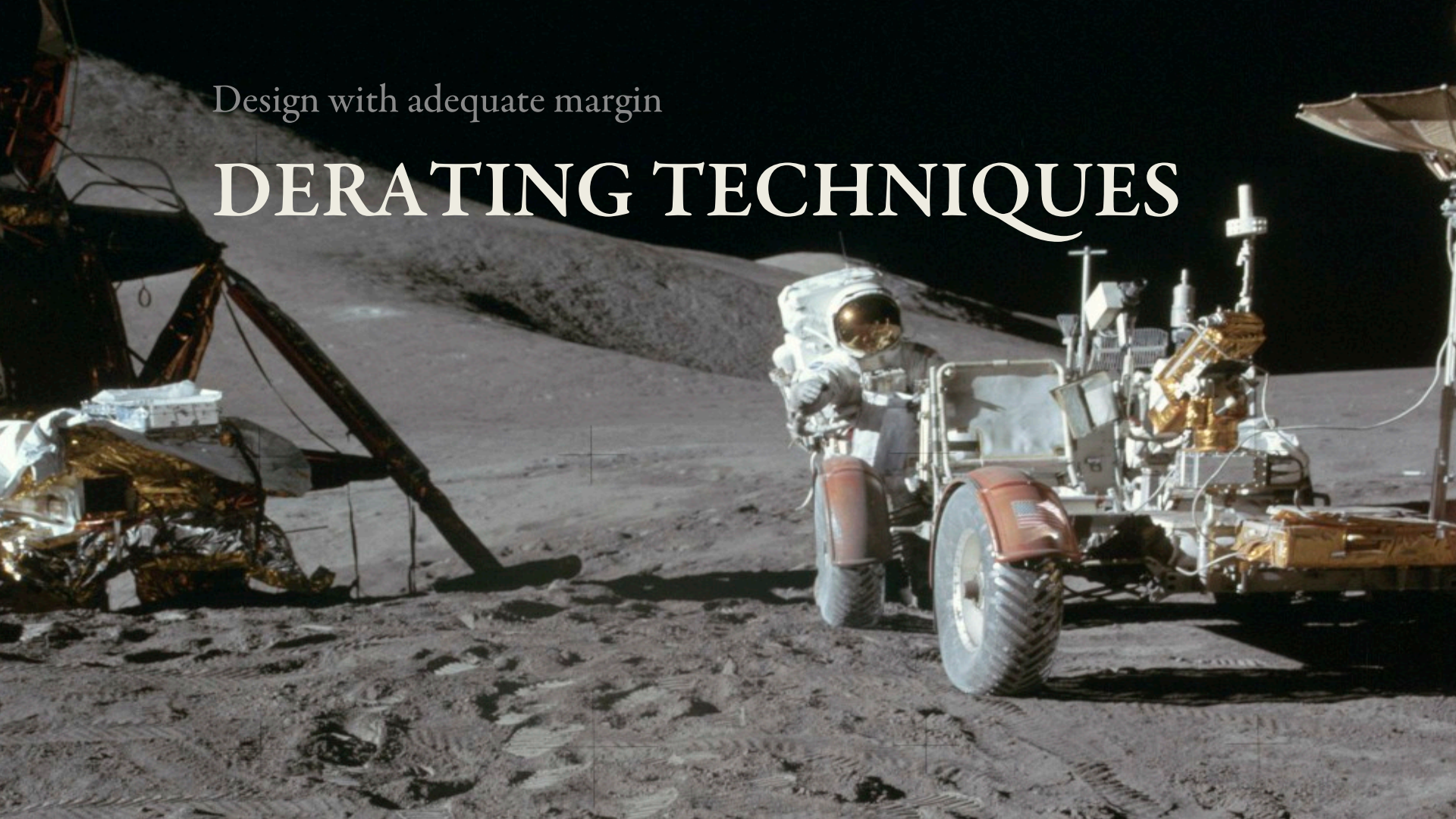# ASQ CRE Prep course

Lesson III. B. 2.

Derating Methods
and Principles

Design with adequate margin

DERATING TECHNIQUES

Derating

Use an item with applied stresses are below rated values

Lower the rating of an item in one stress area to allow an increase in rating in another stress area

Uprating?

Arrhenius Law

Chemical reaction rate and relationship to temperature

Doubling failure rate for increase of 10°C

(only for specific activation energy, 0.7eV)

Safety Factor

$$\text{Safety Factor} = \frac{\mu_x}{\mu_y}$$

$$\text{Margin of Safety} = \frac{\mu_x - \mu_y}{\mu_y}$$

μ_x is average strength

μ_y is average stress or load

S-N Diagrams

Graphs to evaluate material fatigue damage under stress or load.

Relationship between stress and cycles to failure

Miner's Rule to Aggregate Different Stress levels

$$C = \frac{n_1}{N_1} + \frac{n_2}{N_2} + \frac{n_3}{N_3} + \cdots + \frac{n_k}{N_k}$$

How does one set a safety margin policy?

ASQ CRE Prep course

Lesson III. B. 3.

Parts Obsolescence

Management