



Creating Unique Reliability Tests

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Accendo Reliability

Illuminated Reliability Engineering Knowledge



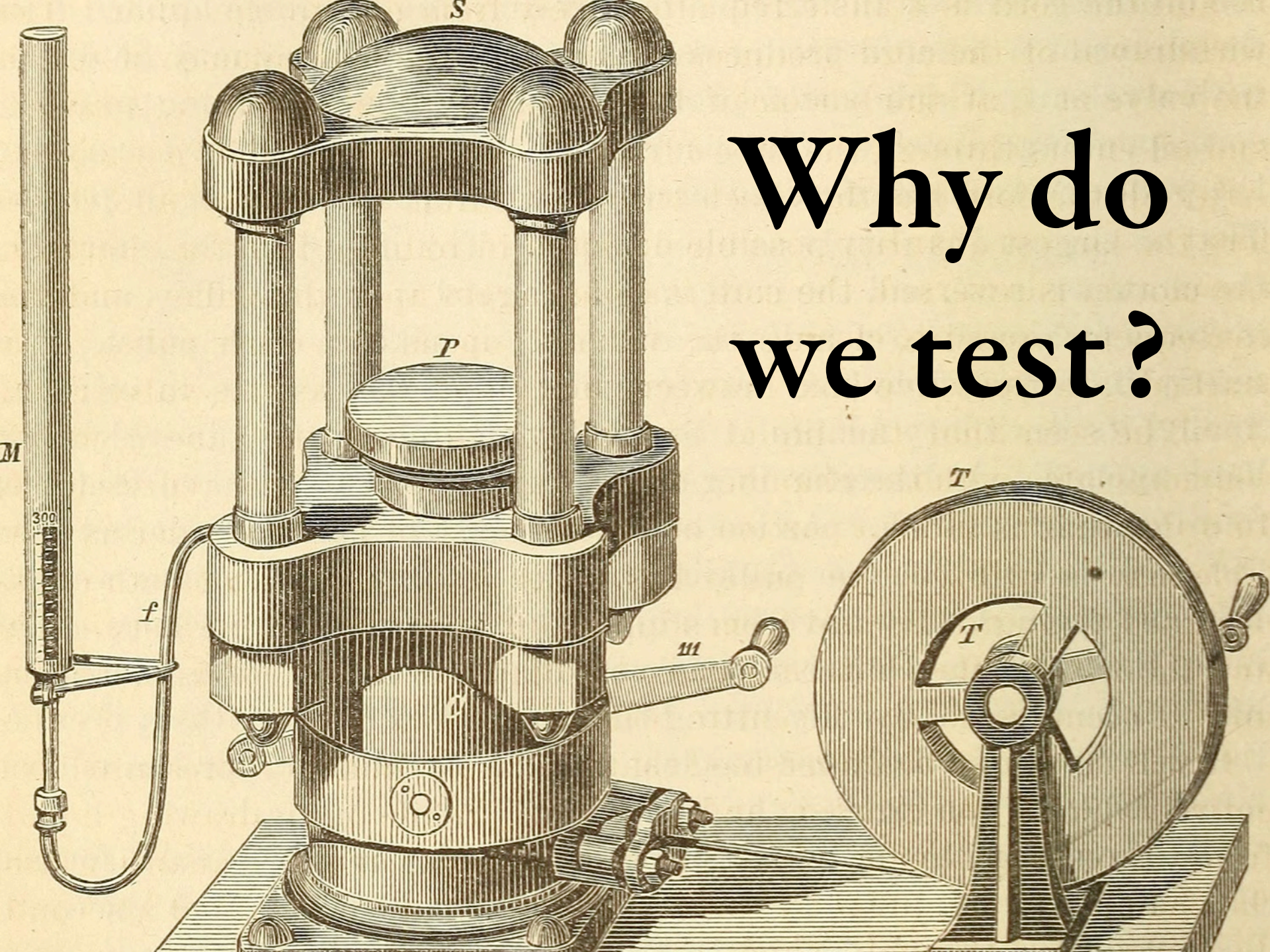
Reliability?



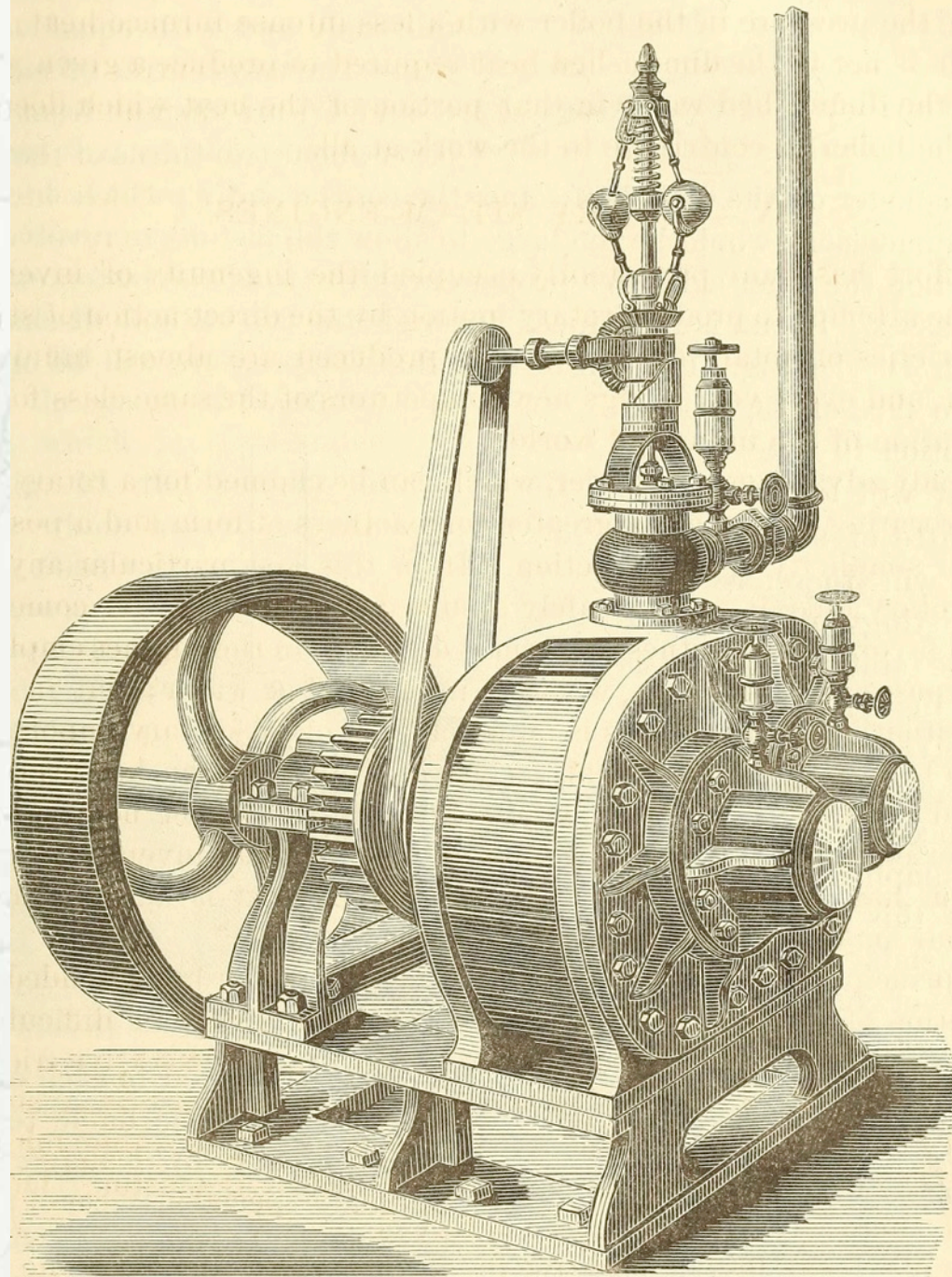
Objective

So, what are we trying to do when
reliability testing?

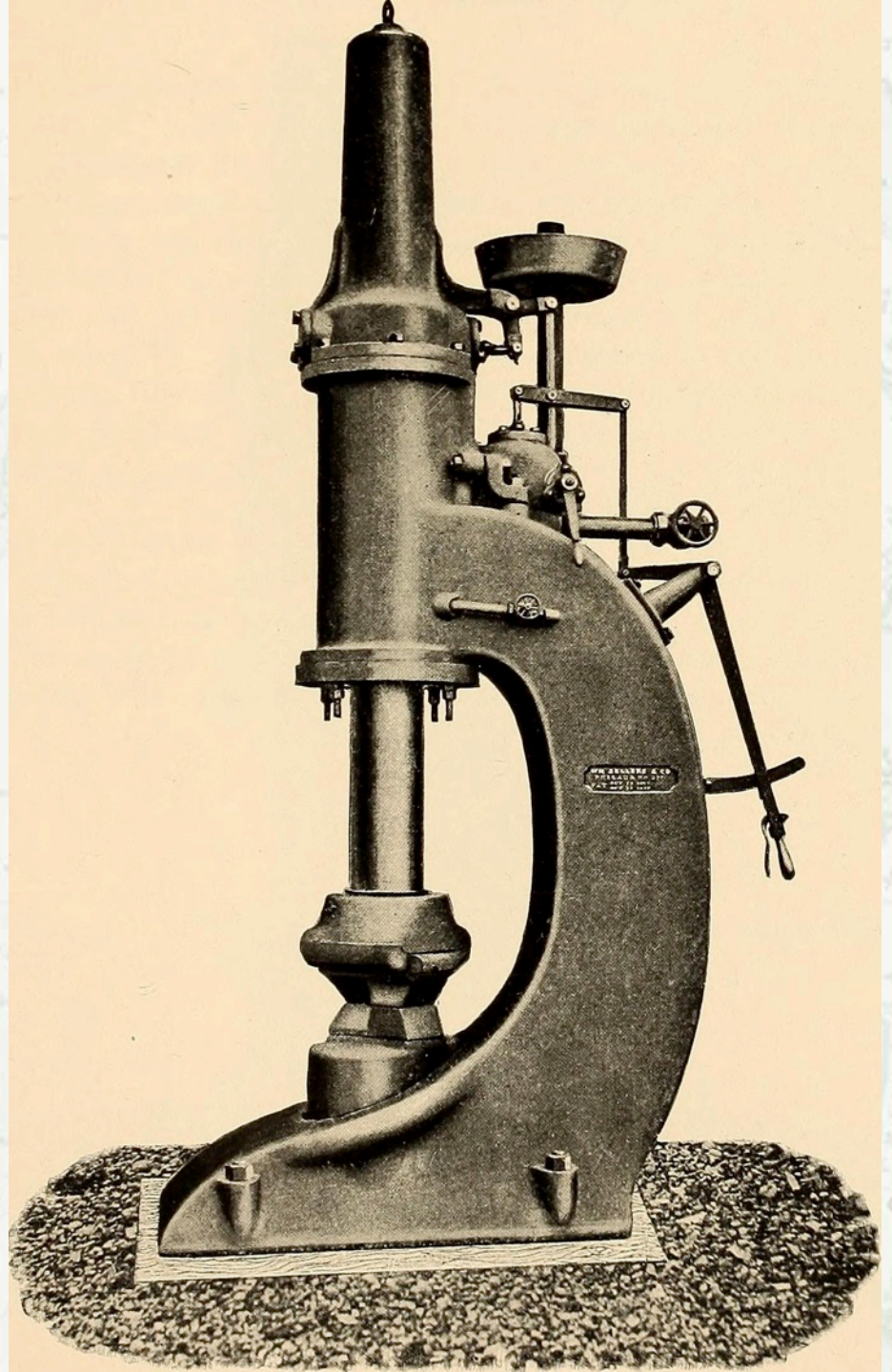
Why do
we test?



What will Fail?



**When
will it
fail?**

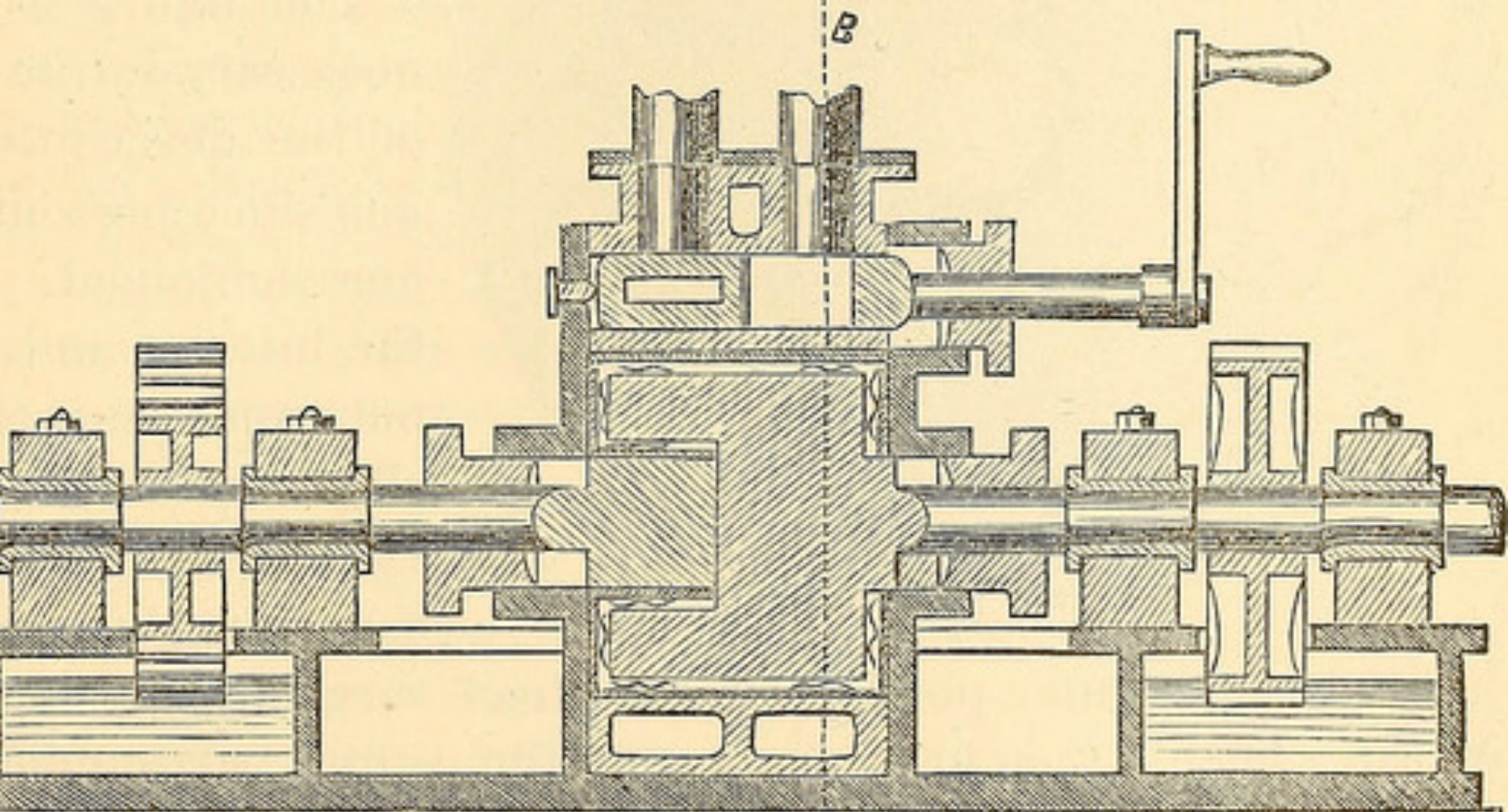


Why is reliability
testing
important?



Common Practices

Do these approaches seem familiar?



Test to specifications

0.10^{mm}

0.10^{mm}

0.20^{mm}

0.30^{mm}

0.40^{mm}

0.50^{mm}

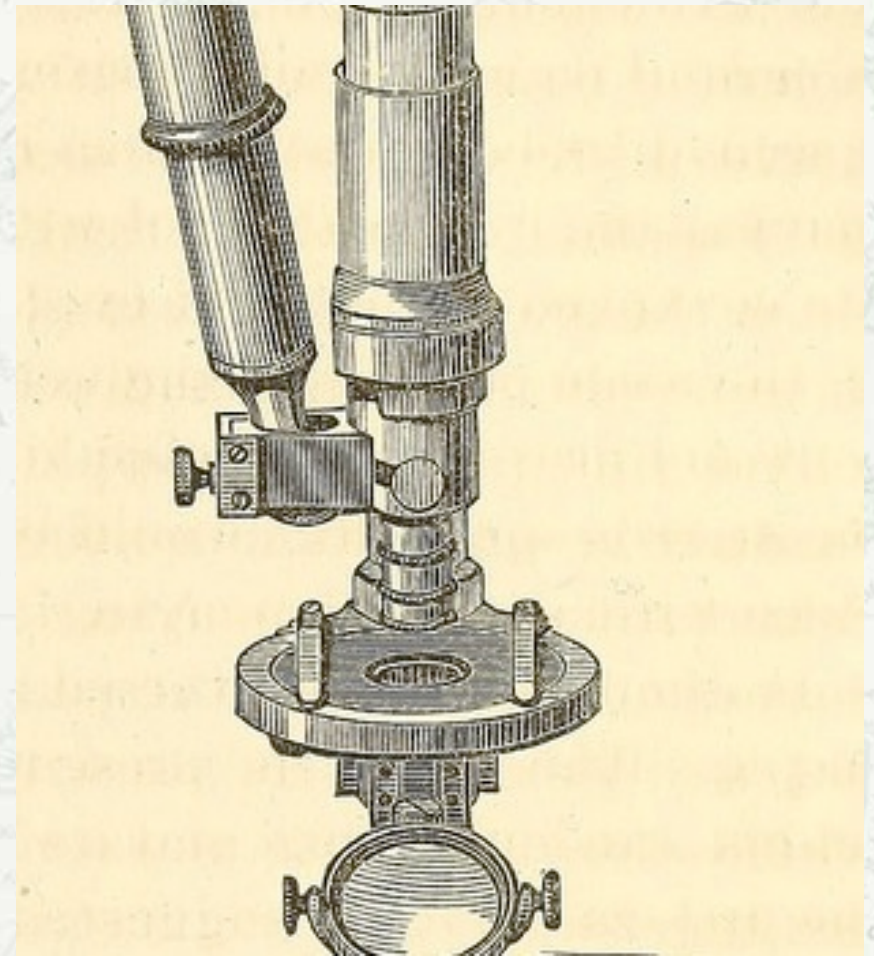
0.60^{mm}

0.70^{mm}

0.80^{mm}

Standards Based Testing

- **77 samples**
- **1,000 hours**
- **85°C chamber**
- **No Failures**
- **So what do we know when test finishes?**



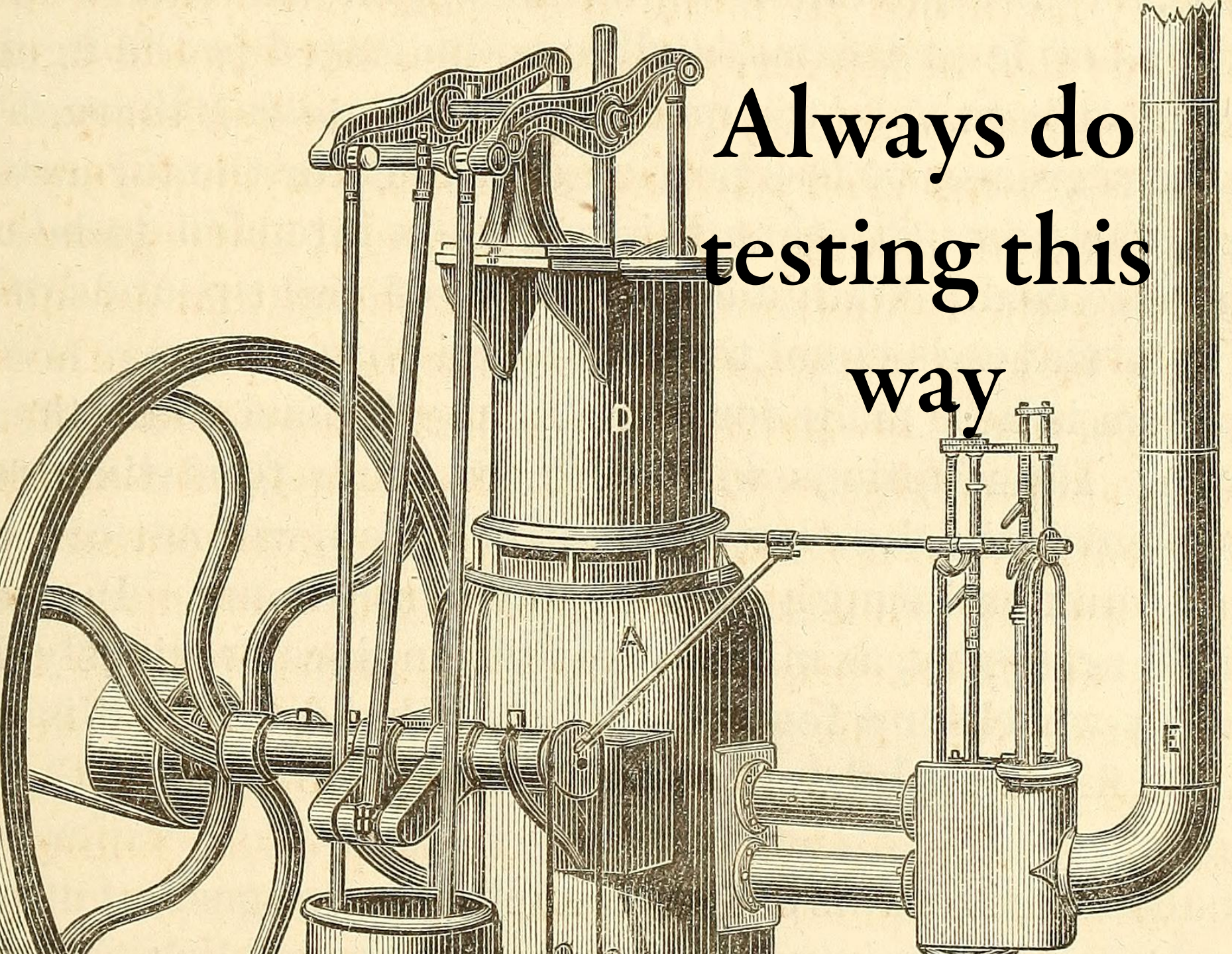
Standards Based Testing

- **77 samples**
- **1,000 hours**
- **85°C chamber**
- **No Failures**
- **For a five year duration**
- **Assume 10x AF**

$$n = \frac{\ln(1 - C)}{m \ln(R)}$$

- **So what do we know when test finishes?**
- **60% C at least 95% R**
- **With 7 samples**
At least 56% R

Always do
testing this
way

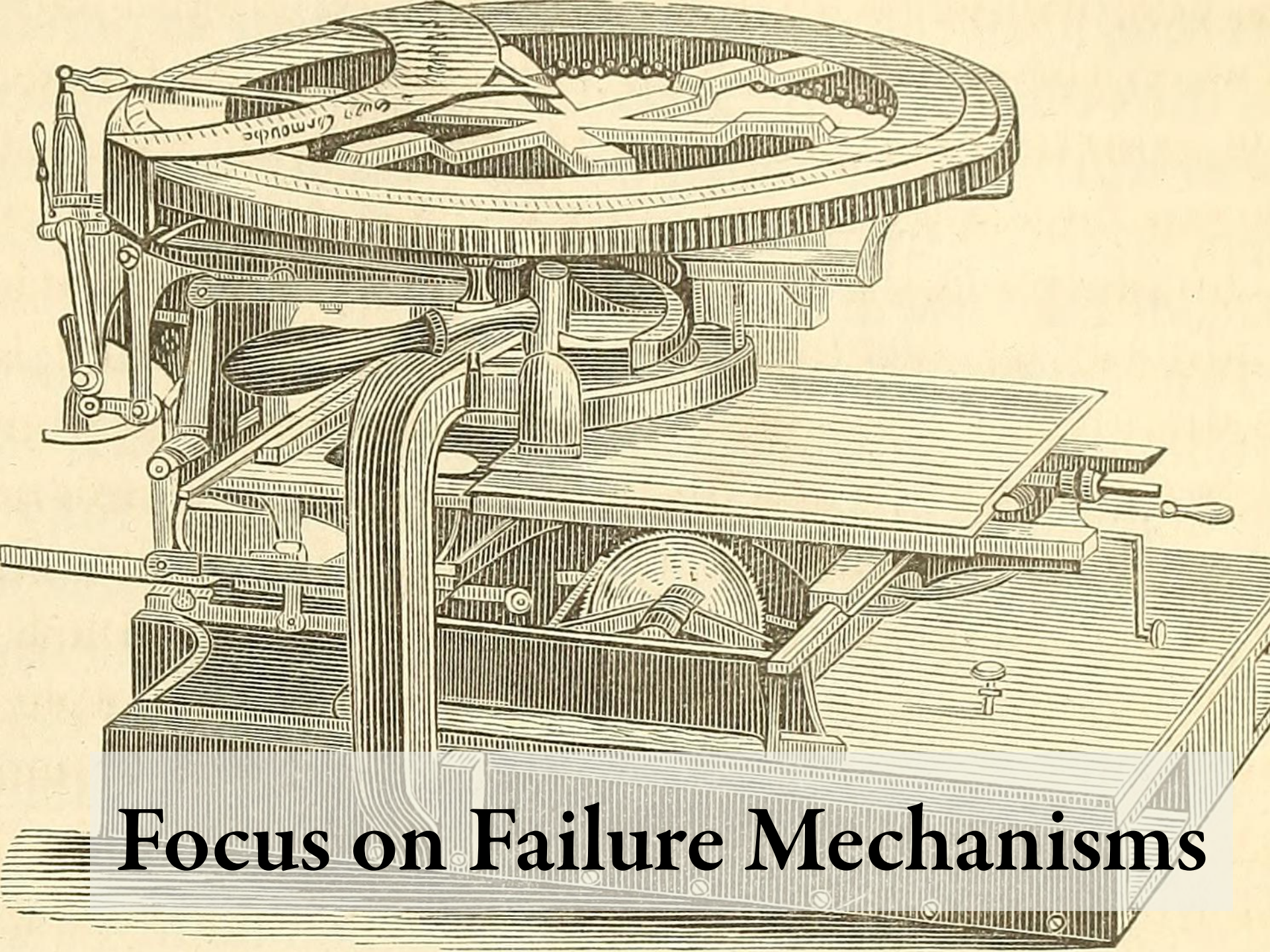


Are you getting
the results you
need?



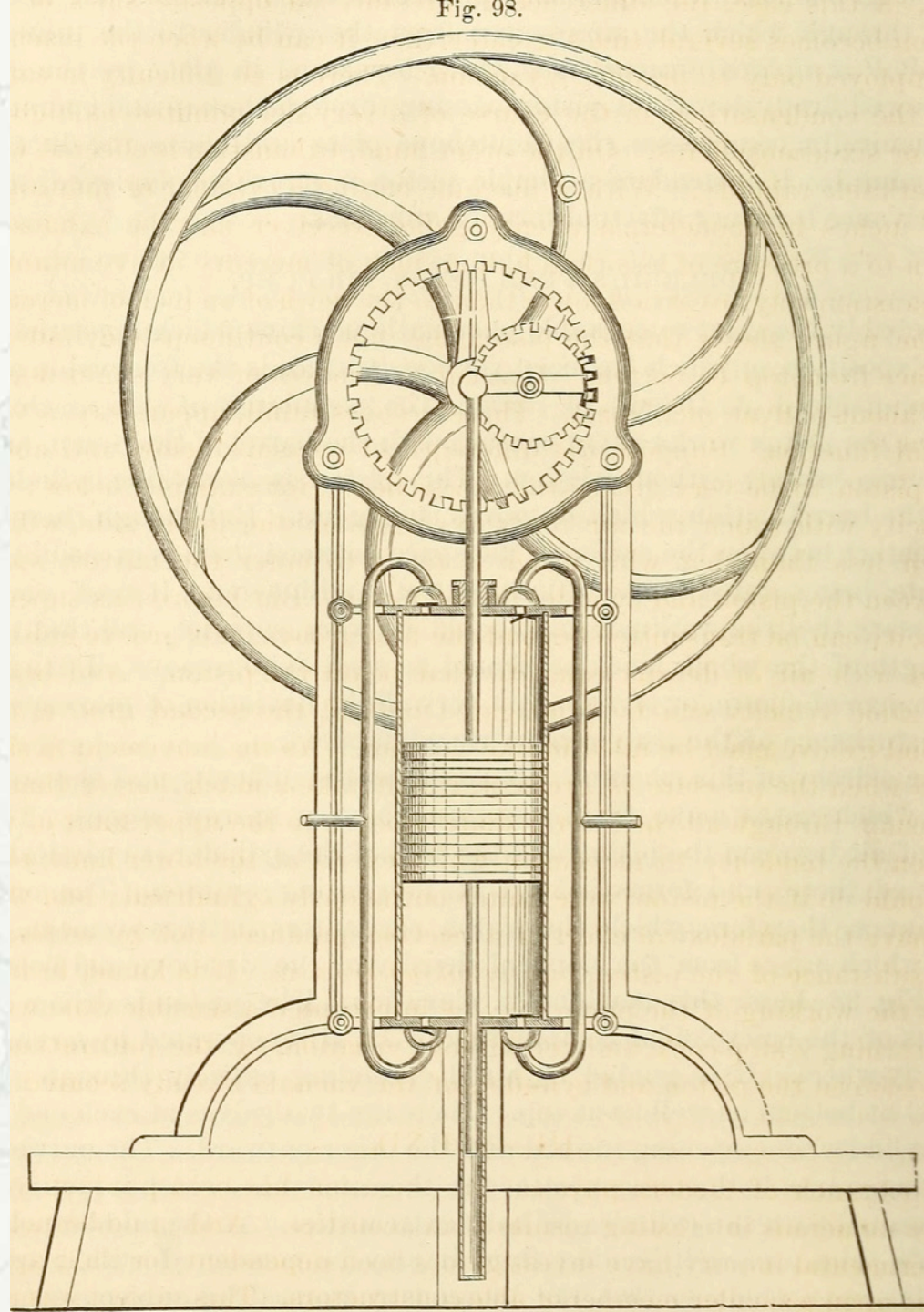
Unique Reliability Testing

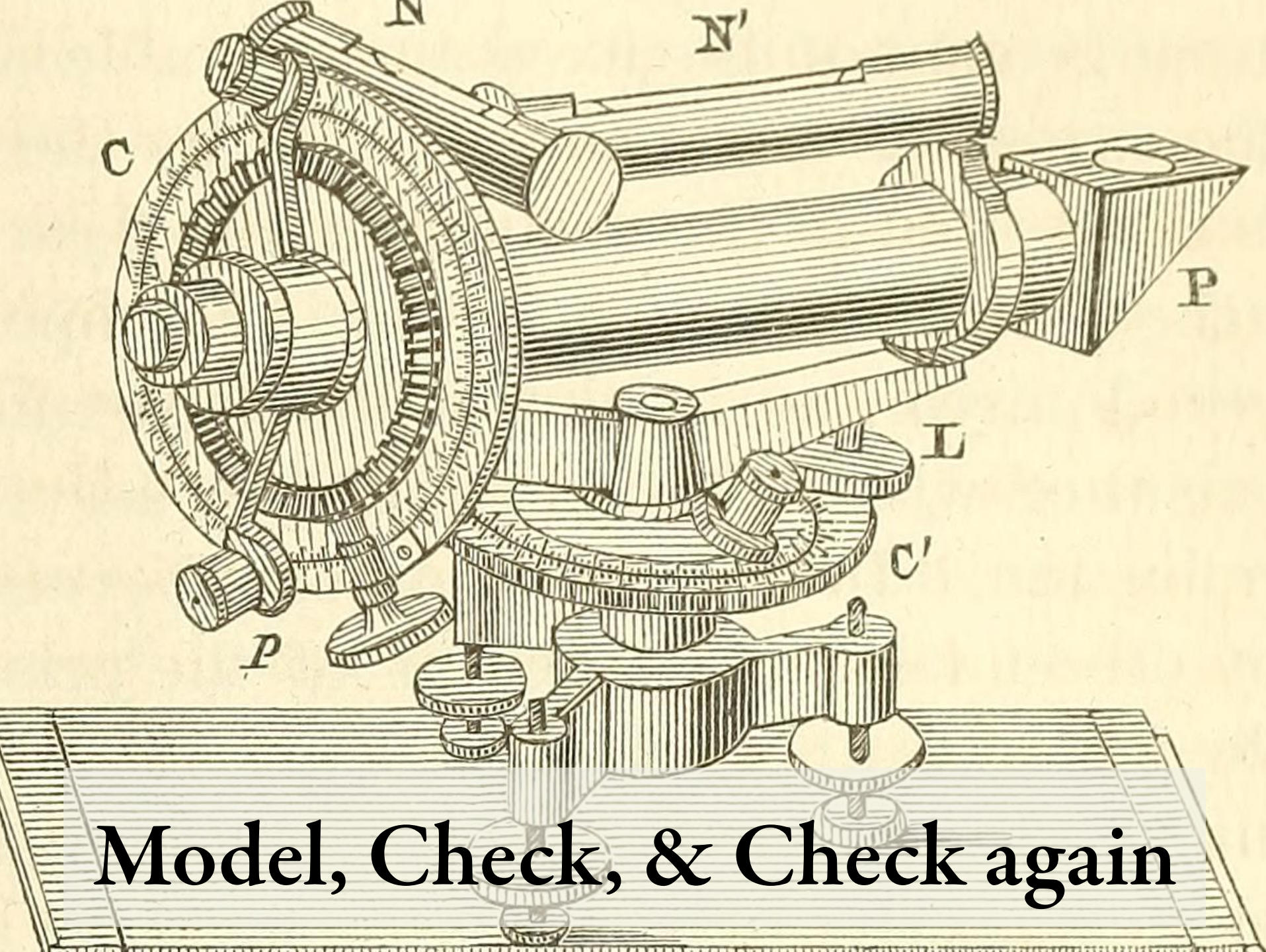
Get results you can use during
development and with customers



Focus on Failure Mechanisms

Connect Test to Use





Model, Check, & Check again

Basic Steps

- **ID Failure Mechanism**
- **What stress(es) promote mechanism**
- **Relationship from test to use**
- **What to measure**
- **How many samples**
- **Duration of testing**

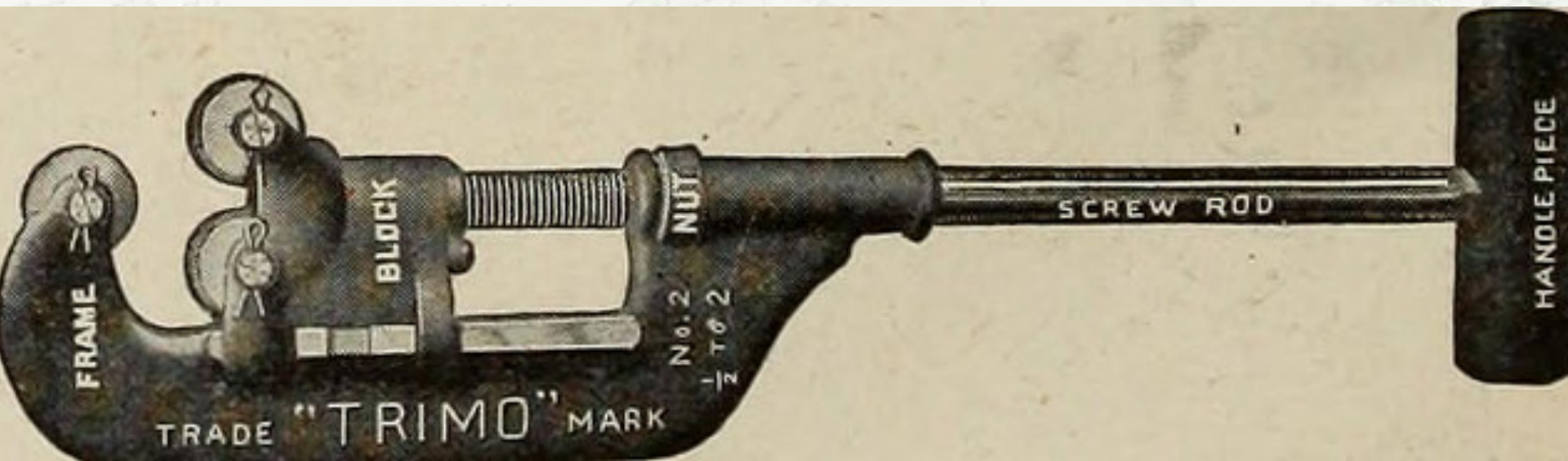
What unique
tests do you use?



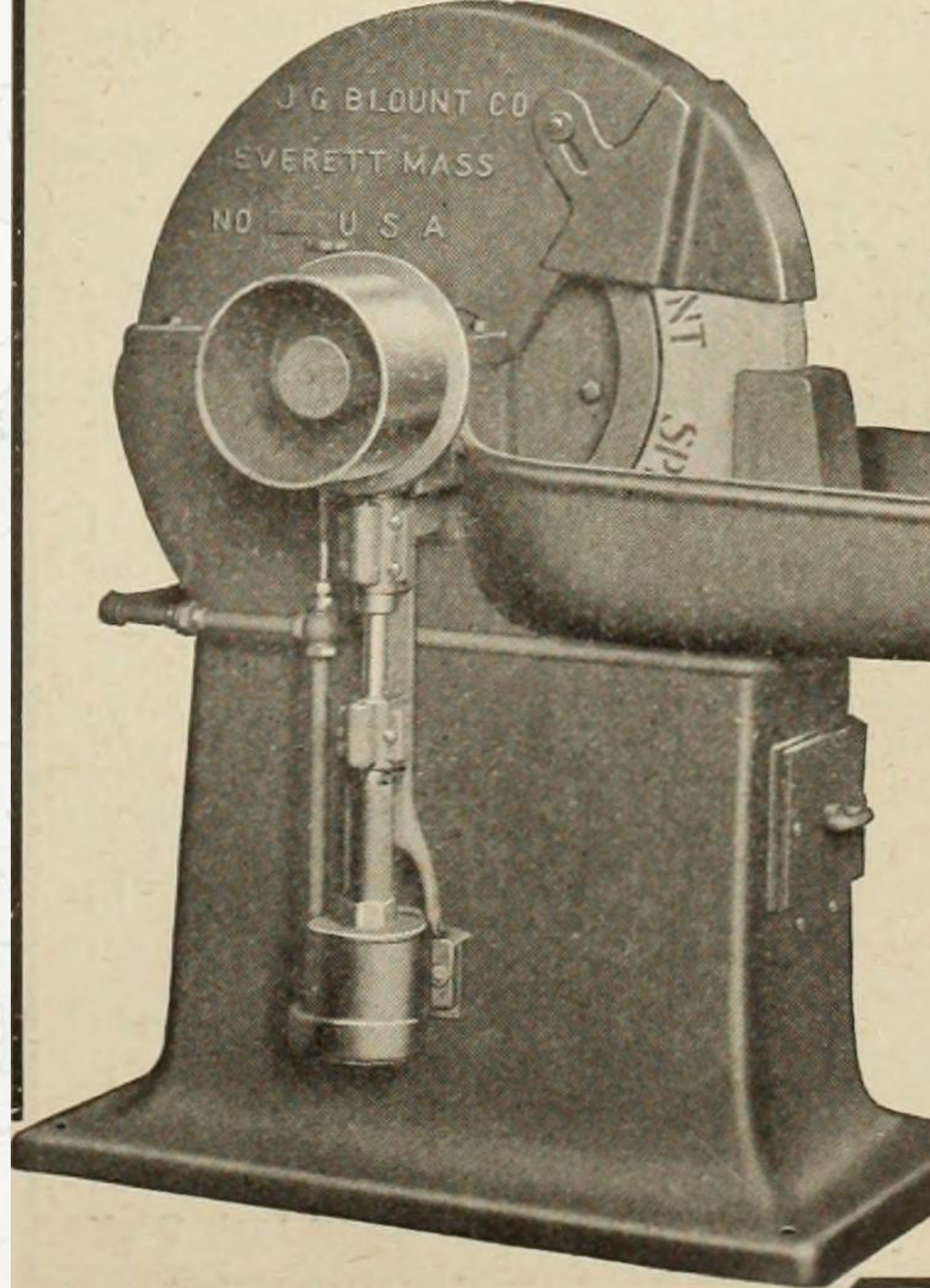
Challenges

Sometimes unique is creative?

Sample Size

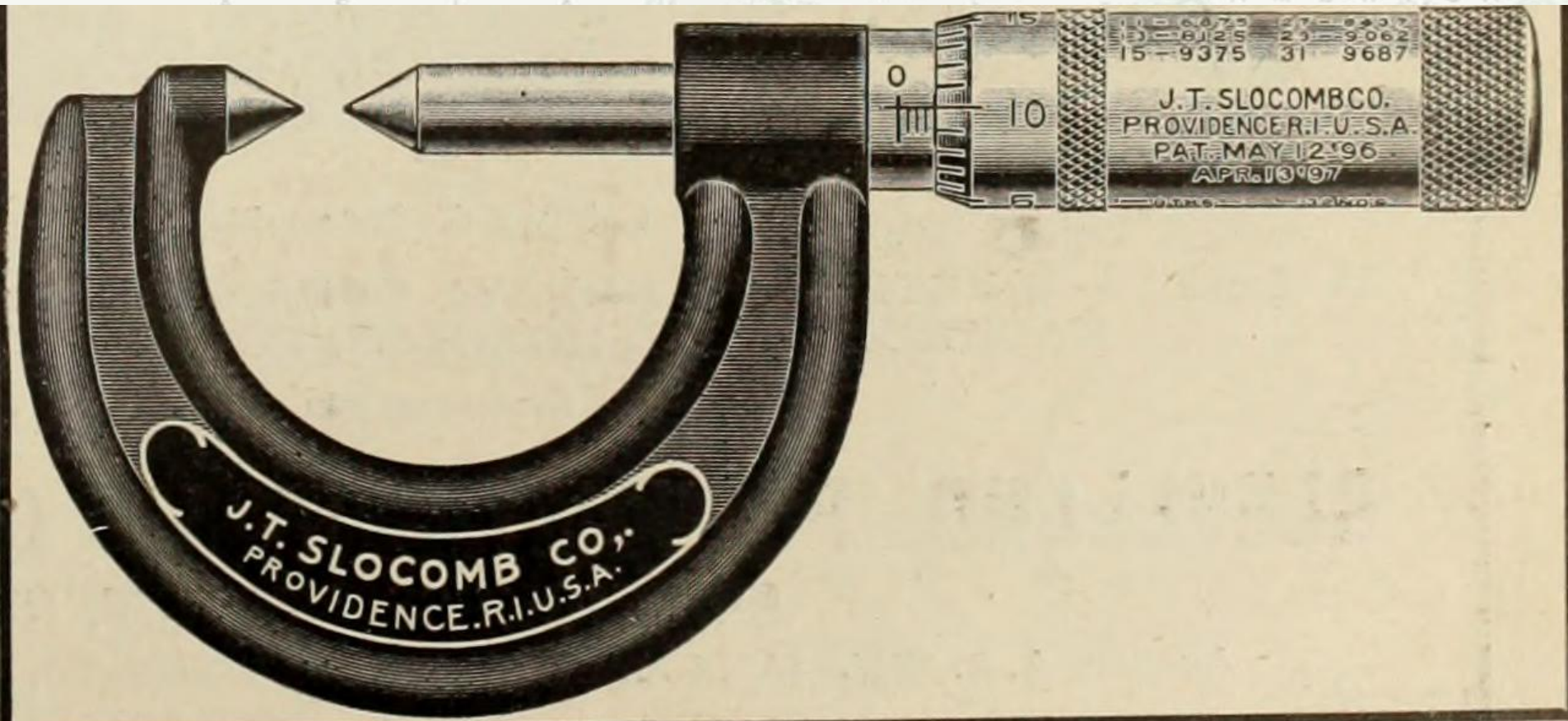


Testing Methods





Measurement Methods

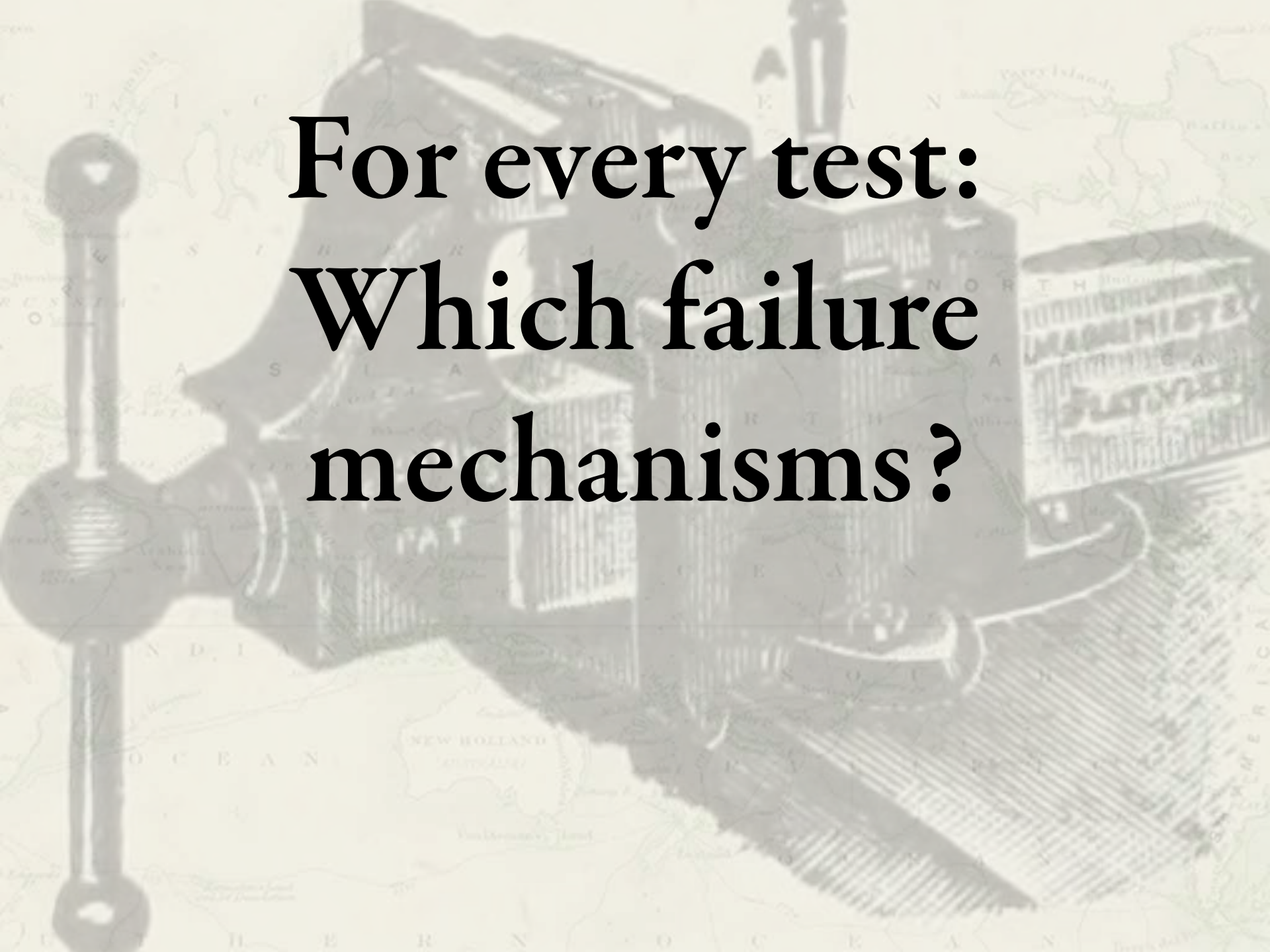


What else is a
hurdle in your
world?

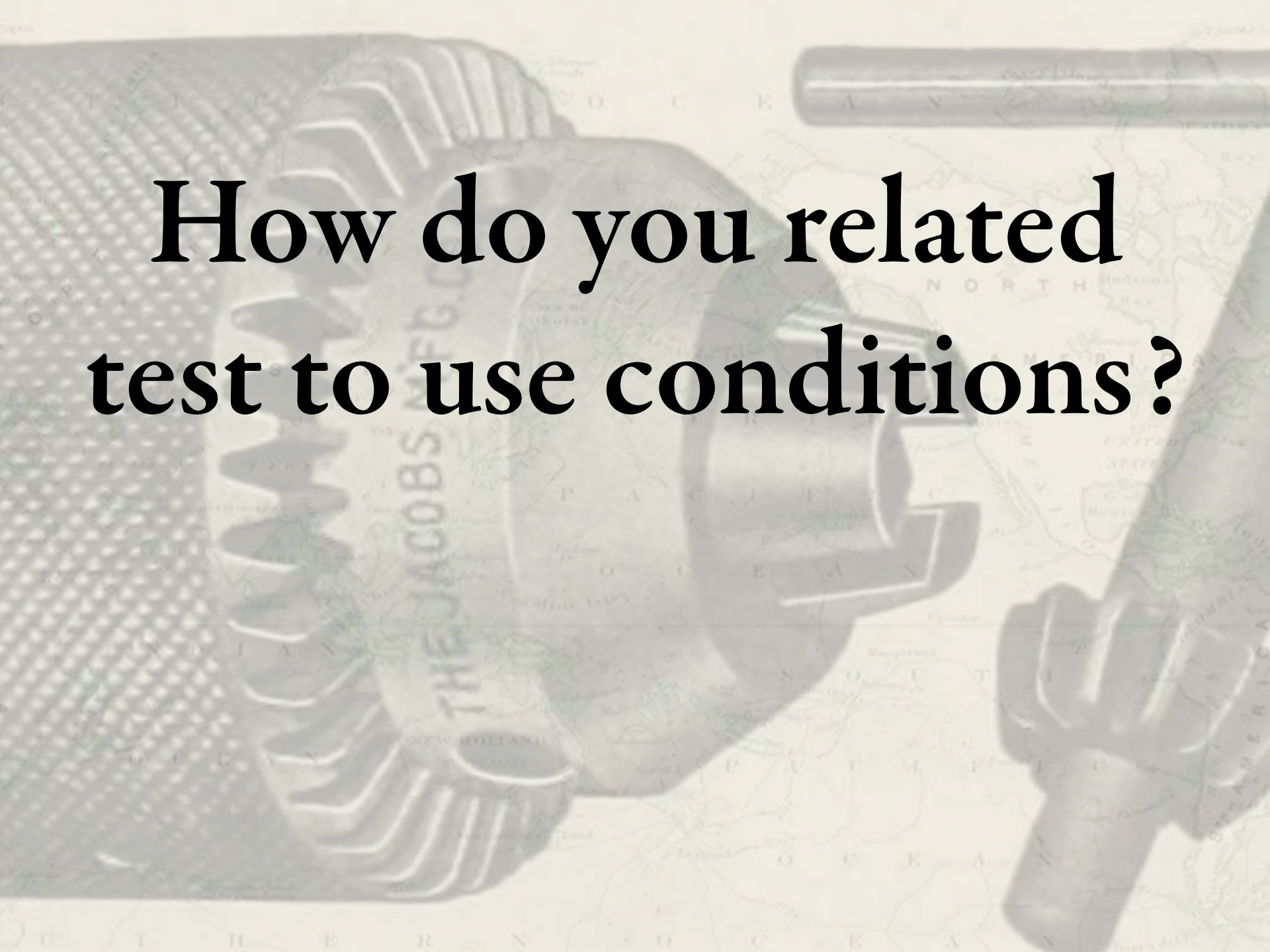


Next Steps

Here's how to get started

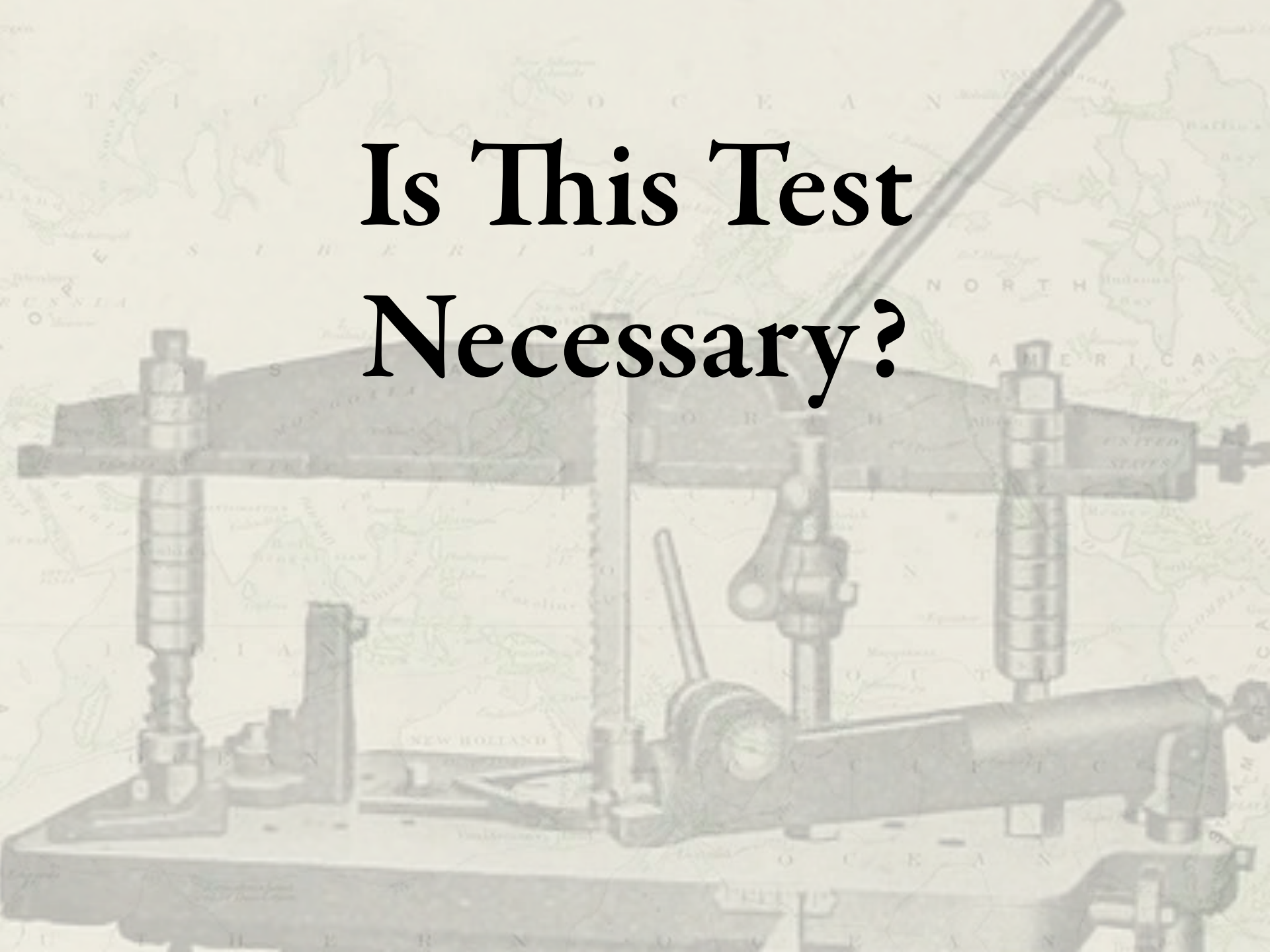
The background is a faded collage. On the left, a vertical mechanical linkage with a ball joint is visible. In the center, there's a complex mechanical assembly with gears and a piston-like component. On the right, a cylindrical object with horizontal ridges, possibly a piston or a part of a machine, is shown. The entire scene is overlaid on a map of Australia, with labels like 'NEW HOLLAND', 'AUSTRALIA', and 'TASMANIA' visible.

**For every test:
Which failure
mechanisms?**

The background of the slide is a faded map of the Pacific Ocean, showing various islands and continents. Overlaid on the map are two large, semi-transparent tools: a wrench on the left and a screwdriver on the right. The wrench has the text "THE JACOBS WFT CO." printed vertically on its handle. The screwdriver has a cross-shaped head. The text "How do you related test to use conditions?" is centered over the map and tools in a large, bold, black serif font.

**How do you related
test to use conditions?**

Is This Test Necessary?





**Does this test provide
useful information?**



Start now
Characterize failure
mechanisms

What Are Your
Questions?



Watch for launch of reliability podcasts

Thanks for participating.