



# ASQ CRE Prep course

Lesson III. A. 2.

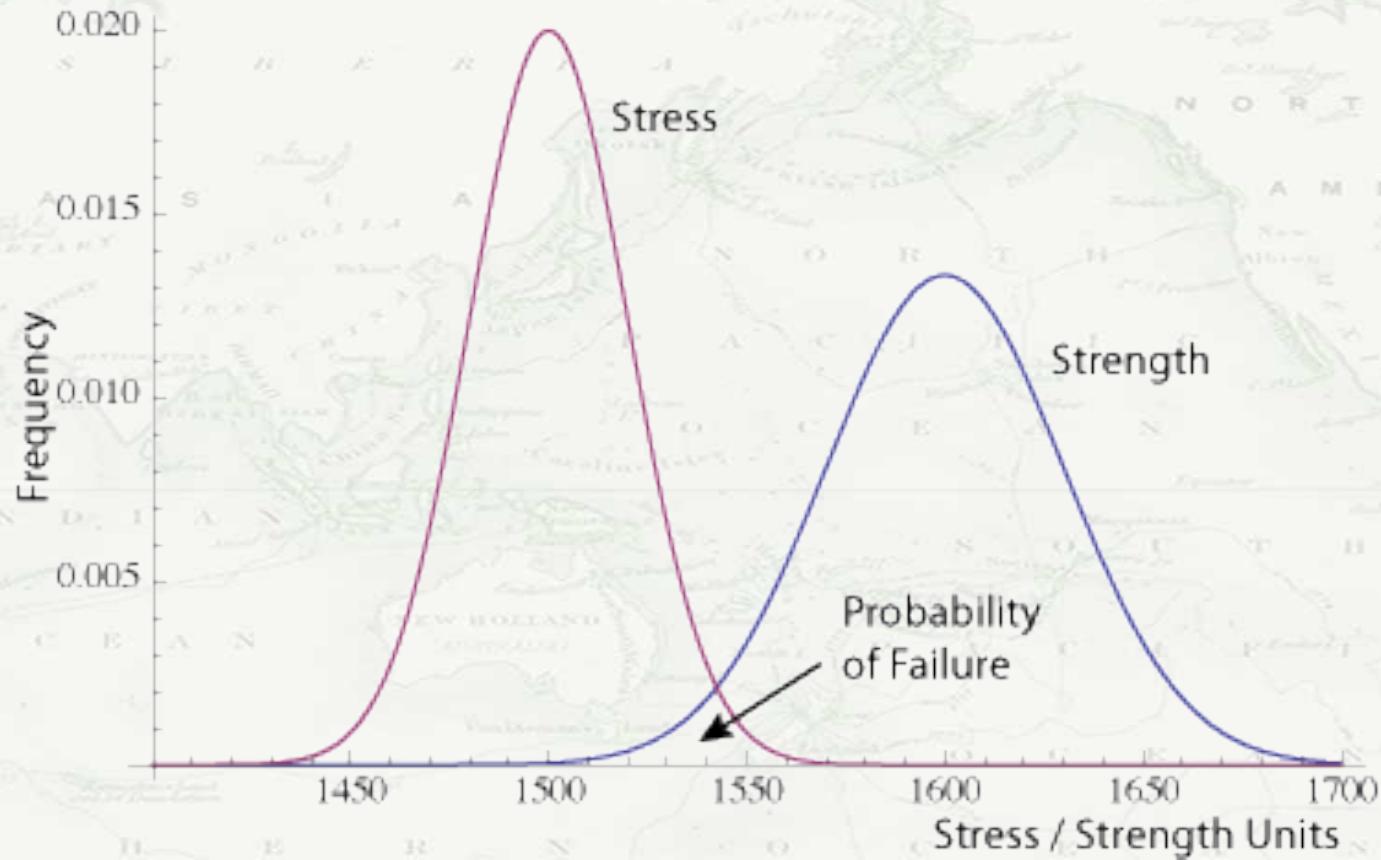
Stress-Strength Analysis

A black and white photograph of the Moon's surface. In the foreground, a small, dark, metallic object with a reflective, crumpled surface is resting on the ground. Behind it, a vertical flag pole stands upright, with a flag attached that appears to be made of a thin, translucent material. The ground is covered in a layer of fine, dark, irregularly shaped rocks and dust. The background is a vast, flat expanse of the same lunar terrain under a dark, featureless sky.

Is it good enough?

# STRESS STRENGTH ANALYSIS

# Concept



# Normal Equations

$$\mu_{strength-stress} = \mu_{strength} - \mu_{stress}$$

$$\sigma_{strength-stress} = \left( \sigma_{strength}^2 + \sigma_{stress}^2 \right)^{1/2}$$

$$Z = \frac{\mu_{strength} - \mu_{stress}}{\left( \sigma_{strength}^2 + \sigma_{stress}^2 \right)^{1/2}}$$

# Normal Example

**Given: the stress distribution for a circuit is a mean of 1200 watts and standard deviation of 20 watts**

**And a transformer performance has a mean of 1300 watts and standard deviation of 30 watts**

**What is the probability of failure?**

# Normal Example

$$Z = \frac{\mu_{strength} - \mu_{stress}}{(\sigma_{strength}^2 + \sigma_{stress}^2)^{1/2}}$$

$$Z = \frac{1300 - 1250}{(30^2 + 20^2)^{1/2}} = 1.39$$

- Then off to z table
- 0.0681
- 6.81% probability of failure

And for  
non-normal?



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Lesson III. A. 3.

FMEA and FMECA