



Selecting Reliability Engineering Tools


Fred Schenkelberg

We have a
Large Toolbox



A collection of antique tools, including wrenches, sockets, and various hand tools, are displayed on a rustic wooden wall. The tools are arranged in a somewhat organized manner, with some hanging from a horizontal bar and others placed on a wooden shelf in the foreground. The wood is weathered and aged, adding to the historical feel of the scene. The text "We bring our Expertise" is overlaid in a large, orange, serif font in the upper right quadrant.

We bring our
Expertise

A close-up photograph of a wooden workbench. A large, dark, cylindrical metal pipe or tool handle runs diagonally across the frame from the top left towards the bottom right. The pipe has some small holes near its base. Scattered around the pipe are several tools and debris: a long, thin metal rod, a bent metal rod, a small metal pin, a small metal bolt, and some wood shavings. The text "The value is in the Application" is overlaid in a white, serif font on the right side of the image.

The value is
in the
Application

The focus is on
decision making,

right?

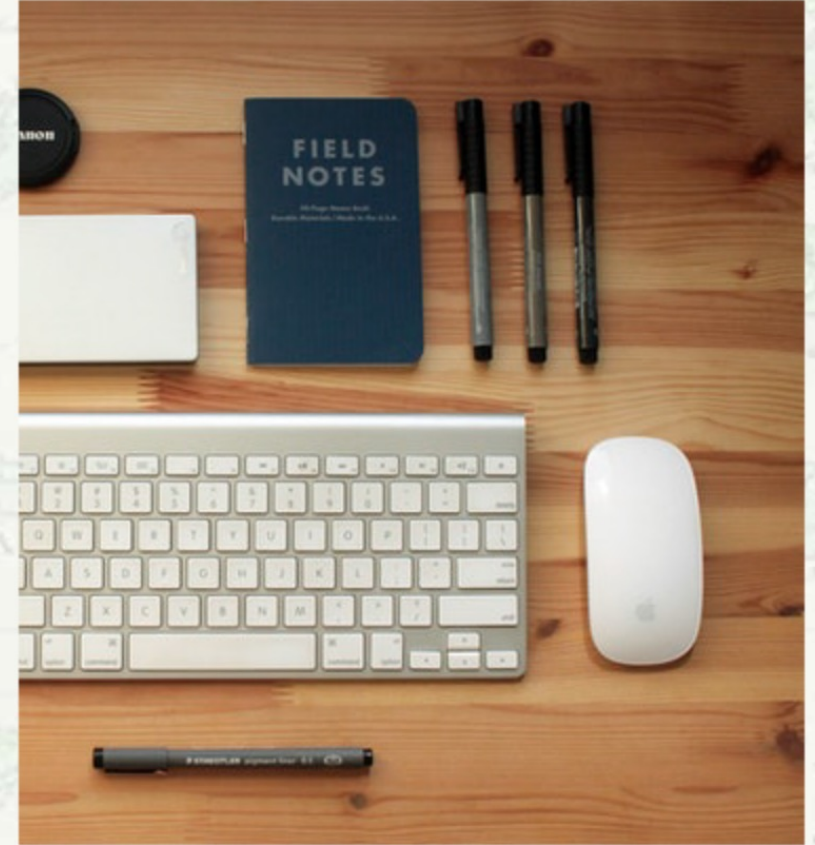
How not to select tools



Standards



Prior Project



Favorites

Open Standards, all done



The committee is always right,
right?

Specific tasks or tests

Lists of tasks or tests

Sample plans

Maturity models

Just use plan from prior project



It worked for the last project, it has to work for this one, right?

Saves time

Build on success

Avoid thinking

Let's use our favorites



Let's double down on what we know

HALT always and often

FMEA is the only tool we need

Failure Analysis is fun

What should we
consider?

How to Select Tools



Situation



Constraints



Capabilities

What is the Situation?



Define the problem very clearly

By when and to what criteria does someone need to make a decision?

What is the problem to solve to aide the decision maker?

Are we solving the right problems?

What actions will add value?

What are the Constraints?



Face it, you will not get enough samples.

time

money

expertise

processes

equipment

what else?

What are our Capabilities?



Will anyone understand the results of the analysis?

Are we capable of doing math,
Understanding a Weibull plot,
Find a root cause,
Influence suppliers,
etc...

What is a

source of failure?

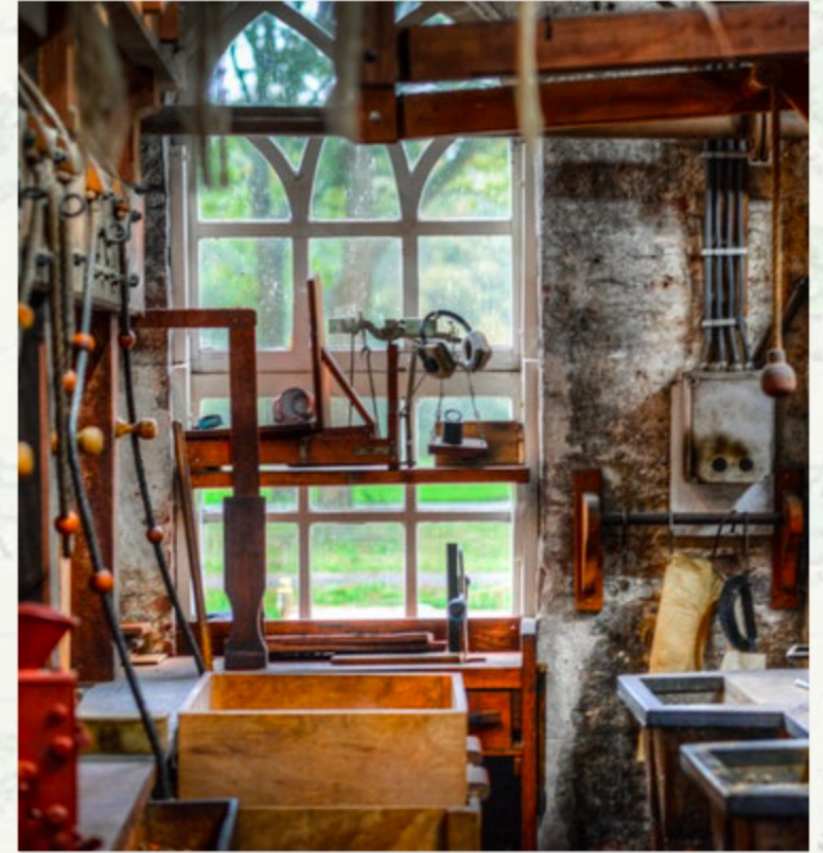
Poor Design Process



Focus & Balance



Feedback



Risk & Decisions

Focus & Balance



Can you tell the difference between a priority and lip service?

Time to market, time to market, time to market...
That failure may trigger a project delay...
We only want tests that pass (no failures)...
That estimate makes our product look bad...

Feedback



Are we there, yet?

Let's just set a goal...

Let's only do testing...

Customer always complain...

FMEAs are too destructive to the team's morale...

We don't have time for failure analysis...

Risk & Decisions



Addressing risks by making better decisions

We don't have time for that analysis...

I don't think it will be a problem...

So, how's the reliability look...

What is another

source of failures?

Let's say we have bad components



Vendor Claims

Field Failures

Variability

Vendor Claims



Questions, contracts, monitoring...

Reliability? here's your MTBF or FIT...

Trust me, it will work in your application...

We are ISO 9001 certified, thus state of the art...

Field Failures



All hands on deck, let's solve this one now...

That is just one report, let's wait...

That is customer abuse, obviously...

As you know, all failures contain gold

Variability



Do you know the difference between
in spec and perfect?

Everything is in spec, guaranteed...

We maintain very tight tolerances...

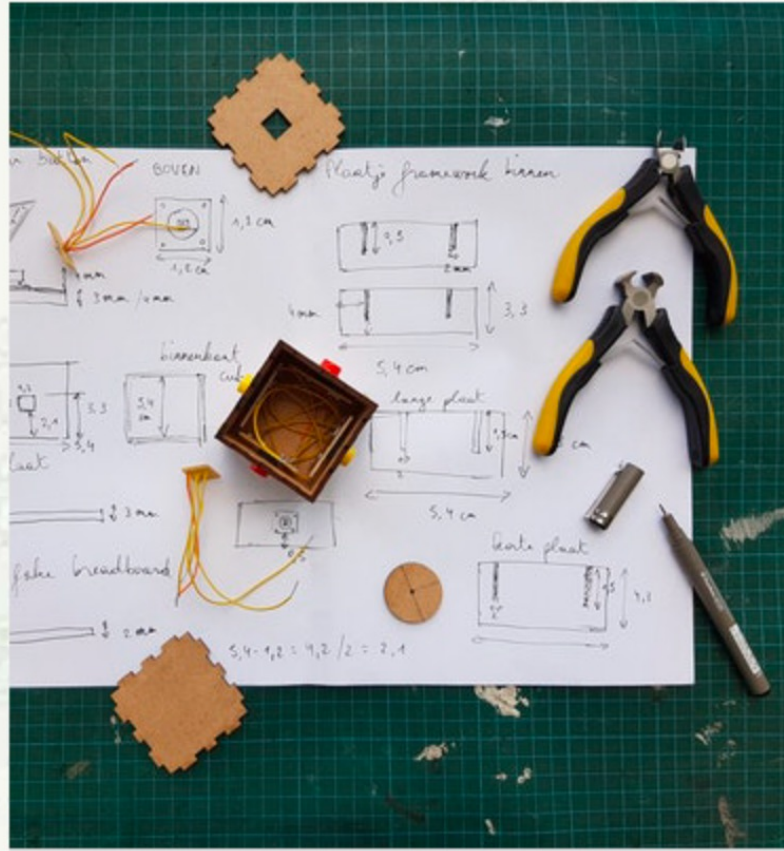
Our staff is highly trained...

What is another
source of failures?

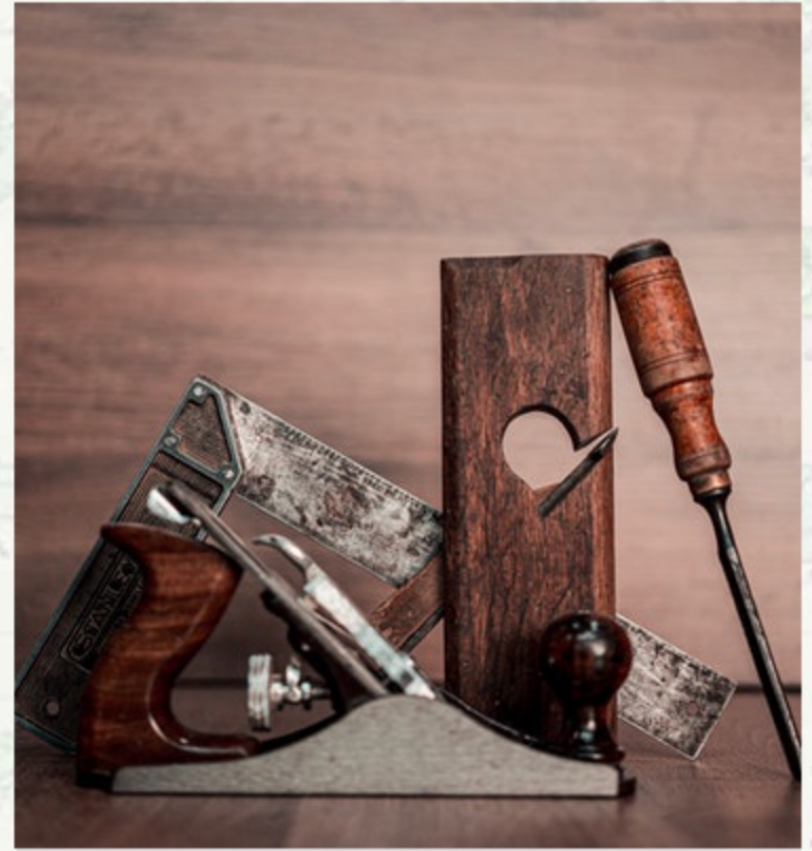
Consider an Assembly Process



Variability



Tolerance



Feedback

Assembly Variability



Good design, good parts, plus a poor assembly process equals...

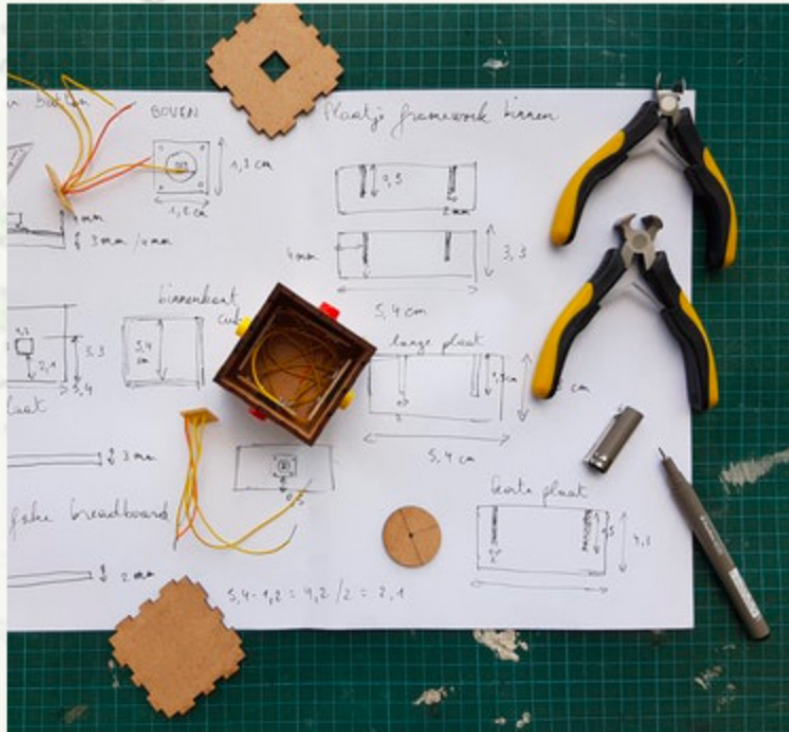
This one extends to shipping, storage, installation, etc.

Our end of line test will catch everything...

We had to loosen the specs as the scrap was too high...

Moved to a new building, nothing has changed...

Assembly Tolerance



Do you have a set of mfg guidelines for your design team?

They are asking the impossible...
Our equipment can not meet that...
Close to spec is good enough, right?

Feedback & Improvement



Where is the best place to solve a manufacturing problem?

See, we use SPC over here, we have been 'in-control' for 7 years now...

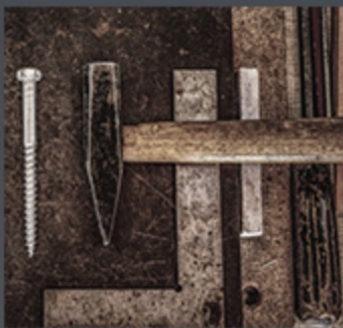
"Do you allow operators to shut down the line?"

Cleaning and continuous improvement interrupt production time...

Are you using the
right tools?

In Summary

Problem or challenge
exists



We need to
make a decision



Consider the
options



Deliver something
of value



More Information

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

images from Pexels

Check out the reliability engineering podcast network at [Reliability.FM](https://www.Reliability.FM)

Download the Finding Value ebook