



Several products get manufactured in the world, to meet the human needs. The firms that apply reliability engineering in their products design will excel and only those firms, alone will survive, as time passes.

Reliability engineering provides the theoretical and practical tools, whereby the probability and capability of parts, components, equipment, subsystems, and systems to perform their required functions, without failure for desired periods in specified environments. It also gives information about the desired and optimised reliability that can be predicated, designed-in, tested, and demonstrated, as well as about the maintainability, availability, safety and quality levels.

It is very important that one gets involved individually and in a team with great interest in order to attain ingenuity and creativity in the design and application of reliability function in a product/company. Quality, reliability and cost are three independent business measures. The cost and quality has a relation and is easy for a manufacturing group to trade off.

In order to design a reliable product, one must know the many ways its parts can fail, as well as the magnitude and types that cause such failures. Despite observing thousands of failures in industry each day, we still know very little about why things fail and even less about how to control these failures. The only way to improve the situation is through and systematic **field failure data** collection and analysis.

Quality Vs Reliability: Quality is a measure, independent of time, lot dependent and latent failures can be removed whereas, **reliability** is time dependent, latent failures can be detected. Numerical estimates like MTBF could be adopted to compare between two different designs and thus reliability can be defined as follows.

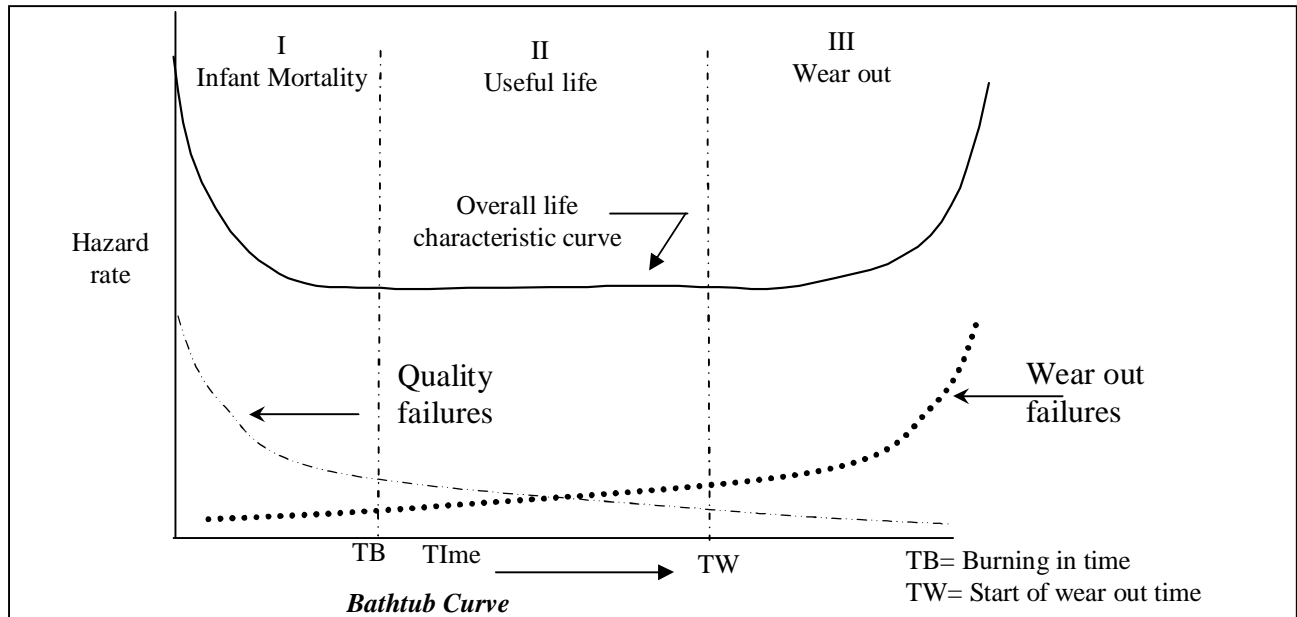
Reliability is the conditional probability, at a given confidence level that the equipment will perform their intended functions satisfactorily or without failure and within specified performance limits, at a given age, for a specified length of time or minimum time, when used in the manner and for the purpose intended while operating under the specified application and operation environment stress levels”

Applying reliability techniques, is an unending process at Presevi and we introduce reliability engineering from design stage itself. Our design and manufacturing team has been trained in the measure and application of reliability techniques. The **FTA** data (field failure analysis), prepared by studying several failure histories, modes and mechanisms of failures of various products, is applied whenever a new product is designed. We get an improved MTBF since FMECA and FTA are carried out on our products that give an excellent reliability. Presevi has realised that **reliability of a product** cannot be improved but has to be built into.

Availability:- Another important term is “**availability**”. Availability of a product to a customer is defined as

$$A = \frac{MTBF}{(MTBF + MTRR)}$$

where MTBF is the mean time between failure and MTRR is the mean time to rectify and replace.



Availability term of a product gives one the idea as to how long a product is available to the customer and is the combined measure of reliability and maintainability. In order to maximize this term, **MTBF** shall be maximum and **MTRR** the minimum. Hence availability is an important measure when choosing a product.

For eg., The availability of product comes down when one selects a low cost product, not considering the “availability factor”, say an AIRCON controller, that has a high level of **probability of failure, high rate of service calls and downtime**. Naturally, this product would be rated as less cost effective. In other words, a reliable product may appear **costly at the time of purchase, but would be cost effective in the long term**, due to high level of availability.

Reliability prediction: Presevi practices certain methods like “physics of failure methodology” for predicting reliability. Our products get exposed to several tests in order to ascertain infant mortality period, useful life and wear out period. Thus, these products are “**burned in**” in the factory, before being despatched, so that the product will have a higher life at the customer’s end.

Our road map from concept of a product to the manufacturing stage is unique in nature. The prototype, once developed, gets evaluated by carrying out several hardware and software test cycles. A pilot production under strict manufacturing control is taken up, results evaluated, rectified etc., before the final mass production is taken up. We find this method successful.

Application of several of these proven techniques to improve reliability, quality, and manufacturability improves the **availability** and **confidence level**, which lead to customer satisfaction and more business. We believe in manufacturing cost effective products but not merely cheaper products.