

No News Is Good News...

We were talking with some mechanics in a major petrochemical process plant about how their major machinery inspection and overhauls were being executed. They insisted they would always have the Original Equipment Manufacturer's (OEM) representative present. We asked them why and they felt the vendor's rep would assure a quality job; besides, their management deemed the OEM's presence necessary to satisfy warranty and insurance requirements. As we sat with them several of the men were summoned out of the meeting: A major centrifugal compressor train had just shut down, and they were required to immediately attend to the problem. It turned out a compressor's kick-back valve* had acted up and the train had shut down on a thrust bearing high temperature and position indication. The men worked two twelve hour shifts to open up the thrust bearing on a multi-stage barrel compressor and to replace the thrust collar together with the badly damaged entire thrust bearing assembly. When we visited the machine later in the week it was running nicely attesting to the skills of the people who had worked on it – without a vendor's representative who could not be scheduled in on a short notice from a distant location.

While we recommend to utilize skilled field service personnel of a reputable compressor manufacturer, we would like to point out that we should observe some subtle points regarding the interfacing of OEM personnel with our mechanics. Our first objective should be to make sure our people are trained for exactly the contingency described above.

* also known as recycle valve for surge control

Point One: The OEM's field service representative should seldom touch - just look.

Point Two: Instruct the client's personnel by show and tell - instructing but letting the site mechanics/artisans do the actual work such as disassembly and final reassembly together with the necessary dimensional control and documentation tasks.

Where does this topic fit in? It fits into the frequently neglected area of machinery repair quality assurance. The old adage "no news is good news" applies: When a machinery repair has been successfully performed, often nobody cares to mention it. However, when it has not been successful, "high tech" reliability jargon is used to identify causes ranging from lack of machinists' training to poor inherent equipment maintainability. This is the bad news.

Yet, we believe there is no need for recriminations had we thought about an appropriate basis for our machinery maintenance and repair routines beforehand. If we want to be successful in the repair business we must define the "Repair Cycle" as follows:

- Assess the damage by taking failure mode inventory
- Analyse and identify the cause of the failure leading to the repair
- Execute the repair by dimensional checks and proper parts replacement
- Follow a check list format for a quality field installation if the equipment had to be removed for the repair
- Perform and supervise an equipment run-in, or post-repair acceptance routine
- Follow-up to eliminate failure root cause all the while documenting what you have done
- Transfer progressive thinking by advancing the idea that Best of Class (BOC) companies practice >> **Every maintenance occasion is an opportunity for continuous improvement** <<.

This repair cycle is applicable to all types of machinery, be it special purpose or general purpose equipment such as, for instance, a small centrifugal pump. Once all phases of the repair cycle are defined and understood, they need to be supported by providing appropriate training, tools and procedures. In the training area, we would see that our mechanics/artisans are regularly updated in on-site seminars or toolbox discussions on subjects covering shop and field practices such as:

- Alignment (e.g., the use of Laser alignment)
- Anti-Friction Bearing fitting
- Coupling assembly
- Lubrication
- Piping to machinery fit-up and alignment
- Seal assembly
- Function of machinery and components

In the tool area, provide tool lists and kits for important jobs. Keep mechanics updated on the use of Computerized Maintenance Management System (CMMS) input tools, such as Portable Data Terminals (PDTs), in order to free them from tedious and frequently meaningless documentation tasks. Management must develop incentives for shop and field personnel to supply the what, when, where, why, how and who together with material and component changes into the repair history.

Finally, maintenance engineers and technicians must help mechanics to adhere to correct practices by leading the development of realistic and easily accessible procedures, for instance:

Procedures for each specific machine on site with sections covering:

- Safety Precautions
- Detailed Inspection, Maintenance, Repair and Overhaul (IMR&O) procedures
- Rotor and spare check-out
- Clearance tabulation forms (e.g., “as found”, “as repaired”)
- Bolt torquing for important joints (e.g., casings, reciprocating compressor valve caps, bearing caps, couplings, flanges and others)
- Sealant and adhesive use (e.g., an approved listing of S & As)
- Alignment instructions (e.g., identification of operating shaft centreline location)
- Up-to-date spare parts list
- Tool list
- Digital photo file of last IMR&O
- Facilitate the swinging of pumps and other equipment with installed idle spares

Many companies have had success with sequestering experienced shop and field mechanics/artisans to structure and write these procedures themselves thus achieving the necessary site acceptance and buy-in. We thought we saw some positive indications of what we just mentioned at the plant we visited.

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