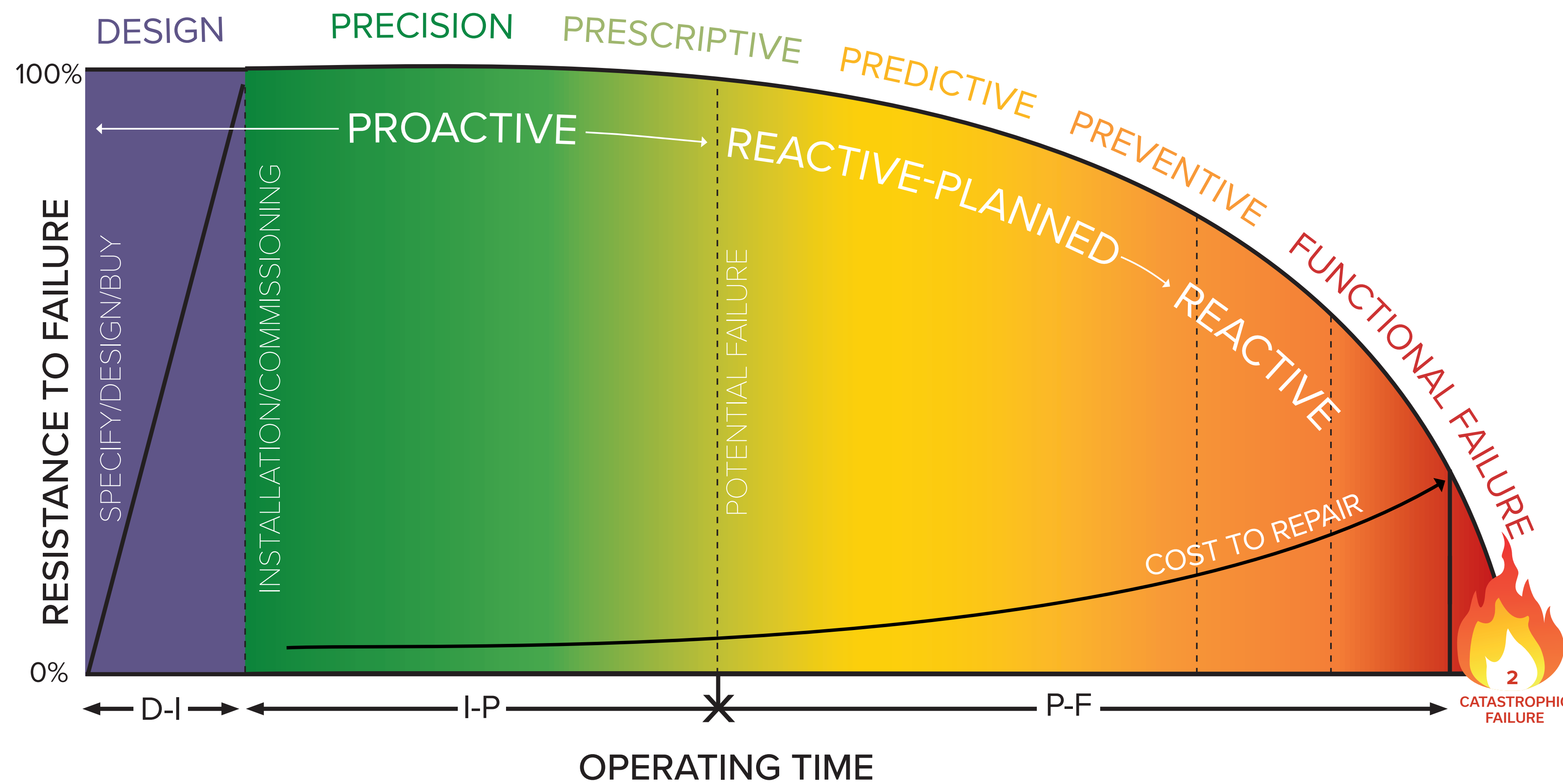


## D-I-P-F CURVE (DESIGN-INSTALLATION-POTENTIAL FAILURE-FAILURE)



### ASSET LIFECYCLE MANAGEMENT

- 1) Specify for Reliability and Sustainability
- 2) Design for Reliability and Sustainability
- 3) Procure/Buy for Reliability and Sustainability
- 4) Build for Reliability and Sustainability
- 5) Precision Installation and Commission for Reliability and Sustainability
- 6) Operate for Reliability and Sustainability
- 7) Maintain for Reliability and Sustainability

### ASSET CONDITION INFORMATION

- 1) Ultrasound Testing
- 2) Fluid Analysis
- 3) Vibration Analysis
- 4) Motor Testing
- 5) Infrared Thermal Imaging
- 6) Nondestructive Testing

### PREVENTIVE MAINTENANCE

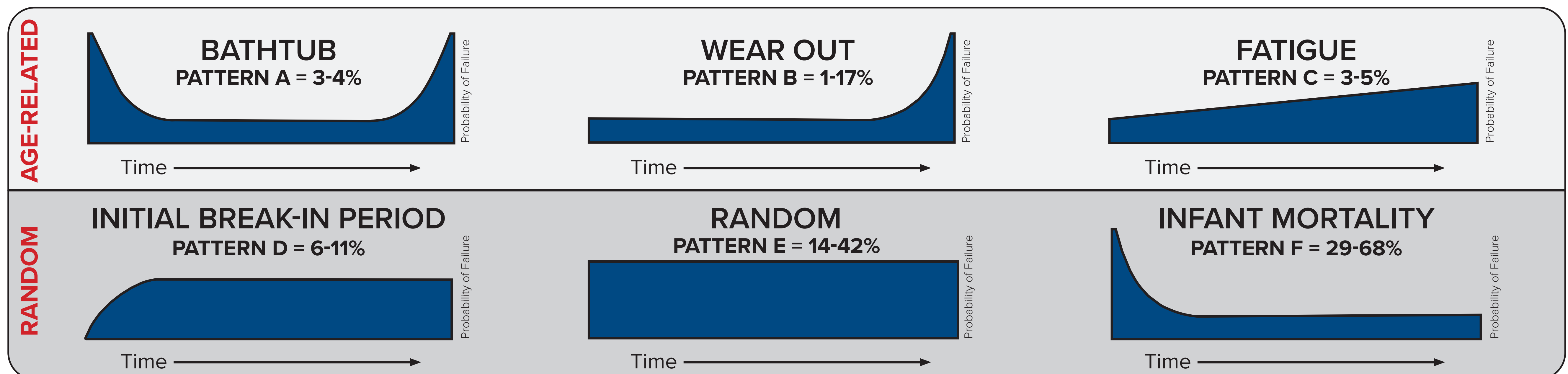
- 1) Time- and Usage-Directed Tasks
- 2) Human Inspection

### FAILURE

- 1) Age Related Failures
- 2) Random Failures
- 3) Hidden Failures
- 4) Functional Failures
- 5) Catastrophic Failures

## FAILURE PATTERNS

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



Failure Pattern Percentage Sources: RCM by Nowlan and Heap, U.S. Navy, Bromberg