Ammonia Plant Case Study

This case study takes place in a Louisiana ammonia plant. The plant had above industry average downtime (116 Days of downtime compared to an industry average of 49.5 Days (worst record in the world for this type of facility). One major reason was the plant had unexpectedly lost the ammonia compressor twice in one year, primarily because of lack of lead time information. Supervision was trying to monitor vibration on equipment running 36,000 rpm using once a month hand held velocity readings which is not recommended for high speed large equipment. The lack of continuous information allowed large gaps about equipment health to exist. This degrades the ability of employees to have any lead time to bring equipment down in a safe manner. Best practices recommended radial eddy current proximity probes which measure shaft displacement 24/7 along with preset alarm levels that will provide critical information for decision making.

The preventive initiatives were ineffective due to the rescheduling of preventive maintenance work in an effort to make up lost production needed to meet customer orders on time. As a result major breakdowns were occurring at the worst times with costly damage and extended repair times.

The predictive maintenance effort was ineffective because in most cases there was no lead time provided to schedule work. The technicians were not taking readings at the scheduled intervals and equipment was failing catastrophically. Because there was a lack of readings being taken no trending was being performed therefore, no lead time was provided. The high amount of reactive work was causing supervision to pull hourly technicians to help with repairs.

Root cause analysis was being performed inadequately and often stopping at the physical (broken component) and human roots (placing blame). The depth of the analyses did not dig into the system roots where recommendation leverage could be provided.

Process data in many cases lacked the ability to help operators see approaching unfavorable trends. The data was in some cases missing, inadequate, or misleading the operators.

Part inventory management was being affected by the high failure rates as well. It caused supervision to horde parts and stash them all over the plant, just in case a failure occurred and they didn’t have the part(s) in stock. Machinery and part balancing was also a problem because only the high speed equipment was receiving quality balancing (always through a third party for balancing) All other equipment was either not balanced or balanced incorrectly. Often pumps came from stores with high vibration.

After all these problems were addressed:

- Net dollar savings in three years was $36,000,000
- 19.4 Days downtime after one year (best in the world in one year!)
- 10 Days downtime after 2 years

All of these conditions were created because of reacting to unscheduled outages. When lacking proaction, priority, and focus in an organization this kind of environment is created robbing you of the ability of using time effectively. All of your reliability activities as well as production are negatively affected.