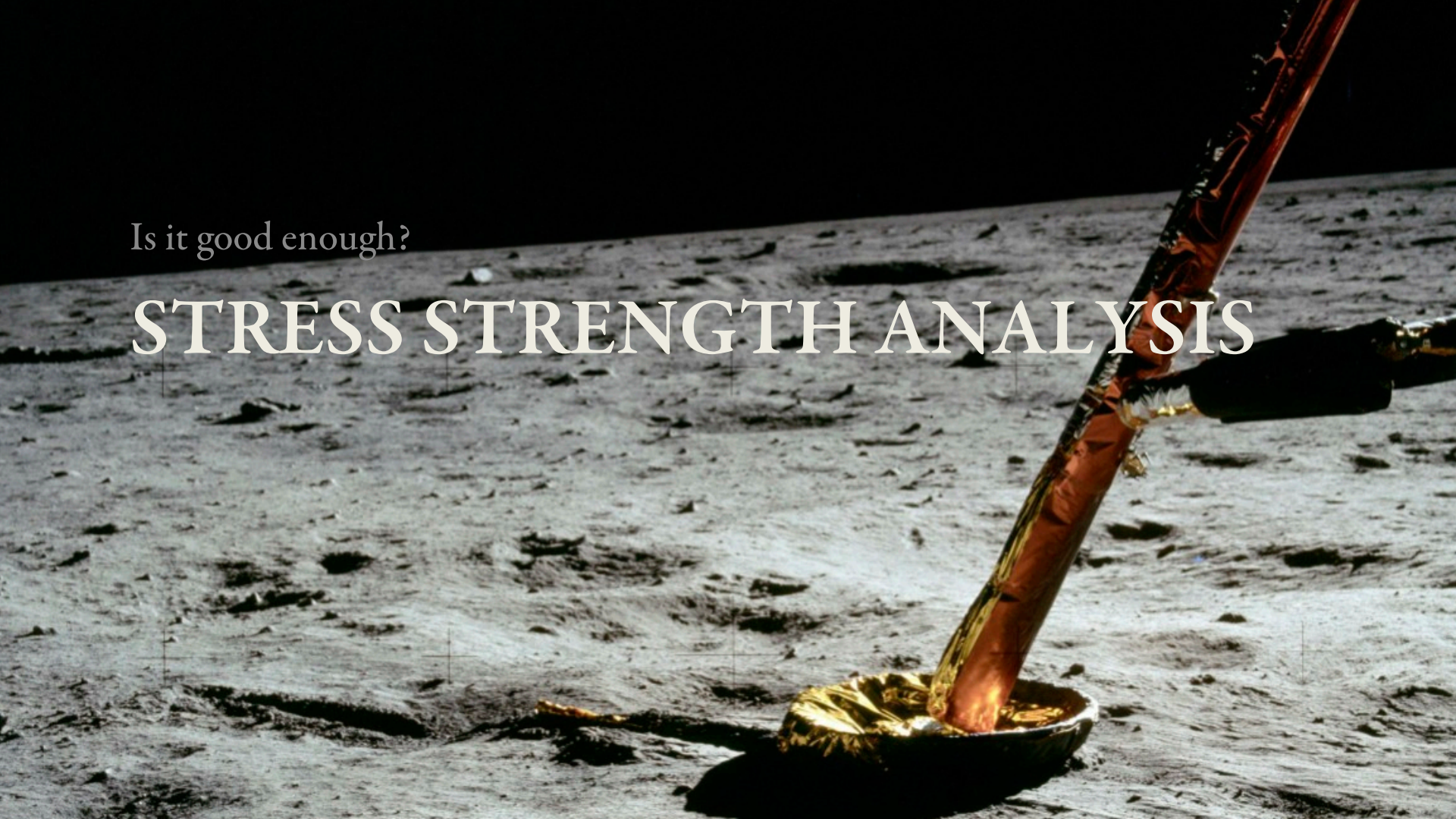
ASQ CRE Prep course

Lesson III. A. 2.

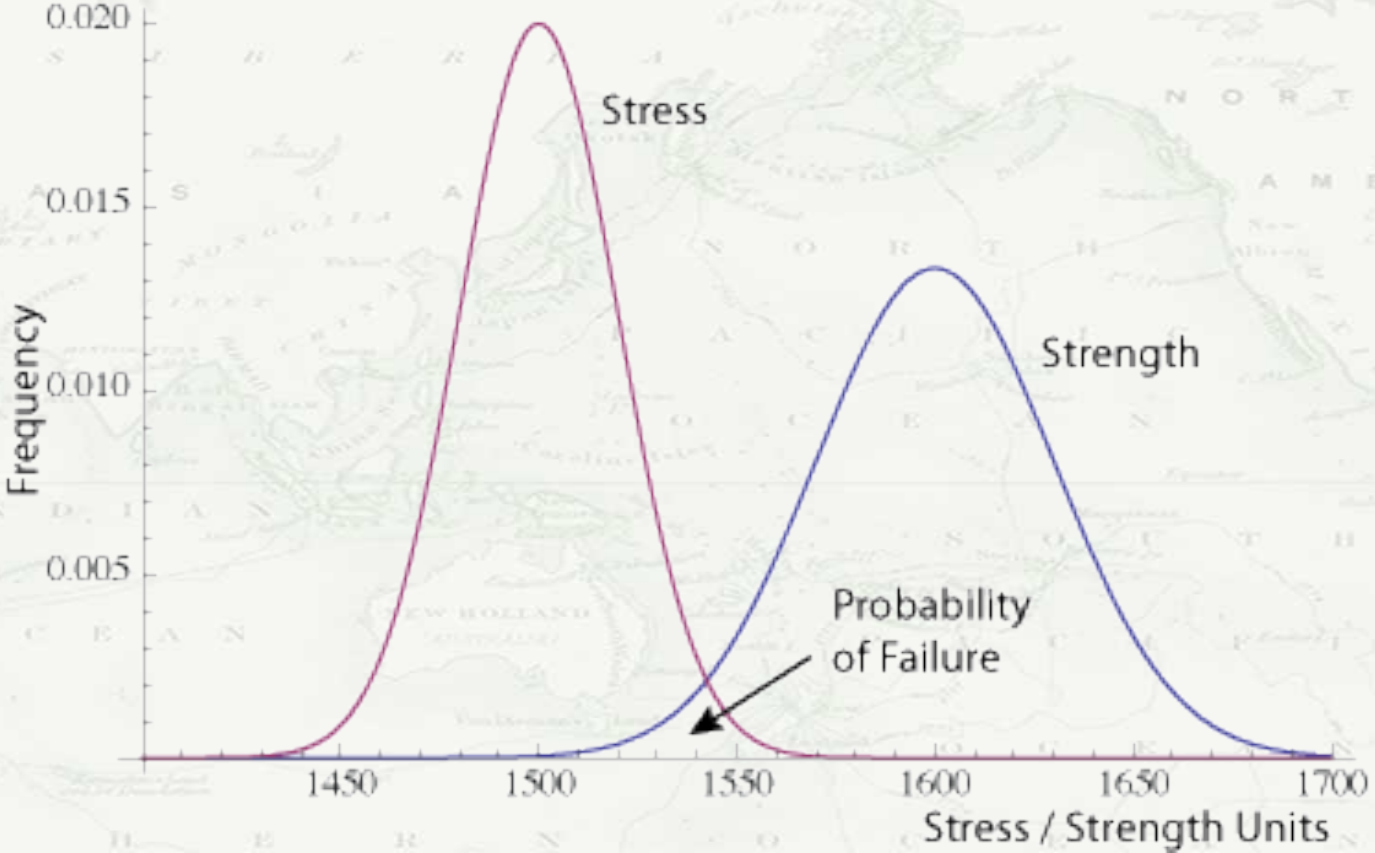
Stress-Strength Analysis



Is it good enough?

STRESS STRENGTH ANALYSIS

Concept


0.020
0.015
0.010
0.005
Frequency
Stress
Strength
Probability
of Failure
1450
1500
1550
1600
1650
1700
Stress / Strength Units

Normal Equations

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

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

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

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

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

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

- **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