



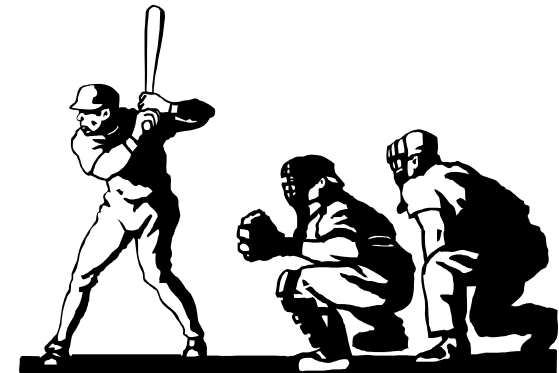
Reliability Organizations Know Things

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Reliability & Maintenance / Defect Elimination
Defect Elimination Specialist

Safety Moment – Reliability Organizations Know Things

Know what impacts the outcome:

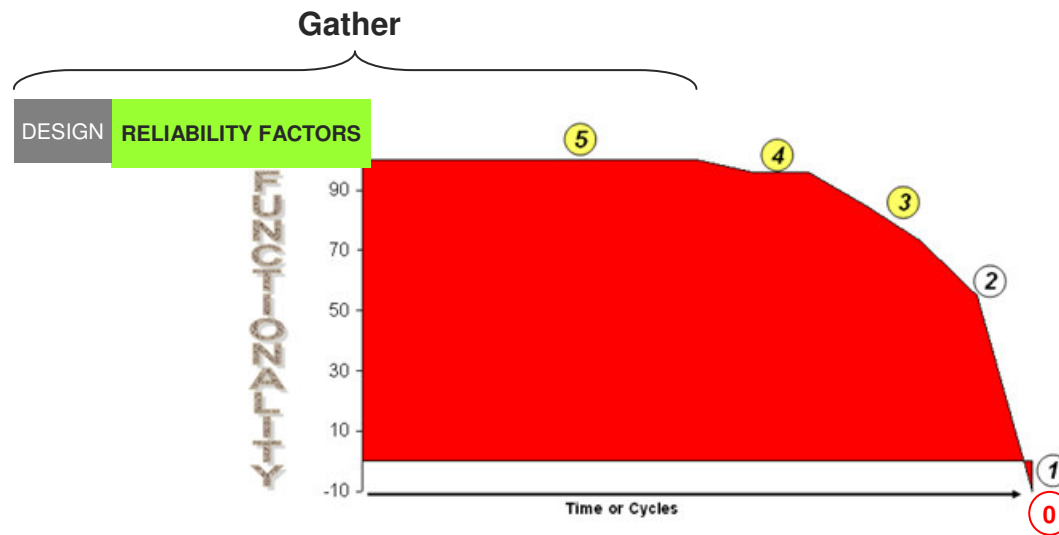
- Scope of work lacks clear definition
- Job Safety Analysis Less Than Adequate or not performed
- Tasks requires special attention or non-routine *without* planning
- No Procedure or Less Than Adequate Procedure
- Work Practices overweigh Procedures
- Potential skills & knowledge gap
- Less Than Adequate Oversight / Audit Process
- Delays or deviation
- Reactive work
- Ergonomic / Work Environment / Fatigue
- Communication gap between groups
- Hostile work culture
- Weather extremes



Based on:
"An Engineer's View of Human Error" by Trevor Kletz
&
Key Findings from 15 years of investigations

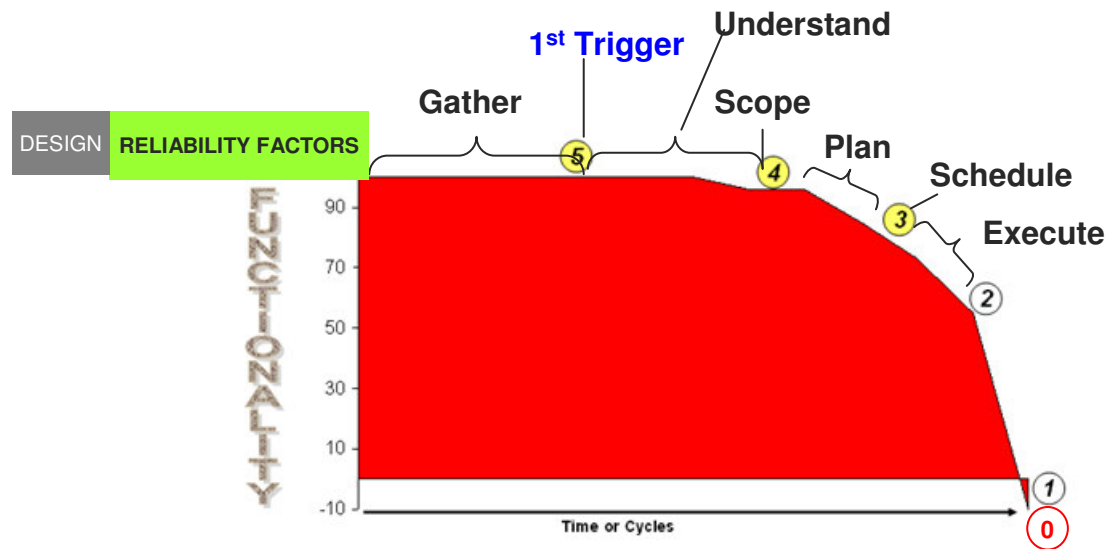
Reliability Organizations Know Things

- ISO 14224 -Collection, analysis and exchange of reliability and maintenance data
 - **Purpose Statement: “Data collection is an investment....”**



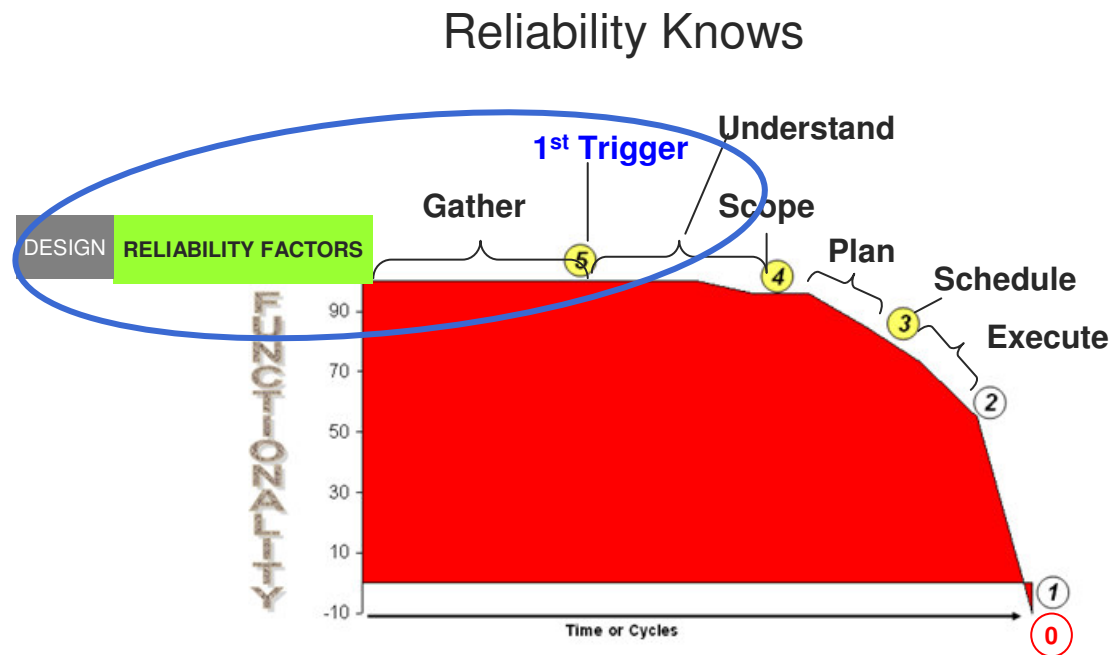
Reliability Organizations Know Things

- ***What we believe to be true: “Data collection is an investment that will provide the opportunity to understand our work and failure processes through active analysis; which become the catalyst to enable the organization’s goal of moving from reactive to responsive actions in a way that will provide the opportunity to remove defects through increasing our knowledge of why things fail and why things are successful.”***



Reliability Organizations Know Things

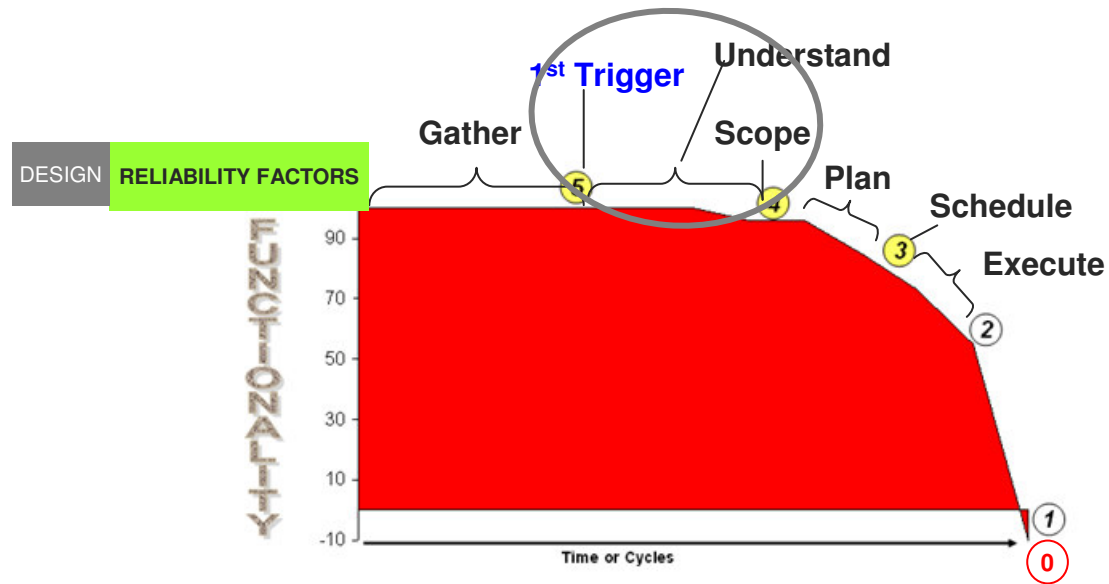
- *“Gather, analyze, understand, communicate.”*



Reliability Organizations Know Things

- *“communicate, consult and inform.”*

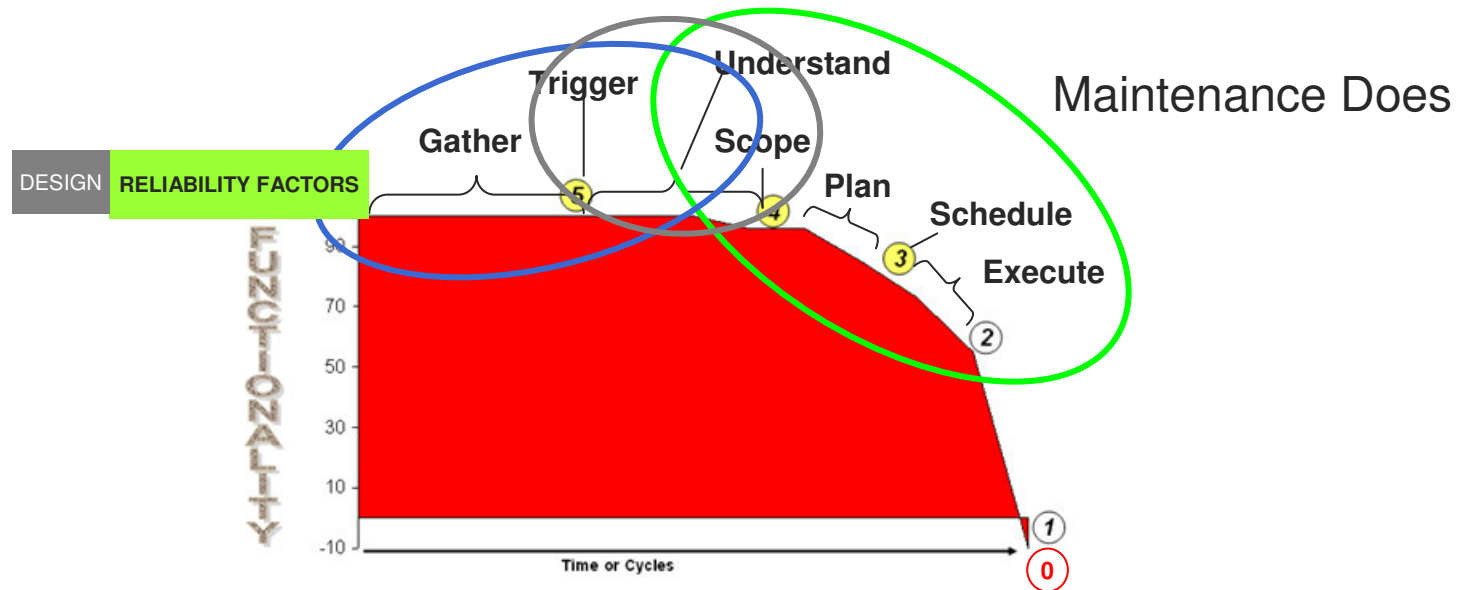
Reliability Communicates



Reliability Organizations Know Things

- *“Scope, plan, schedule, execute, communicate.”*

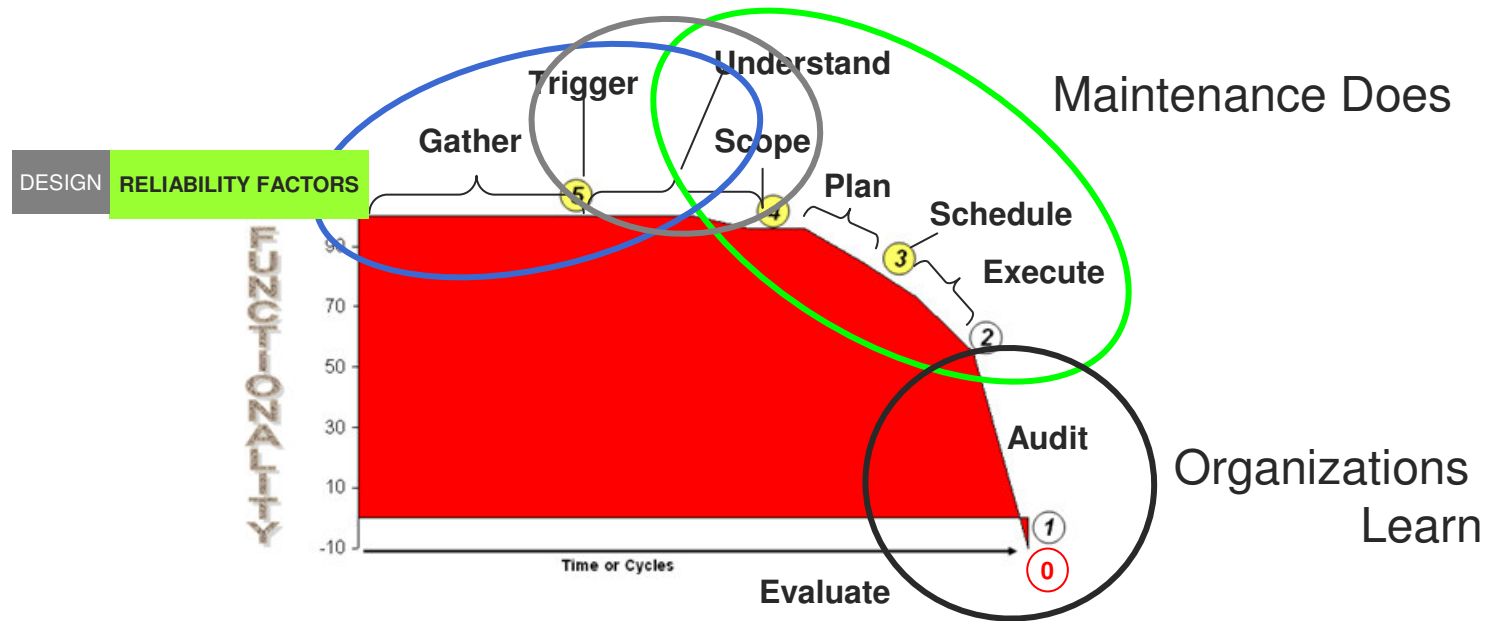
Reliability Knows & Shares



Reliability Organizations Know Things

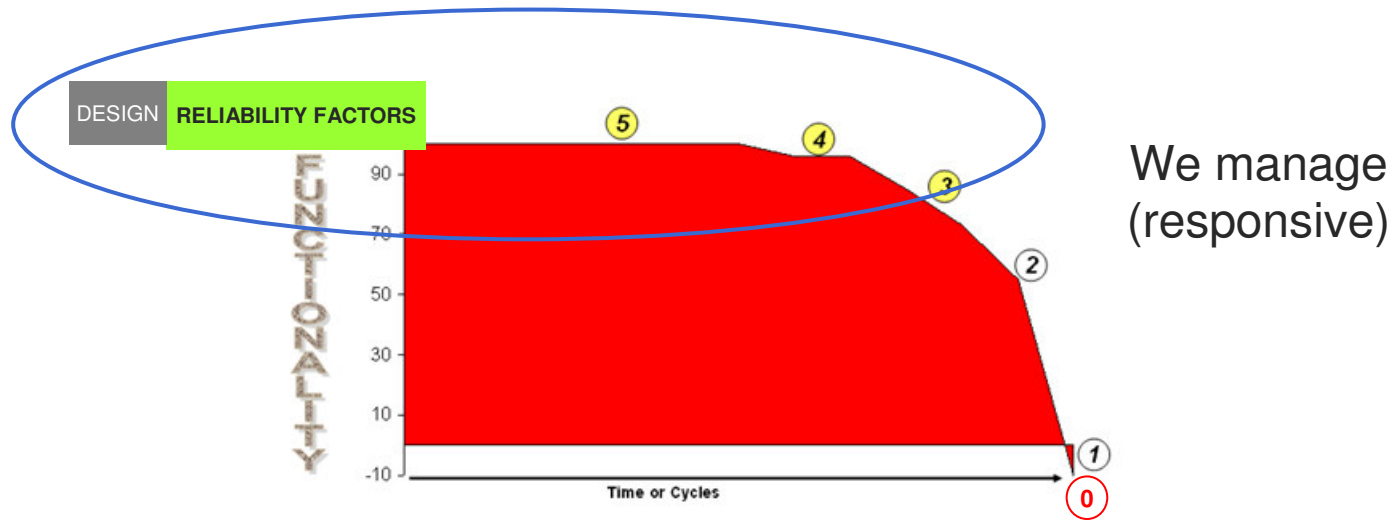
- *“Audit, evaluate, learn, communicate, improve.”*

Reliability Knows & Shares



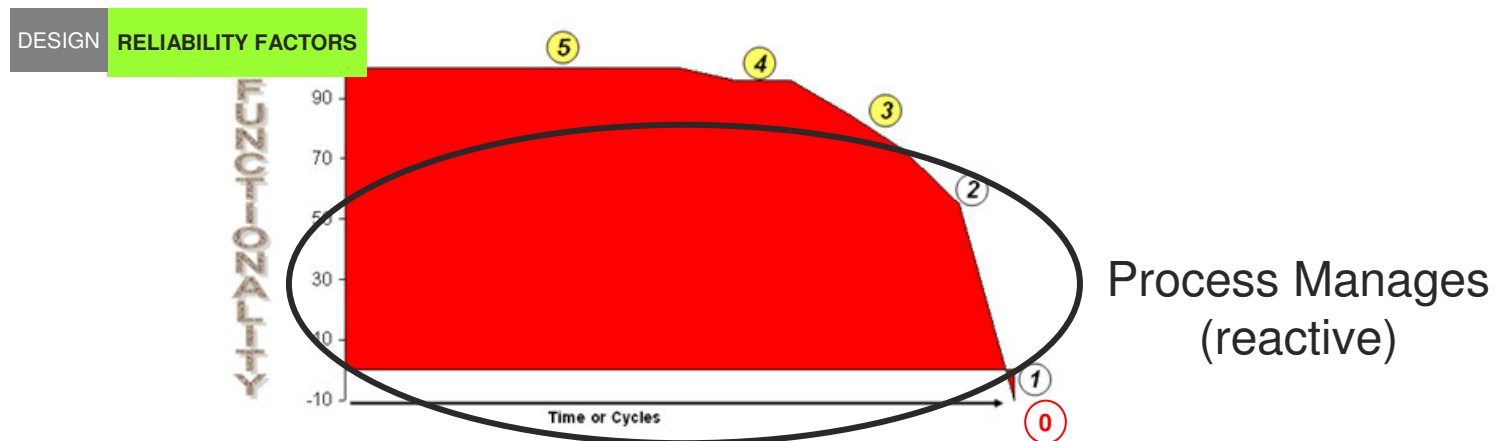
Reliability Organizations Know Things

- **Data Collection & Analysis** provides the organization the opportunity to understand the current status of the equipment and make proactive decisions on how to manage the assets.



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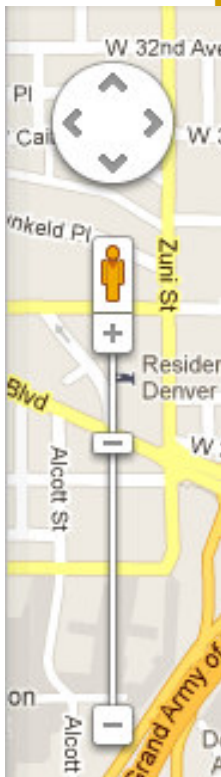
Reliability Organizations Know Things

- Reliability Organizations
 - Depends on accurate data to understand the current and historical condition of an asset.
 - Asset Driven Data
 - Asset Characteristics Information
 - Criticality Rank
 - Conditional Status
 - Activities
 - Audit / Evaluate Results

Reliability Organizations Know Things

- Reliability Organizations

- Need accurate data at the asset level



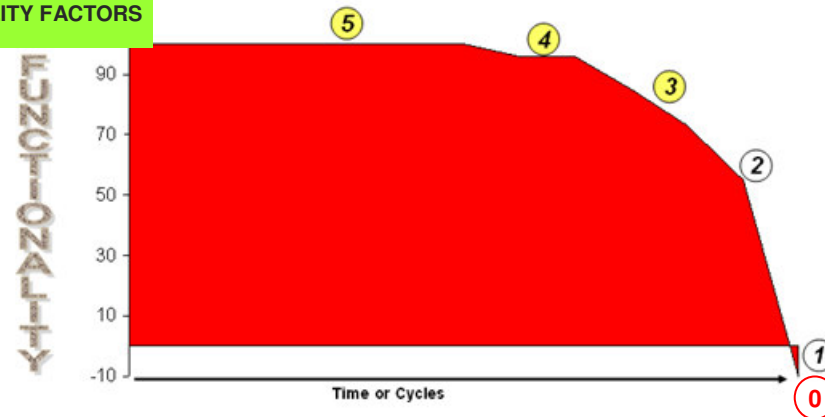
- Unique Number for the equipment
 - Used to track life cycle activities against an asset from purchase date until scraped.
 - Technical Name or ID
 - Field name or identifier stays with the system or location when asset is replaced.
 - Asset ID
 - Identifier that stays with the asset until scraped
 - P&ID
 - Identifying number in drawings and documents
 - Normally this will be part of the Technical ID
- Provides a tag for sorting and reporting at an asset level.
- Provides an identifier for the asset as a part of a system and/or as a unique asset.
 - System issues
 - Asset issues

Reliability Organizations Know Things

- Reliability Organizations
 - Need accurate data at the asset level
 - Used for equipment reliability analysis
 - Search, sort, report
 - Asset Characteristics Information
 - Type
 - Class
 - Design Specification / Number
 - ANSI, API, etc
 - Size
 - Model
 - Manufacturer
 - Criticality Ranking

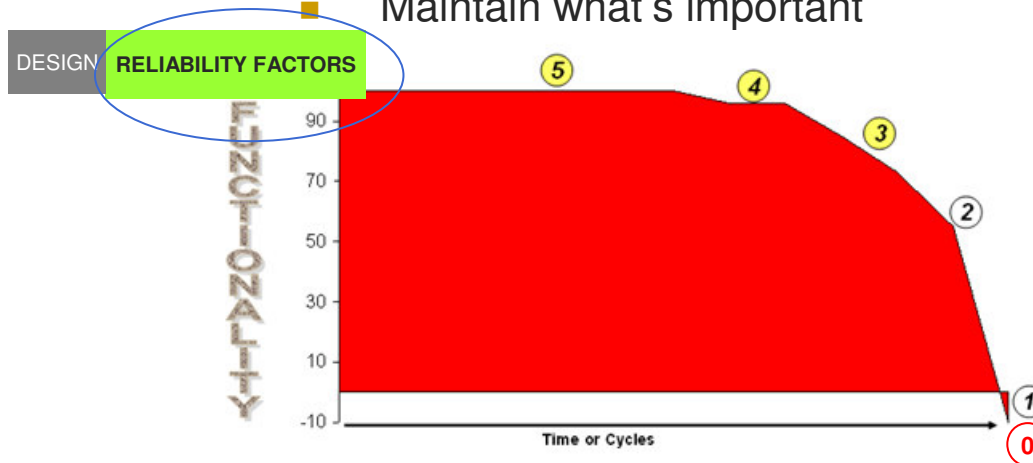
DESIGN

RELIABILITY FACTORS



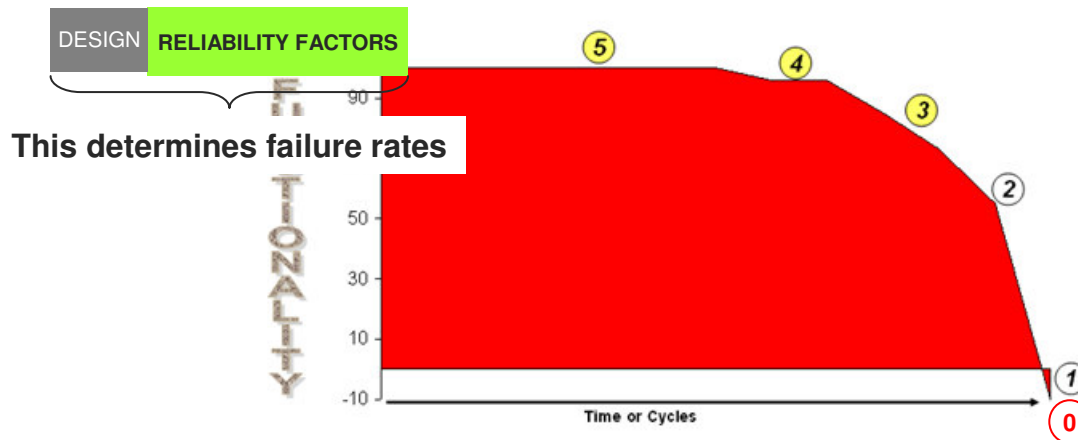
Reliability Organizations Know Things

- Reliability Organizations
 - Need accurate data at the asset level
 - Used for equipment reliability analysis
 - Search, sort, report
 - **Criticality Rank**
 - Know what's important
 - FMEA
 - Likelihood
 - Business Impact
 - Fast Track RCM
 - Maintain what's important



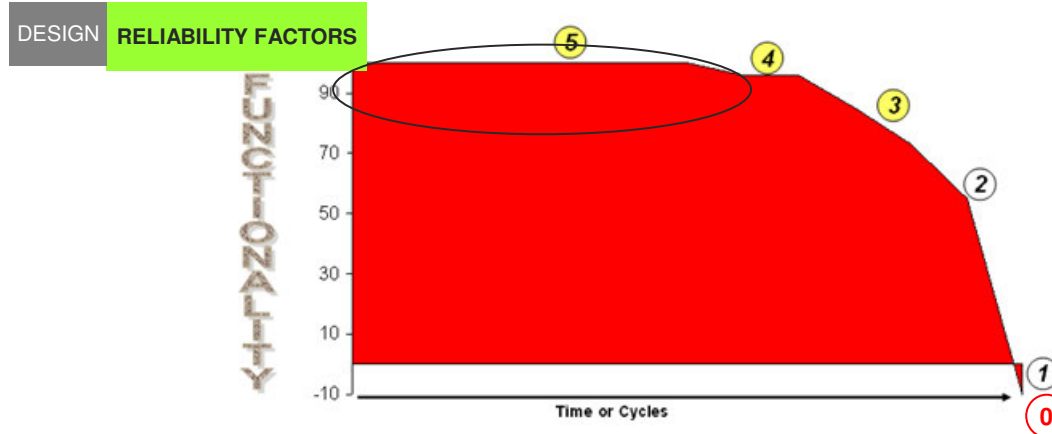
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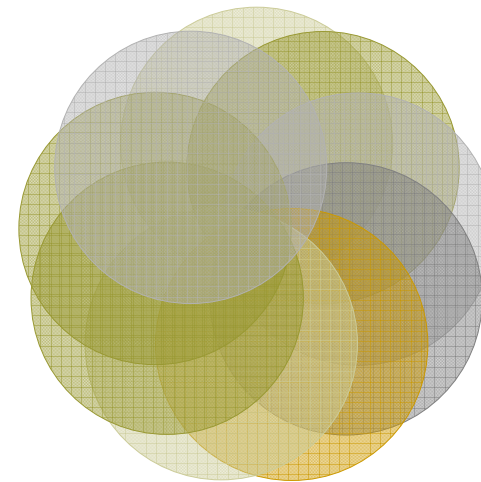
Reliability Organizations Know Things

- Reliability Organizations
 - Need accurate data at the asset level
 - Used for equipment reliability analysis
 - Search, sort, report
 - Conditional Status
 - **Review & Analyze:**
 - On-line monitoring
 - Operator Rounds
 - Mechanical Routes
 - Conditional Audits
 - **Create Records to document status**
 - Current requests
 - Current work orders



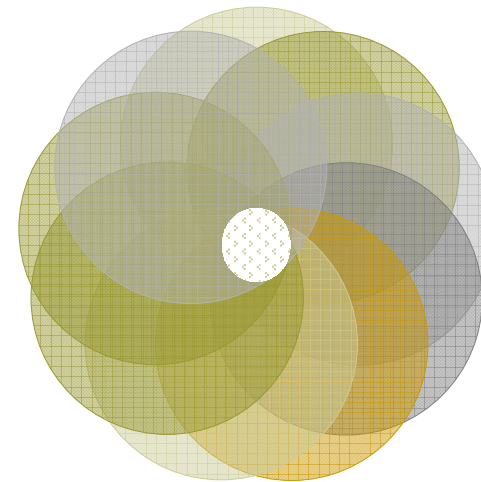
Reliability Organizations Know Things

- Reliability Organizations
 - Need accurate activity data
 - Type of Activity (What)
 - Purchase
 - Assemble
 - Install
 - Commission
 - Operate
 - Maintain
 - Repair
 - Replace
 - Where
 - Location
 - System
 - When
 - Date of event
 - Date removed from service
 - Date returned to service
 - How
 - Type of work
 - Why
 - Reason codes



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 - Reason Codes



Reliability Organizations Know Things

When Activities Occur

■ Maintenance

- Creates document to track costs
- Validate the asset
- Determine the reason.
- Set the scope of work.
- Determine the level of response.
- Determine the type of work.
- Document what will be done.
- Determine if it's DE work
- Determine when it will be done.
- Complete Task as planned.
- Document what was done.

■ Reliability

- Validate reliability information is captured on event.
 - Determine the right asset is identified.
 - Validate reason for work.
 - Validate type of work
 - Validate failure status (yes or no)
 - Validate DE work
 - Ensure failure date is correct
 - Ensure completion date is correct
 - Validate work scope is documented
 - Validate failure evaluation codes are correct for as found and as completed

Reliability Organizations Know Things

- Reliability Organizations
 - Need accurate reliable data
 - Audit / Evaluate
 - MTBR by equipment type, class, asset
 - MTBF by equipment type, class, asset
 - MTTR by equipment type, class, asset
 - Average Cost to repair by equipment type, class
 - PM Compliance
 - PM Analysis by equipment type, class, asset
 - Criticality Assessment Review
 - FMEA Review by asset
 - Reason Review by equipment type, class, asset
 - Activity Review by equipment type, class, asset
 - Top 10 Bad Actors by equipment type
 - Failure rate (determine Likelihood) (Weibull)
 - Business Impact
 - Safety
 - Environmental
 - Community
 - Production Loss
 - Budget

Reliability Organizations Know Things

- Reliability Organizations
 - What do we know?
 - We know data is an asset
 - We know what equipment is critical
 - We know the current status of critical equipment
 - We know which assets are Bad Actors
 - We know which assets are operating un-spared (at-risk)
 - We know the life cycle of critical equipment
 - We know why things fail
 - We know how to communicate what we know
 - We know how to manage our assets
 - How do we know?
 - We have accurate data
 - We transform data into knowledge
 - We use knowledge to manage the processes
 - Why do we know?
 - We understand that by knowing (understanding) we can manage our assets.
 - We understand the value added by being responsive versus reactive
 - We understand the value added by being proactive (defect elimination)

Reliability Organizations Know Things

- Questions?