

Reliability is the probability (likelihood) a system will perform its intended function with no failures during a given period of time (mission time) under specified operating conditions (environment).

Maintainability is the probability a failed item will be restored or repaired to a specified condition within a given period of time.

Availability, a function of reliability and maintainability (R&M), is the probability a repairable system will perform its intended function at a given point in time or over a specified period of time when operated and maintained in a prescribed manner.

Ideally and from an R&M plan, the **R&M team** performs three major functions, namely, (1) Design for R&M, (2) R&M verification, and (3) Analytical physics. Specific **R&M tasks** are

R&M Tasks

1. Establish quantitative R&M requirements.
 - a. Design goals
 - b. Specifications
2. Allocate or apportion the R&M requirement to system elements.
3. Apply reliability design methods.
 - a. Parts and material selection
 - b. Derating
 - c. Stress-strength analysis
 - d. Identification of alternative technologies
 - e. Simplification (e.g., reduce parts count)
 - f. Redundancy
4. Apply maintainability design methods.
 - a. Fault isolation
 - b. Diagnostics
 - c. Parts standardization and interchangeability
 - d. Modularization
 - e. Accessibility
 - f. Repair versus replace
5. Perform reliability analyses.
 - a. Reliability block diagram analysis (RBD)
 - b. Failure-modes-effects and criticality analysis (FMECA)
 - c. Fault tree analysis (FTA)
6. Perform maintainability analyses.
 - a. Maintenance and spares provisioning
 - b. Preventive maintenance intervals
 - c. Predictive maintenance
 - d. Ergonomics.

7. Participate in concurrent engineering activities.
 - a. FMECA reviews
 - b. Design reviews
8. Perform R&M predictions or demonstrations.
9. Establish R&M test procedures and analyze test data.
10. Monitor R&M performance.
 - a. Analyze field data
 - b. Identify failure-root cause