APPLICATION OF FMEA METHOD IN THE DESIGN

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Abstract: The quality of the product should be considered in the design stage regardless its destination. A design mistake has a great impact on the product. The product can result with defects that make it unusable, or it may result with quality defects that make it not to sell and so it turns into a loss for the enterprise. Because of all these, it is necessary to ensure the quality even from the design process.
The use of FMEA (Failure Modes and Effects Analysis) method with a product provides techniques for detecting the defects that can occur in a product, the effects of these defects on the user and the level of their acceptance.

Failure mode and effects analysis (FMEA) is a design and analysis technology that is directly applicable to failure and prevention. The technology provides a structured systematic identification of the potential failure modes in design or manufacturing, then, by studying the impact of failure to the system, provides a qualitative evaluation of the necessary corrective actions by focusing on the problems affecting systematic reliability. FMEA has been widely adopted and has become standard practice in Japanese, American, and European manufacturing companies. This technique is very effective and time-intensive.

Its effective use could lead to numerous reductions (improvements) in:

- Internal defects (during and after the manufacturing process);
- Customer complaints;
- Failures in the field;
- Performance deficiencies;

In addition, successful application of a FMEA could lead to improved customer satisfaction in products and services produced by reliable manufacturing processes.

The principal steps of a FMEA application include:

1. Exhaustive determination of process parameters (brainstorming);
2. Determination of the potential failure modes;
3. Determination of the failure effects on the final product or system;
4. Determination of the principal root causes;
5. Estimation of the severity of the failure on the final product or system;
6. Estimation of the failure occurrence (probability of appearance);
7. Assessment of the detectability of the failure;
8. Calculation of the risk priority number (RPN);
9. Recommendation of preventive actions;
10. Reassessment of the RPN under the new process conditions;

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