit the bottom line directly

Some take a bit of time to occur  
such in the loss of repeat customers



# Make the Costs Known



Everyone in your organization should know and understand the cost of unreliability

Publish and Teach how to use

How can we Manage  
these Risks



# Risk Management



Identify

Quantify

Mitigate

# Identify Risks



FMEA

HALT

SPC

what else?

We have the tools to do this well

# Quantify the Risks



Someone on the finance team may be a wonderful ally here

This may require some thinking



# Mitigate the Risks



Design out opportunities for failure  
Design in graceful failure patterns  
what else?

Can you eliminate all risk?

What else can

we do?

# In Summary

Risk Management



Unreliability



Consequences



Real Costs





# More Information

Visit [AccendoReliability.com](https://www.AccendoReliability.com)

Let me know if you have any questions.

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