

## Warranty Planning

### What is it?

Warranties are a formal commitment to deliver (or require delivery of) reliable products/systems. They identify what is warranted, warranty length, what scenarios are/are not covered, and liability. For warranty planning: Include people, process and product costs; Warranted items fail; Performance quality is not guaranteed; Warranties define acceptable liability conditions.

### What's the payoff?

Strategic warranty planning can increase customer confidence, reduce operational costs and provide the opportunity to generate revenue. Effective warranties integrate reliability, maintainability, supportability, availability, and life-cycle costs to arrive at optimized solutions.

### How can we help?

- Perform independent benchmarking of your markets to determine the best type of warranty for your products
- Perform reliability analyses of your products and make recommendations to determine a cost-optimized warranty
- Analyze your products to assess whether improvements can be made to justify longer warranty periods
- Collect/analyze warranty data returns to determine reliability trends, root failure causes and potential corrective actions for warranty failures (and beyond)
- Determine how large your spare parts inventory should be to support your warranty program (and beyond)



Whether your company is marketing commercial products or selling to the Government, warranties are an important ingredient to competitive success. Effective warranty planning can ensure success, but lack of attention to cost analyses can spell disaster. This article is intended to introduce the basics of warranties and to identify sources for more information.

A warranty is the seller's assurance to the buyer that a product or service is as represented. An express warranty is one where the terms are explicitly stated in writing and an implied warranty is one where the seller automatically is responsible for the fitness of the product or service.

Generally, three types of warranty replacement type, and (3) replacement with the distinct length of the original warranty cost of the replacement depend to be most advantageous to the as a compromise. With this type Warranty planning includes a determining factor in deciding acquisition price. Once this decision the costs have to be determined these decisions. At this point you shouldn't be a surprise because product is expected to fail. Used to project costs, with a late and Corrective Action (FRACAS)

Using Accelerated Life Testing to Assess Warranty Risk

During a recent project, a question arose about the feasibility of providing a ten year warranty for a new system. The system consisted of a proven electronic assembly and 40 newly designed hybrid electronic modules. Warranty costs could be significant if reliability risks were not fully understood. The company producing the system wanted to be certain that the probability of failure for any given system was less than 10% during the 10 year warranty period. Thus, the reliability, or probability of success, had to be greater than 90%.

In order to address the warranty risk a reliability analysis of the system was conducted. Field data from the proven assembly (subassembly) indicated that 275 fielded assemblies had accumulated an average of 4200 hours each, or 1,150,000 total operating hours with no failures. Using the Quanterion Automated Reliability Toolkit (QART) Chi-Square Confidence Interval Calculation Tool shown in Figure 1, a mean time between failure (MTBF) at 60% confidence of 1,200,493 operating hours, or 833 failures per billion hours (FPB), was estimated based on this data.

