



ASQ CRE Prep course

Lesson III. A. 9.

Reliability Optimization

A photograph of an astronaut in a white spacesuit working on a large, dark, rectangular satellite component in space. The astronaut is positioned in the center-left, reaching towards the component on the right. The background is a bright blue sky with white clouds. The satellite component has a dark, textured surface with some lighter-colored panels. The astronaut's suit is white with various equipment and cables attached. The overall scene is a high-contrast, professional photograph of a space mission.

Improve only what makes a difference

RELIABILITY OPTIMIZATION

Simple Example

Compressor $R_1 = 0.98$

Combustor $R_2 = 0.90$

Turbine $R_3 = 0.97$

**System goal of 90%
reliable**



What do we change?

How good does R_2 have to be?

$$R_T = R_1 \times R_2 \times R_3 = 0.98 \times 0.90 \times 0.97 = 0.856$$

$$R'_2 = \frac{R'_T}{R_1 \times R_3} = \frac{0.90_T}{0.98 \times 0.97} = 0.947$$

How about Redundancy

$$R_T = R_1 \times (1 - (1 - R_2) \times (1 - R_2)) \times R_3$$

$$R_T = 0.941$$

More on
modeling in next
chapter



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Human Factors