FMEA Improves Your System Reliability

Sun, 07/18/2010 - 07:32 — Ernie



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Summary

- Failure Mode and Effects Analysis (FMEA) improves the reliability of your system and helps avoid unexpected costs.
- Can be performed anytime but ideally should be performed during initial design.
- FMEA is a rigorous structured approach to identify potential system failures.

What is an FMEA?

No doubt you've heard Murphy's Law - "Anything that can go wrong, will go wrong". A Failure Mode and Effects Analysis (FMEA) helps to minimize this reality by providing a structured method for identifying potential failures in a complex system and quantifying the effects in terms of a Risk Priority Number (RPN). By focusing on the highest RPN values an action or maintenance plan can be developed that improves reliability and mitigates overall risk. FMEAs are most effective during system design but can be performed anytime.

A Practical Application

I recently completed an FMEA for a Water and Wastewater treatment facility for a small mountain community serving 180 customers. The system was originally constructed in 1996 and has been

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upgraded over the years. The original operator had few documented procedures and basically ran the system using a 'seat of the pants' approach. Often system failures would occur that could have been avoided with regular preventative maintenance. The FMEA documented lessons learned from these past events but also identified procedures that had not been previously considered by our new operators.

The FMEA also identified a risk with the design of a recent system upgrade, which added a backup generator for the water well and pressure pumps. The backup generator used propane from a community LPN tank farm. After talking to the local Fire Department I learned that during a wild fire the tank farm might be shut off. Based on this information, we not only added a separate LPN tank for the generator, but also initiated discussions with the Fire Department about updating their policies to consider using the community's water with backup electrical generation during a wild fire event.

Lessons Learned

The individuals who I worked with were not familiar with an FMEA, but they soon recognized the value. As an engineer working for a large company this is something I did as a matter of our standard process. The FMEA method can add value for many organizations, here's what you get:

What We Deliver

Failure Modes Identification – Produce a high level system description identifying failure modes that may occur. To accomplish this a review will be conducted of your system's engineering drawings, perform an evaluation your system via a tour, work with your subject matter experts to fully understand your system, and conduct a final review of this document with the subject matter experts.

Risk and Effects Analysis – Produce an excel spreadsheet containing each of the failure modes and adding: potential effects, severity, potential causes, probability of occurrence, current controls, and probability of detection. This will result in an RPN value for each failure mode. To accomplish this we will review your existing operational procedures, and maintenance records, review the equipment specifications, work with subject matter experts to seek clarification, and conduct a final review with the subject matter experts.

Action Plan Development – Produce an action plan identifying one time or ongoing steps for improved reliability. We work with operations personnel and conduct a final review with subject matter experts to provide the Action Plan.

FMEA and Maintenance Plan Update - Prior to making upgrades to your system the FMEA can be updated to help determine the best possible design.

Conclusion

An FMEA is a well known tool among quality professionals for improving system reliability. [Contact] [2] us to learn more about how we can help you using this powerful tool.

- Quality Excellence [3]

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