

Estimating the Cost of ESD Damage

How do electronic failures affect the manufacturing industry? How many of these failures are caused by latent defects? With the proper testing equipment, catastrophic failures are easy to identify; latent defects, on the other hand, are extremely difficult to detect – particularly once the finished product has been assembled. While it is challenging to estimate the overall cost of latent damage, the expense of customer returns and field service warranties significantly exceeds that of in-house scrap and rework.

To further complicate matters, new technology advancements have created new challenges in ESD management and testing. Devices are faster and ever-shrinking, with increased ESD sensitivity – impacting both productivity and reliability. According to the ESD Association, “Industry experts have estimated average product losses due to static range [up to] 33%. Others estimate the actual cost of ESD damage to the electronics industry as running into the billions of dollars annually.”

Larger companies have cited rates of electronic part failure due to ESD events as high as 25%. Implementation of an effective ESD control program can reduce latent defect field failures to provide a tenfold return on investment.

Although significant emphasis has been placed on ESD management over the past ten years or more, its effects continue to impact production, manufacturing costs, and product quality and reliability. Specialists throughout the industry speculate that static-related losses could range anywhere from 8-33%, and some estimate costs as high as billions of dollars on an annual basis. Damage to actual devices can range from mere cents for a simple diode to hundreds of dollars for a complex hybrid. Factoring in associated costs such as repair, rework, shipping and labor as well as overhead, there is certainly room for significant improvement when it comes to effective ESD cost management.

Electronic failures resulting from ESD are the 3rd highest cause of device-related yield and reliability problems, and technology advancements have only increased the need for improved ESD testing. A crucial aspect of the qualification process, ESD level stress testing is the best course of action in ESD damage mitigation.

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