

ASQ Reliability Division

Who we are

&

How we can help

The Pitch

- Is your organization involved in design, production, or quality? If so, then reliability is probably important to you. But you may not know much about reliability or how to go about achieving reliability.

We can help.



ASQ Reliability Division

- Have you heard of us?
- Largest group in the world that promotes reliability training and education.
- Volunteer organization focused on member benefits and advancing reliability engineering globally.
- Activities are concerned with reliability, maintainability, quality, safety, and effectiveness of products, processes, and services

ASQ Reliability Division - Mission

- Provide a global forum for networking among practitioners of reliability engineering, management and related topics,
- Facilitate growth and development of division members,
- Promote reliability engineering principles and serve as a technical resource on reliability engineering for ASQ, standards agencies, industry, government, academia and related disciplines
- Sponsor, present and promote reliability, maintainability, and related training materials for courses, symposia, and conferences.

ASQ Reliability Division - Involvement

- Collaboration / Networking / Communication



- Quarterly Newsletter

- Certification

- ASQ CRE (Certified Reliability Engineer)

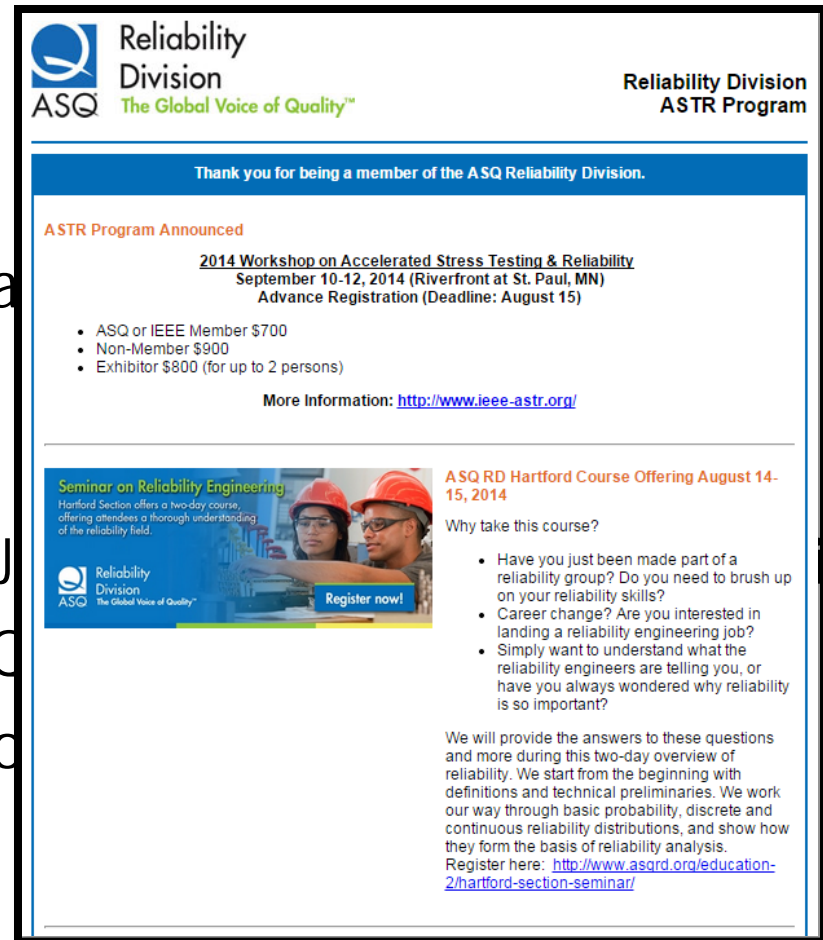
- How can you join us?

- ASQ members – \$10

- Not an ASQ member – Join

- asqrd.org – Free for ASQ members

- Volunteer Leadership Opportunities



The screenshot shows a newsletter from the ASQ Reliability Division. At the top left is the ASQ Reliability Division logo with the tagline 'The Global Voice of Quality™'. At the top right is 'Reliability Division ASTR Program'. Below this is a blue banner that says 'Thank you for being a member of the ASQ Reliability Division.' The main content is titled 'ASTR Program Announced' and features a '2014 Workshop on Accelerated Stress Testing & Reliability' scheduled for September 10-12, 2014, in Riverfront at St. Paul, MN. Registration details are listed: ASQ or IEEE Member \$700, Non-Member \$900, and Exhibitor \$800 (for up to 2 persons). A link to <http://www.ieee-astr.org/> is provided for more information. Below this is a section for a 'Seminar on Reliability Engineering' offered by the Hartford Section, featuring a photo of two people in hard hats. A 'Register now!' button is visible. To the right of the seminar photo is a section titled 'ASQ RD Hartford Course Offering August 14-15, 2014' with the question 'Why take this course?' followed by a bulleted list of reasons: 'Have you just been made part of a reliability group? Do you need to brush up on your reliability skills?', 'Career change? Are you interested in landing a reliability engineering job?', and 'Simply want to understand what the reliability engineers are telling you, or have you always wondered why reliability is so important?'. At the bottom of this section, it states 'We will provide the answers to these questions and more during this two-day overview of reliability. We start from the beginning with definitions and technical preliminaries. We work our way through basic probability, discrete and continuous reliability distributions, and show how they form the basis of reliability analysis. Register here: <http://www.asqrd.org/education-2/hartford-section-seminar/>'.

ASQ Reliability Division - Offerings

- Training courses
 - Conferences or stand-alone (often partner with ASQ sections)
 - asqrd.org
 - Monthly live webinar training
 - A library of over 100 past webinars and >9,400 hours of instruction
 - *Certificates for “proof of training” (and ASQ Recertification Units)*
- Conferences
 - Sponsor for RAMS (www.rams.org) *Reliability and Maintainability Symposium*
 - the world’s largest reliability conference
 - Sponsor for ASTR (www.ieee-astr.org) *Accelerated Stress Testing & Reliability*
 - focused accelerated testing
- Regional Councilors

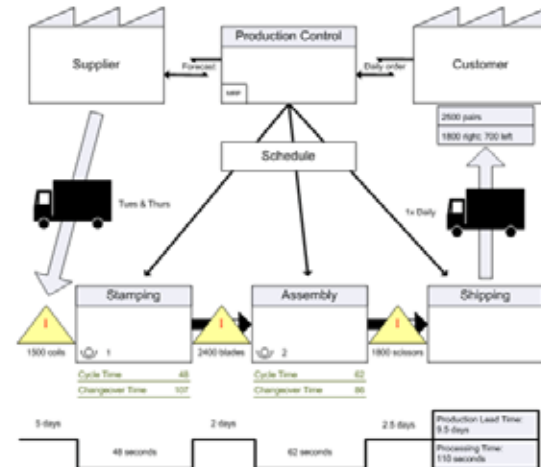
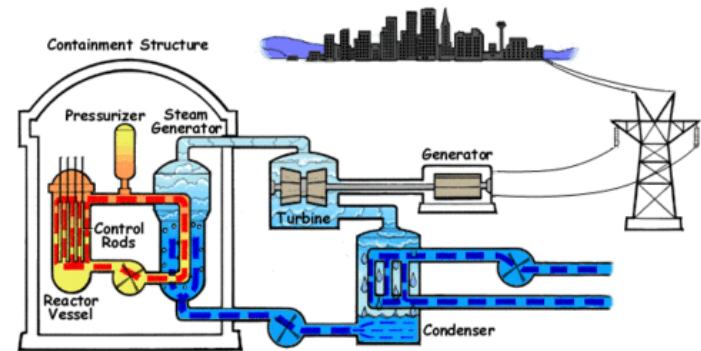
A little about myself



A little about myself



A little about myself



What is Reliability?

- *What do you think reliability is?*
- *Textbook Definition:*

Reliability is the probability that an item will perform its intended function for a specified interval under stated conditions following prescribed procedures.

“Quality over time.”

Reliability Engineering in publications

Beating the Perils of Manned

Space Flight



how can we get a good handle on space-flight hazards? Considerable progress has been made. Far from being a mere paper study, lacking practical significance for want of experience to go on, is the new art of “reliability analysis.” It provides most valuable hints to the space-vehicle designer as to where he should make an extra effort to reduce a potential hazard.



Mission to moon could meet with disaster at any of these 14 critical points. Planners seek to make more risky than rest.

218 | POPULAR SCIENCE

By methods we shall come to, the hazards of all these situations can be soberly appraised and reduced to a minimum. Resulting safeguards will aim to assure an Apollo mission's success from start to finish. And, even if the mission should fail, they are still to provide for bringing the astronauts back safely.

Getting out of a tight fix. Suppose, for example, that while an Apollo spacecraft's crew are orbiting the moon before landing,

for aboard) and of pilot error (including bad navigators and venturing unprepared into adverse weather). Flight conditions when accidents happened have been analyzed, too: takeoffs, landings, and flying under conditions of high or low visibility, smooth or turbulent air, icing, thunderstorms, and so on.

For space hazards, a new method. Without such data for space,

Continued

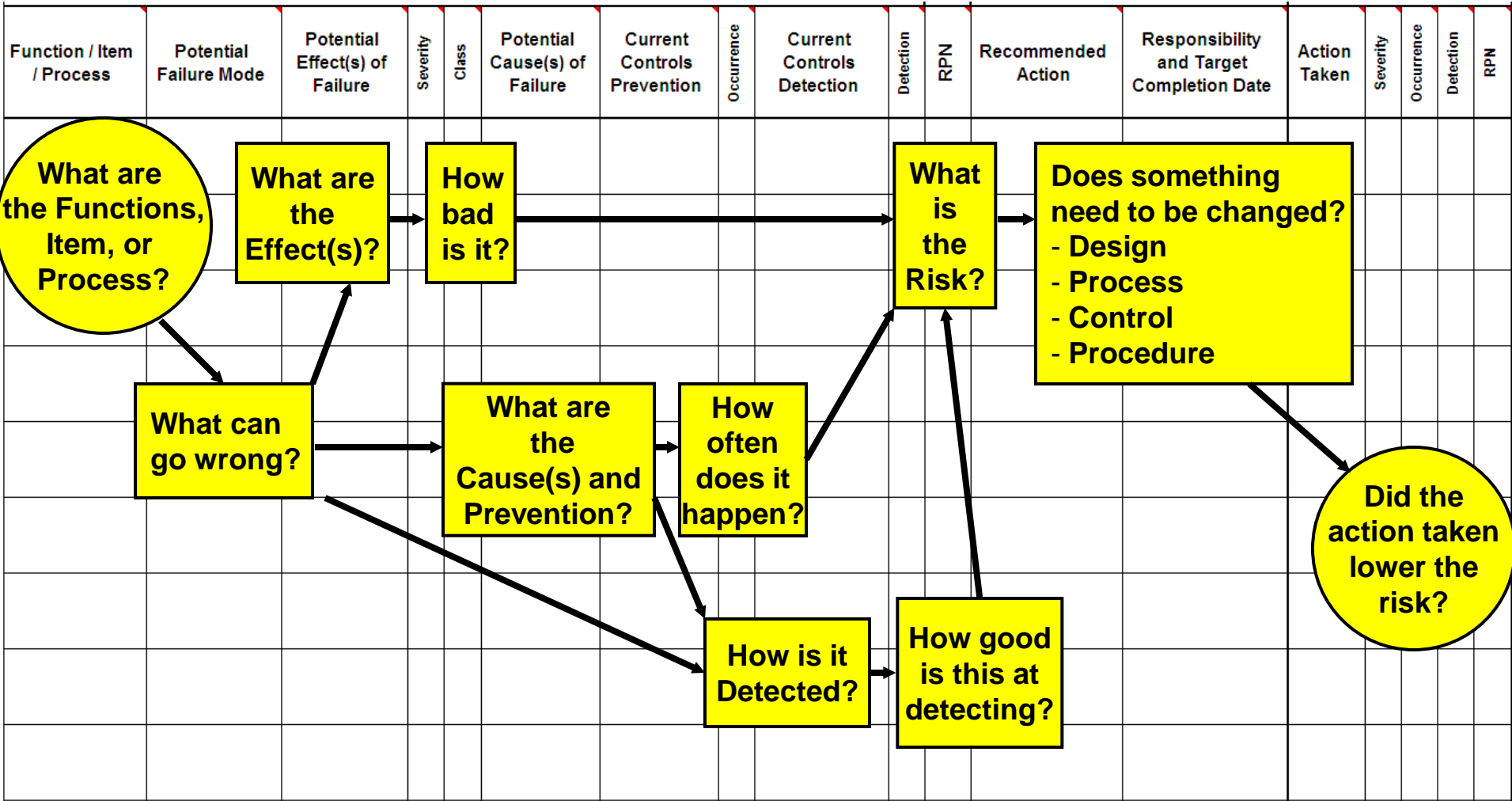
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WIND IT UP...
by SS winner JIM CLARK

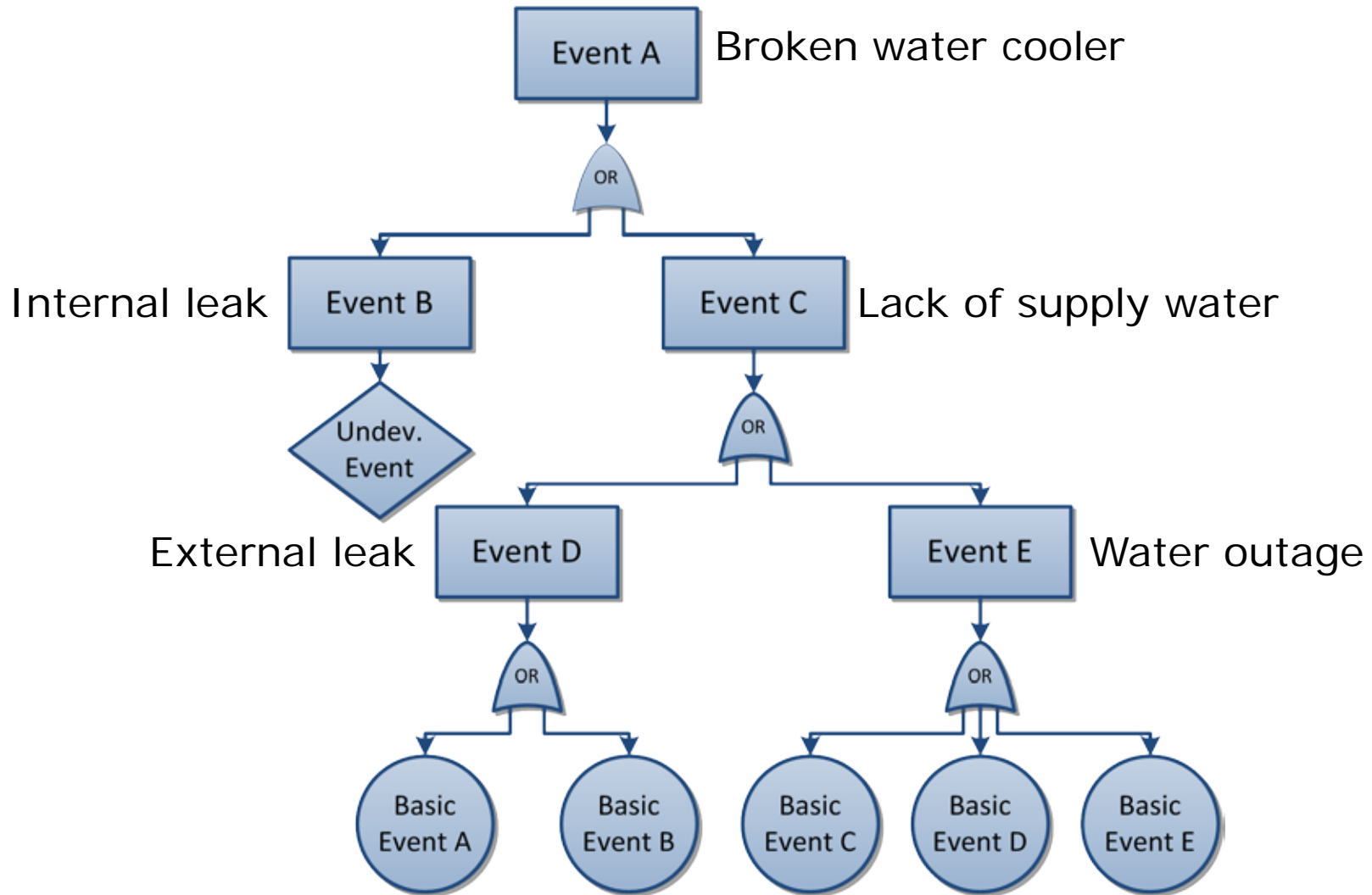
We help Quality

- **Structured Processes**
 - Failure Mode and Effects Analysis (FMEA)
 - Fault Tree Analysis (FTA)
 - Failure Reporting And Corrective Action System (FRACAS)
- **Data and Statistics**
 - Factory Data, Test Data, Field Data
 - Discrete and Continuous Probability Distributions (especially Weibull) – probability of failure
 - Predictions (failure rates, warranties, etc.)

Failure Mode and Effects Analysis (FMEA)



Fault Tree Analysis (FTA)



Failure Reporting, Analysis and Corrective Action System (FRACAS)

- Reactive
- Failure rate measured

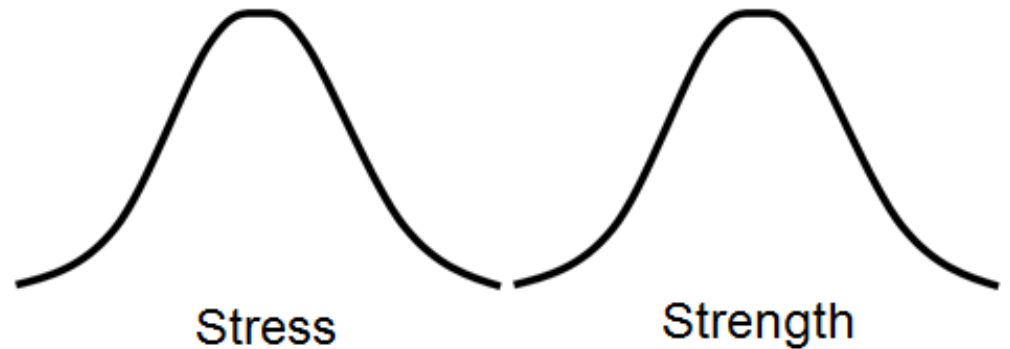
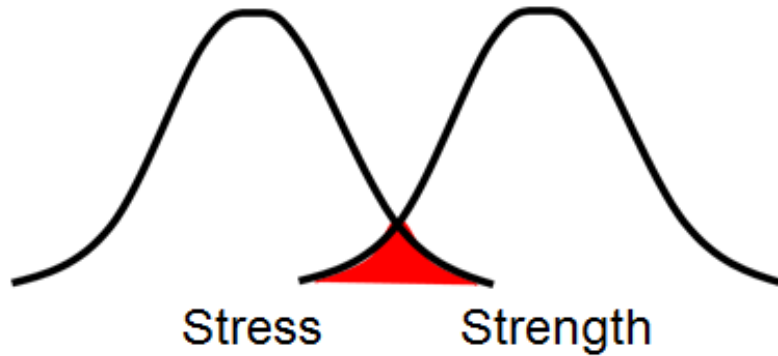


- Proactive
- Failure rate assumed

We help Engineering

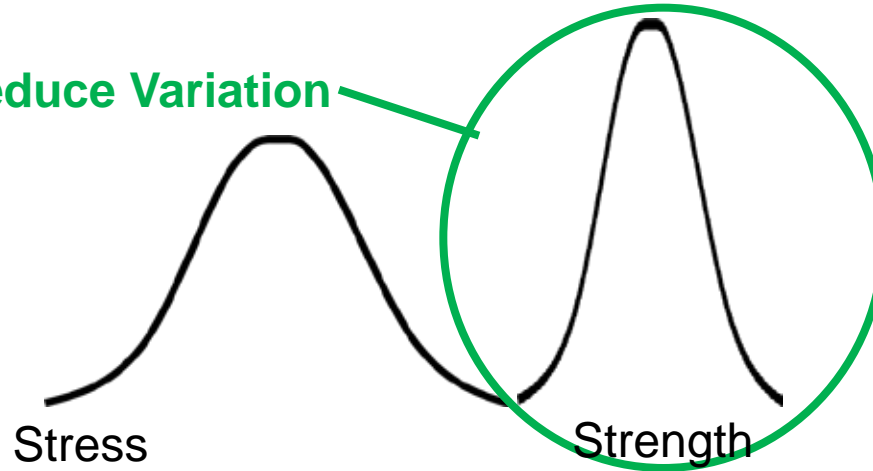
- **“Designing for X”**
 - Environment and Use
 - Stress–Strength
 - Design FMEA
 - Design of Experiments (DOE)
- **Testing**
 - Stress Testing – the earlier and harsher, the better
 - Life Testing – accelerated life testing / degradation analysis

How we help - Design

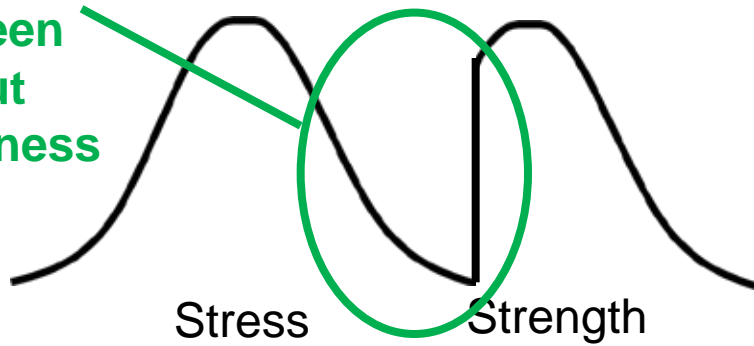


How we help - Design

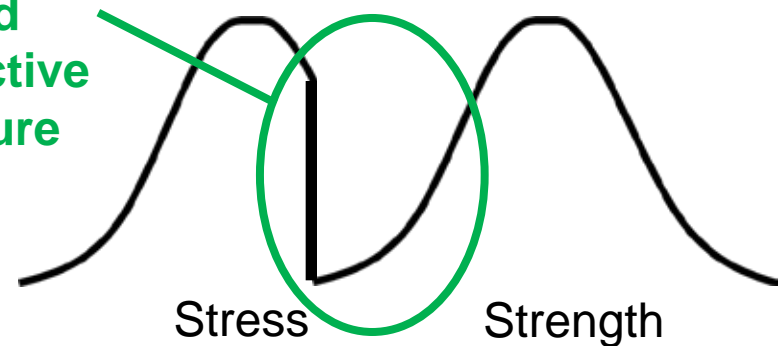
You Could Reduce Variation



You Could Screen Out Weakness



You Could Add Protective Feature



We help Operations

- **Processes**
 - Process FMEA
- **Maintenance**
 - PM (Planned, Preventive, and Predictive)
- **Optimization and Lean**
 - Process optimization - Design of Experiments (DOE)
 - Total Productive Maintenance (TPM) and Overall Equipment Effectiveness (OEE)

6 Basic Failure Profiles



A



D



B



E



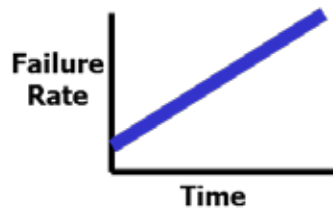
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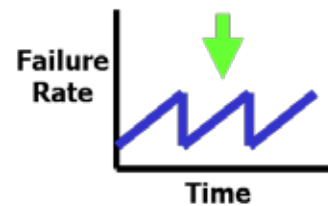
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How we help – Preventive Maintenance

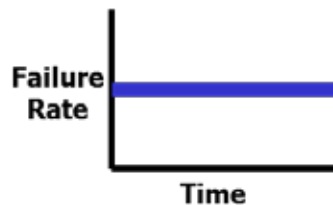
- Reliability trends inform maintenance strategy (TPM)



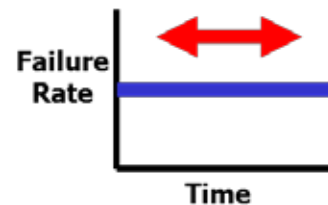
+ PM =



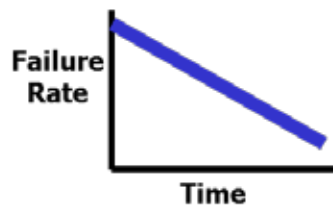
YES!
PM will reduce failures



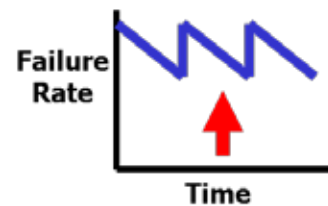
+ PM =



NO!
PM will not impact failures



+ PM =



NO!
PM will increase failures

Predictive Maintenance



Conclusion

- How can I help you?
- What follow up would you like?
- Get involved!
 - Join the ASQ Reliability Division
 - Join the asqrd.org web site
 - Get involved with the ASQ Reliability Division leadership opportunities (or other opportunities within ASQ or your preferred division or group)