FAILURE PATTERNS

Random failures account for 77-92% of total failures and age related failure characteristics for the remaining 8-23%.

**D-I-P-F CURVE**

**DESIGN/BUY**
1. Design for Reliability (DFR)
2. Purchase for Purpose

**PRECISION**
1. Precision Commissioning
2. Precision Installation
3. Defect Elimination
4. Precision Alignment and Balancing
5. Work Processes and Procedures
6. Asset Condition Management
7. Lubrication Reliability
8. Clean to Inspect (SS)
9. Operate for Reliability

**PREDICTIVE**
1. Condition Directed Tasks
2. Ultrasound Testing (UT)
3. Fluid Analysis (FA)
4. Vibration Analysis (VIB)
5. Motor Testing (MT)
6. Infrared Imaging (IR)
7. Non Destructive Testing (NDT)

**PREVENTIVE**
1. Time-Directed Tasks
2. Human Senses (audible noise, hot to touch, smell)

**FAILURE**
1. Functional Failure
2. Catastrophic Failure

**FUNCTIONAL FAILURE**

**CATASTROPHIC FAILURE**

**D-I-P-F CURVE**

**DESIGN**

**PATTERN**

**A** = 3-4%

**B** = 1-17%

**C** = 3-5%

**D** = 6-11%

**E** = 14-42%

**F** = 29-68%

**FAILURE PATTERN PERCENTAGE SOURCES:** RCM by Nowlan and Heap, US Navy, Bromberg reliabilityweb.com • maintenance.org • reliabilityleadership.com

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