



Reliability - Part 2

General Reliability Indices

- Failure rate, $\lambda = \# \text{ of failures} / \text{total operating time of units}$
- Mean time to failure (MTTF) - The average length of time before a failure occurs. It is the inverse of the failure rate
- Mean time to repair (MTTR) (applicable to repairable items - The average length of time to repair a failed item
- Mean time between failure (MTBF) (applicable to repairable items) - The average time from up-time after repair to the next failure. Determines how often failure occurs. **MTBF = MTTF + MTTR**

Availability

Fraction of time a piece of equipment is available for use. Mathematically, $\frac{MTTF}{MTTF+MTTR} = \frac{MTTF}{MTBF}$

Downtime/year

Fraction of time a piece of equipment is unavailable for use each year. Mathematically, $MTTR \times \frac{1}{MTBF}$

IEEE 493 – 2007 ‘Recommended Practice for the Design of Reliable Industrial and Commercial Power Systems’

1. Establish Current Condition of Facility
2. Determine Likelihood of Serious Problem Based on this Condition
3. Sort to Find Equipment Most at Risk to Cause Problems
4. Identify the Predictive Techniques that Gives Early Warning of Problems at that Equipment