



ASQ CRE Prep course

Lesson V. B. 3.

Reliability Growth Testing

TAAF

- **Test, Analyze, and Fix Method**
- **Failure analysis**
- **Corrective Action**



Duane Model

- **Test planning**
- **Given current situation and desired priority**
- **Also, can model reliability growth**

$$\frac{\theta_c}{\theta_o} = \left(\frac{T}{T_o} \right)^\alpha$$

$$\ln \theta_c = \ln \theta_o + \alpha (\ln T = \ln T_o)$$

Alpha values

0.4 – 0.6 top priority

0.3 - 0.4 above average

0.2 – 0.3 routine

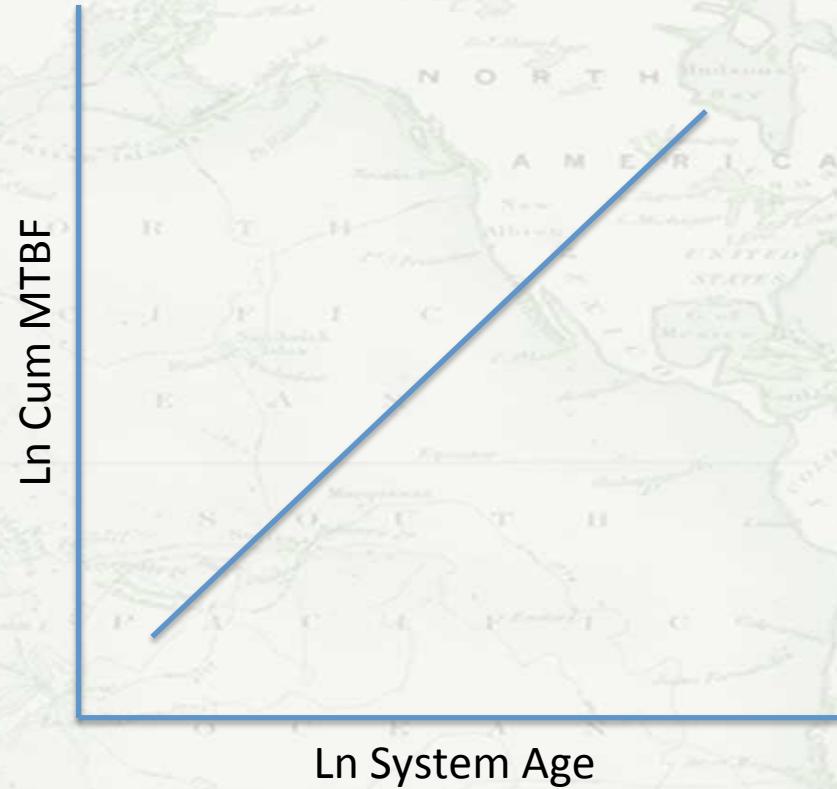
0 – 0.2 low priority

Duane Model Example

**Straight line indicates
NHPP Power Law Model**

$T / [r(1 - \beta)]$

**Curvature may indicate a
different model**



AMSAA Model

- **Uses Weibull**
- **Within a Test Phase**
not across phases
- **Continuous scale**

$$N(t) = \left(\frac{t}{\alpha} \right)^\beta$$

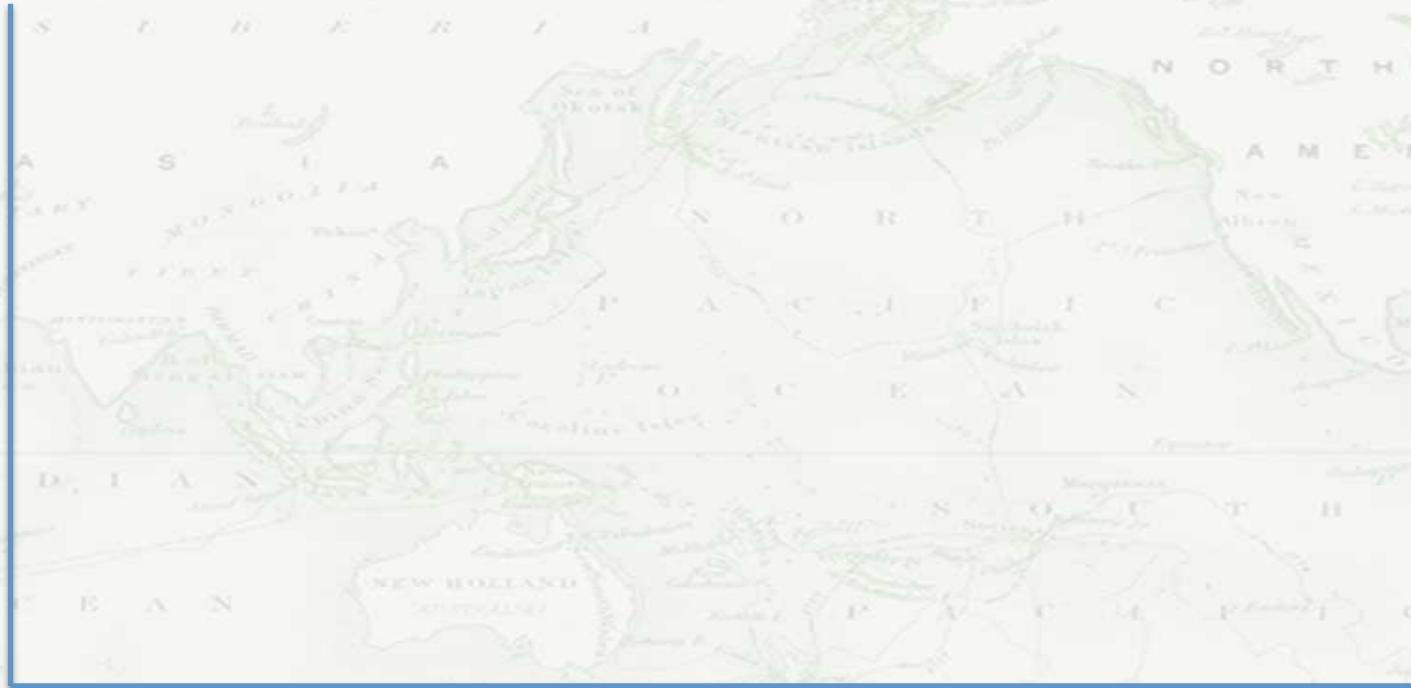
$$\ln[N(t)] = \beta \ln(t) - \beta \ln(\alpha)$$

Mean Cumulative Function

- **Recurrent data (repaired systems)**
- **Plot cumulative failures over time**
- **Regression provides a model**



MCF Example



Which Plots and
Models are most
useful?



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Lesson V. B. 4.

Software Testing