



ALT Approaches

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Accendo Reliability

Illuminated Reliability Engineering Knowledge



How long will it last?

Estimating reliability performance

Customer Expectations



Financial Planning





Making Decisions

Do you need to
know life time
distributions?



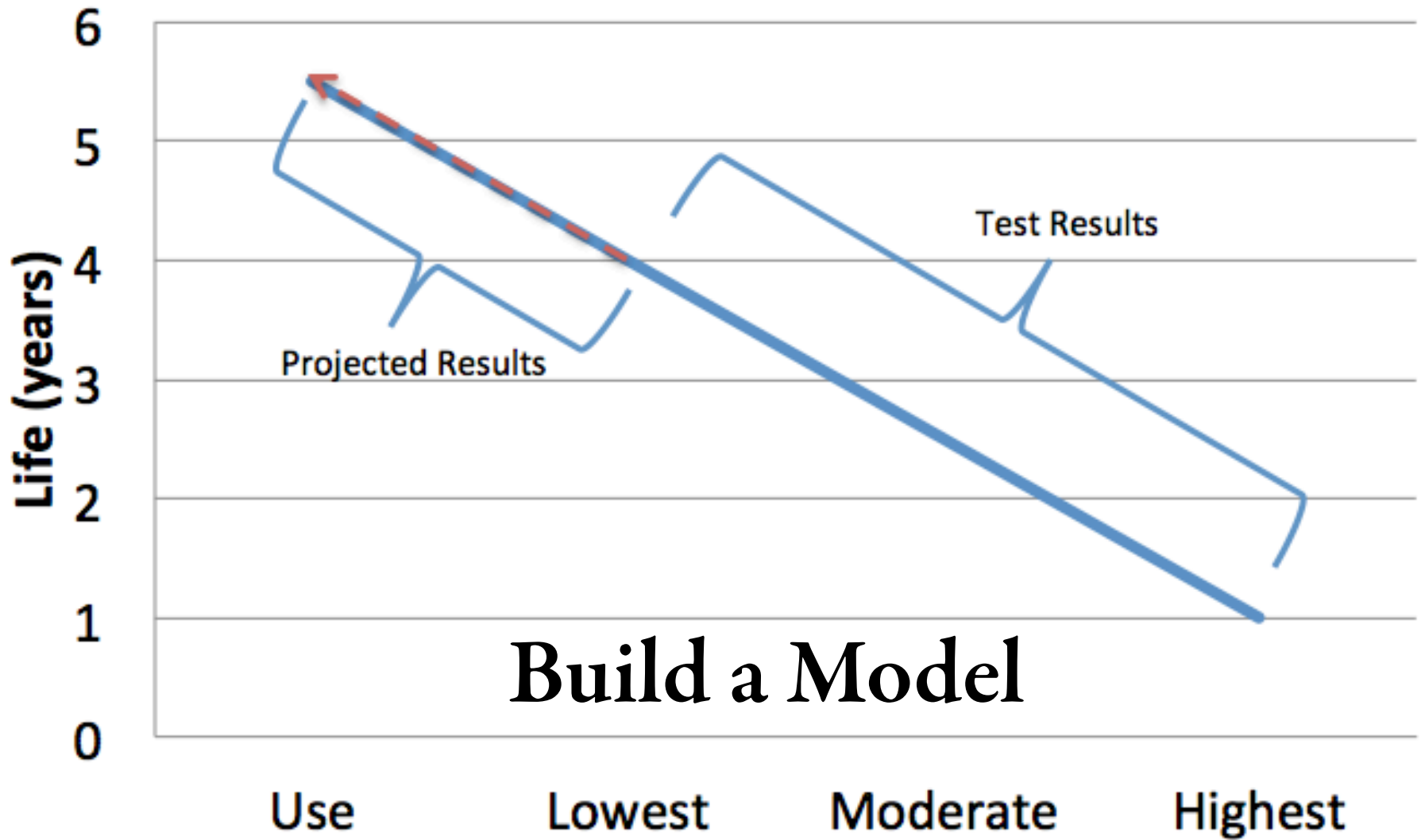
ALT

How to cheat time?



Time Compression

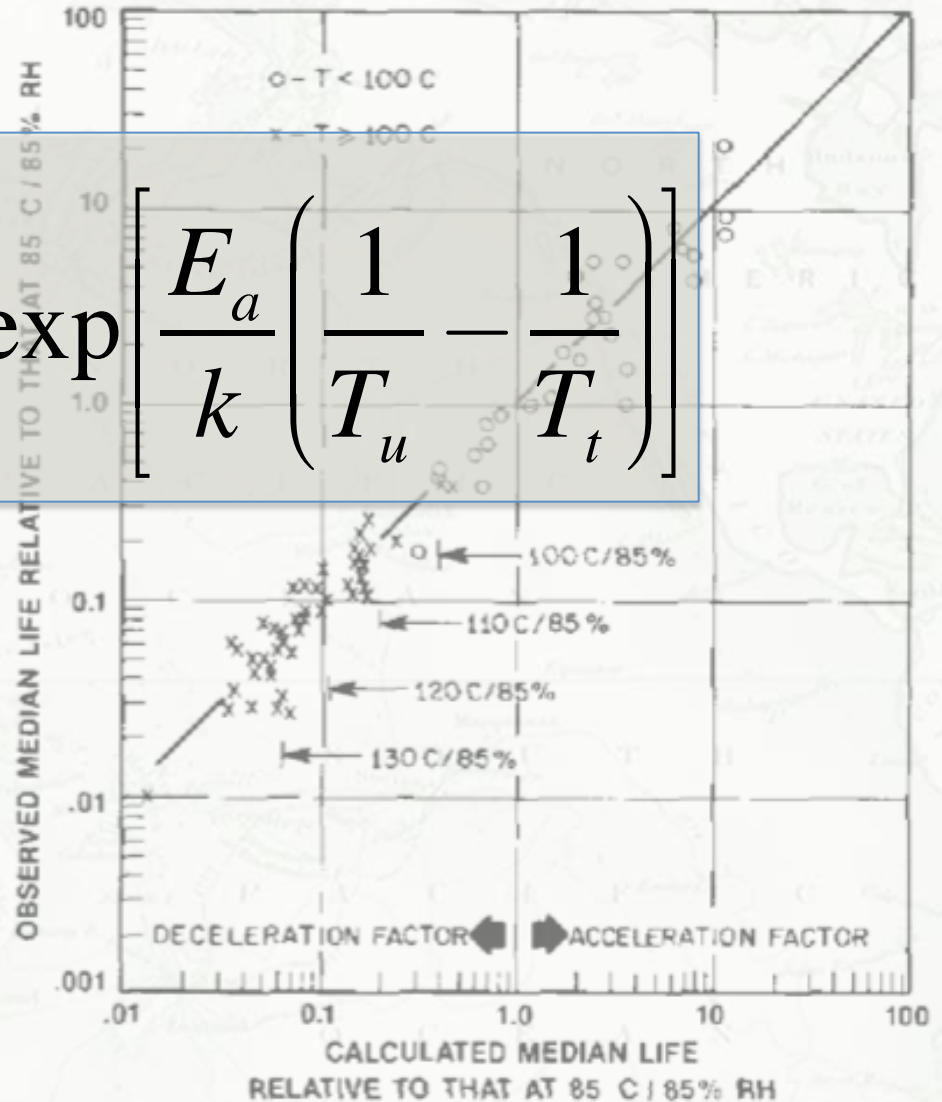
Stress vs. Life



Given a Model

$$AF = \left(\frac{RH_u}{RH_t} \right)^{-3.0} \exp \left[\frac{E_a}{k} \left(\frac{1}{T_u} - \frac{1}{T_t} \right) \right]$$

Peck's
Relationship



Step Stress



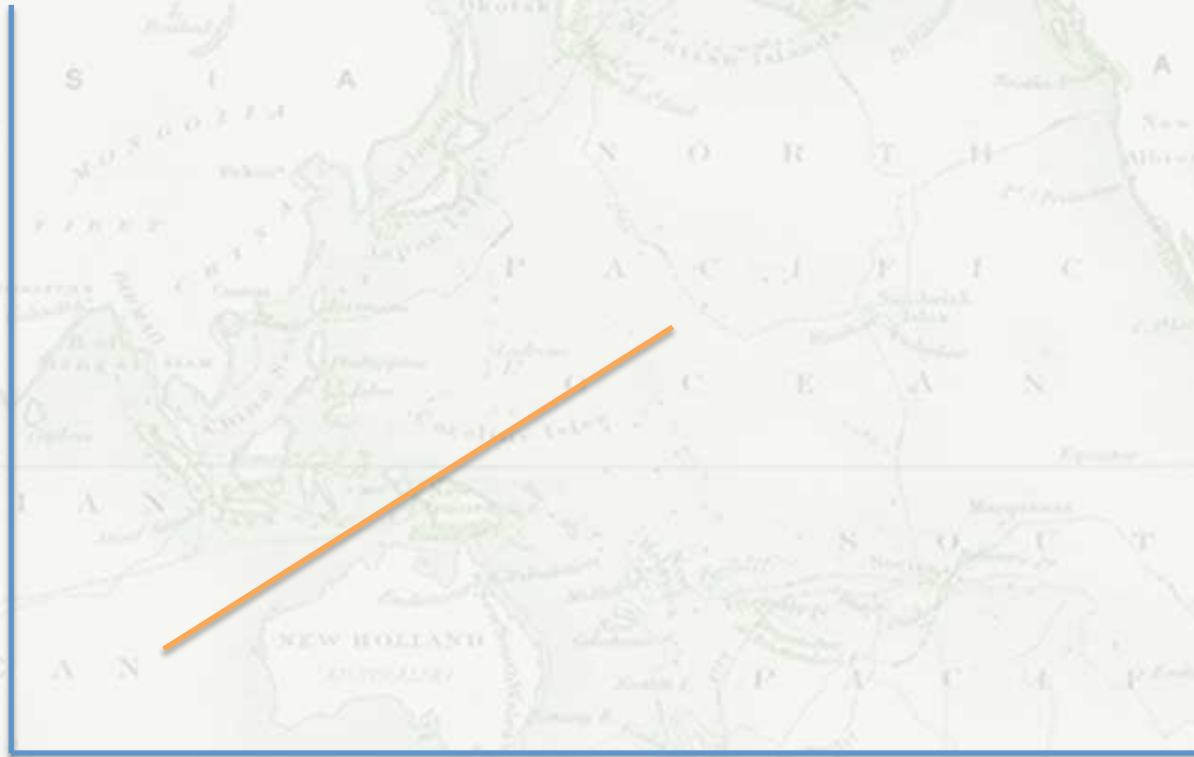
Degradation



Best if you Know the Failure Mechanism(s)

Cumulative Probability of Failure

time



Do you have
models for top
failure
mechanisms?



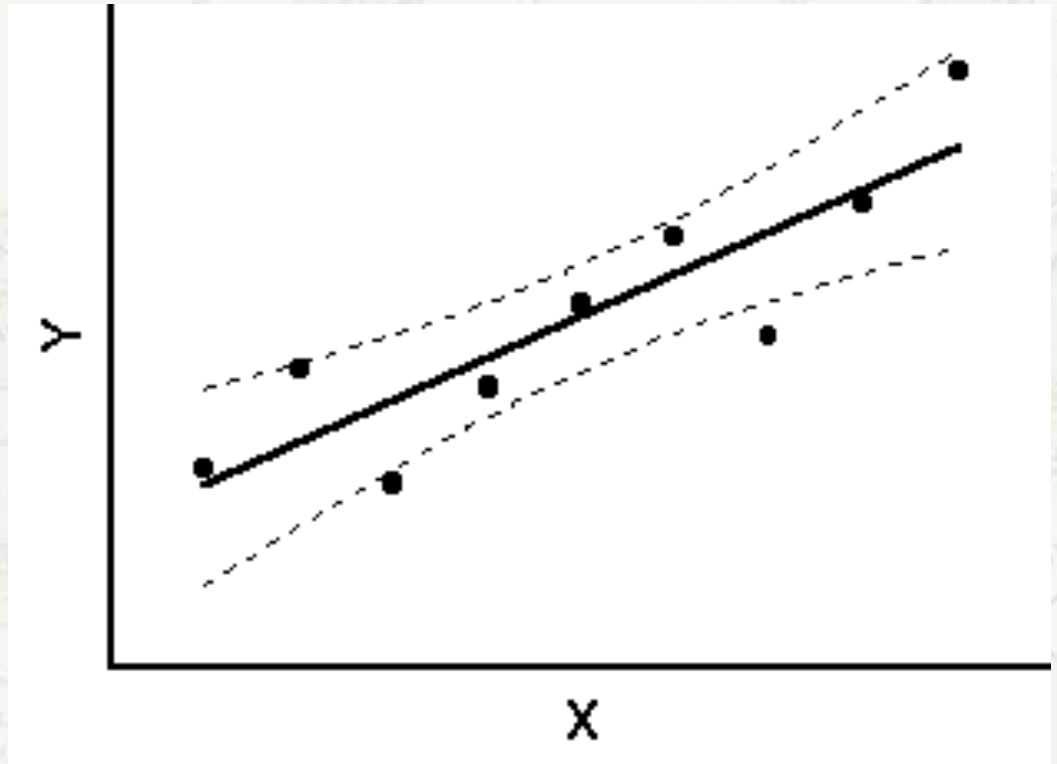
Selection Criteria

How to select the right approach?

Selection Criteria

Meaningful Results

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



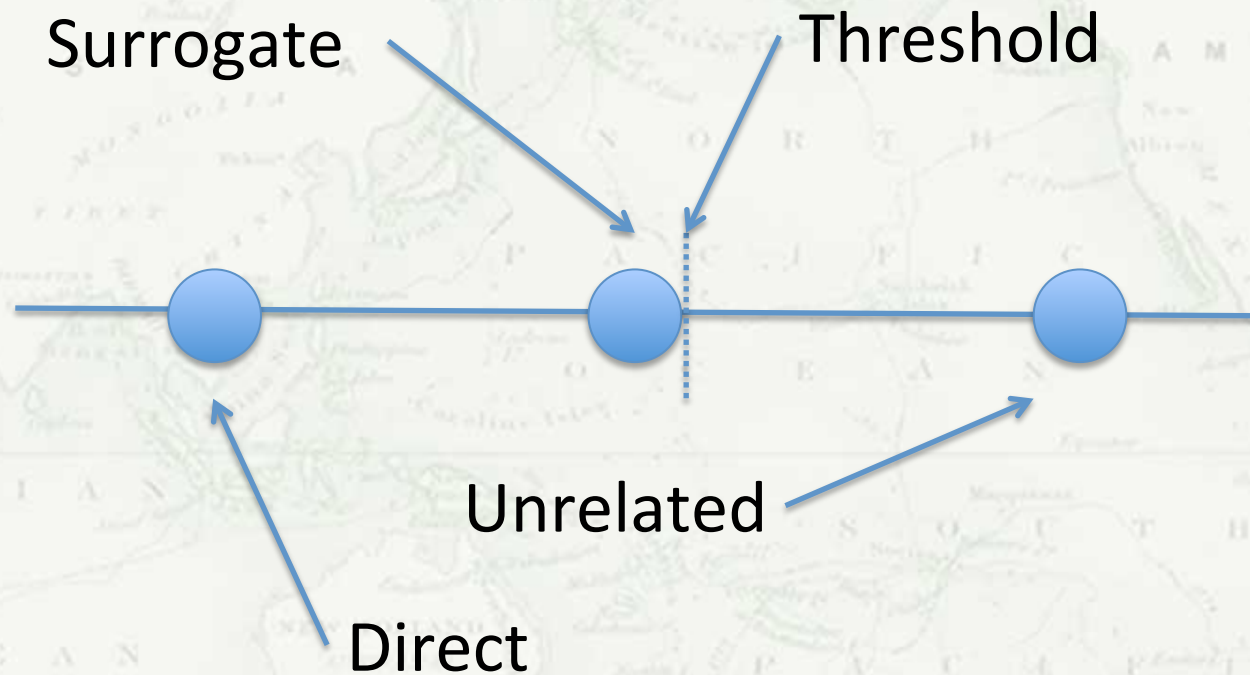
Selection Criteria

Meaningful Results

Measures



Meaningful Results: Measures



Selection Criteria

Meaningful Results

Measures

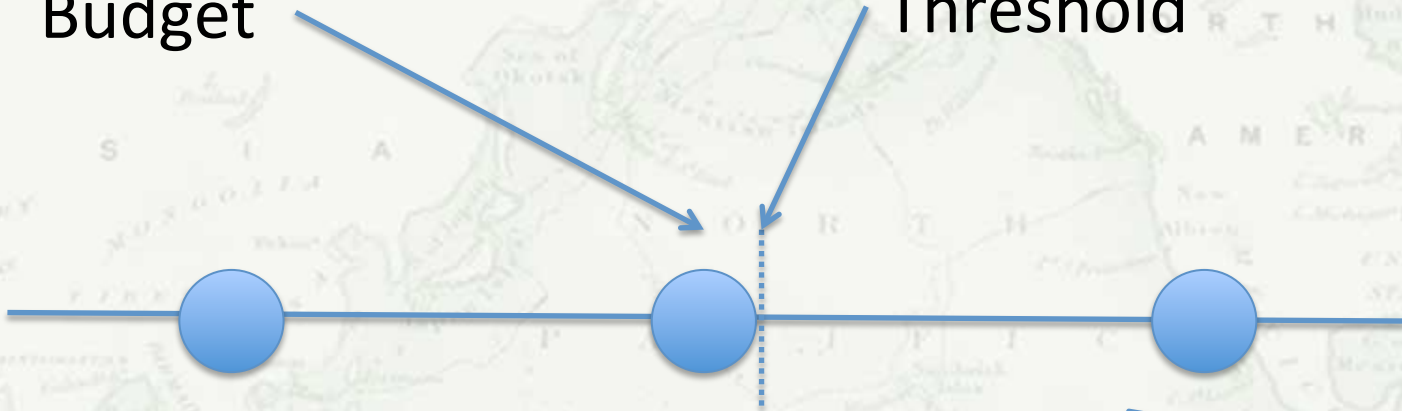
Cost



Cost

Budget

Threshold



Prohibitive

Inexpensive

Selection Criteria

Meaningful Results

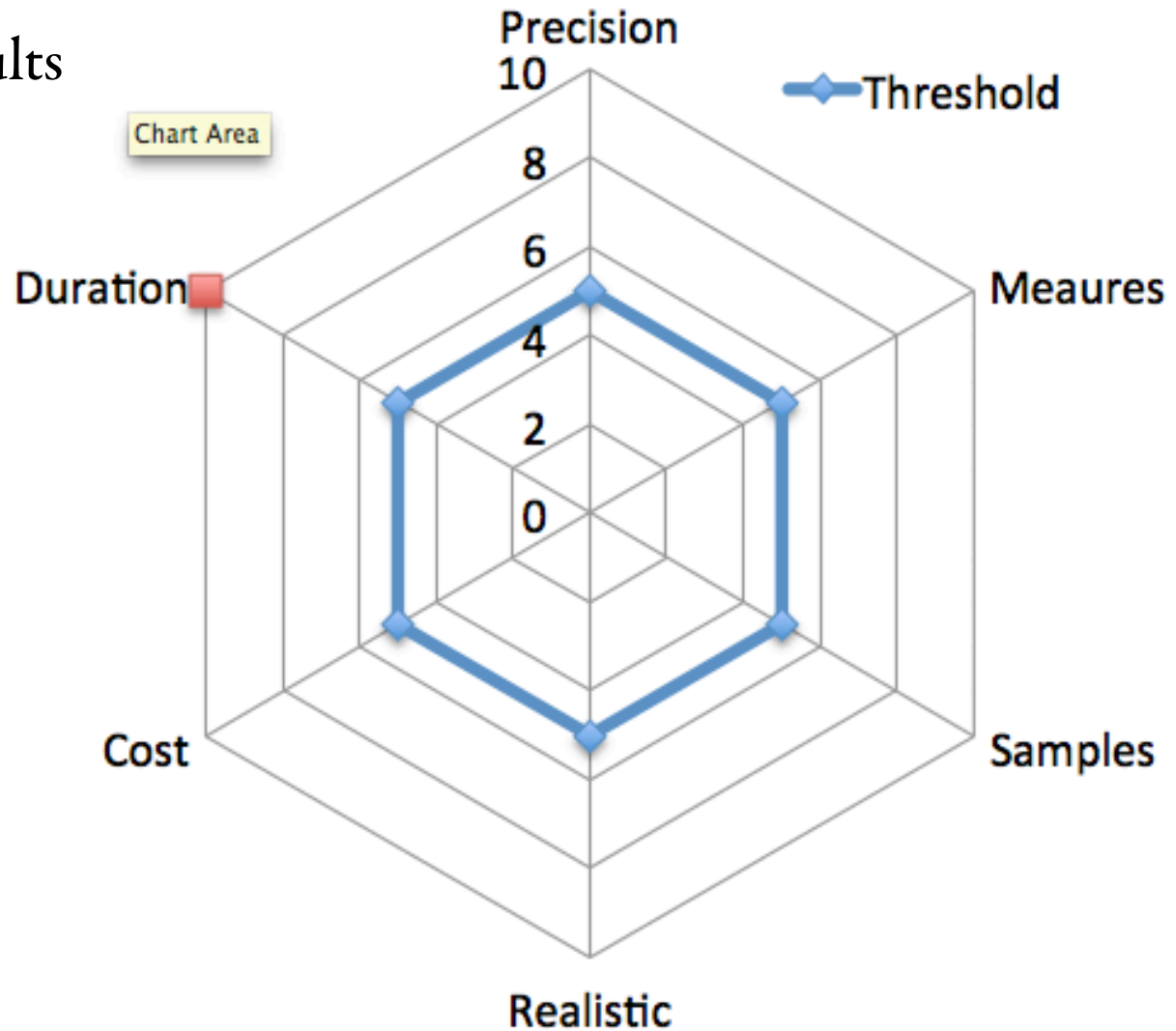
Measures

Cost

Precision

Duration

Samples



What criteria do
you use?



An Example

Which approach would you use?

Example Case

Capacitor

24/7 operation

High voltage load

Outdoor environment

Insulation breakdown
failure mechanism

Let's consider some
ALT options



Discussion Points

Criteria

- **Duration**
- **Precision**
- **Measures**
- **Cost**
- **Realistic**
- **Samples**

ALT Approaches

- **Time Compression**
- **Build a Model**
- **Assume a Model**
- **Step Stress**
- **Degradation**

Who should be
involved
selecting the
approach?

Create Meaningful Tests

- 1. Recognize the risks**
- 2. Identify select tests**
- 3. Estimate Value**
- 4. Determine Conditions**
- 5. Document Success**




Reliability Value

Finding Value

How to Determine the Value of
Reliability Engineering Activities

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- **Join Accendo Reliability**
- **Download a copy directly**



What are your Questions?

Thanks for participating.