Material Integrity Solutions, Inc.

NL-17

PROJECT BULLETIN

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Improving Condition Based Maintenance Program for Gas Compressors & Engines

BACKGROUND

In response to the ever increasing competitive gas market industry, a major gas company recently initiated a condition based maintenance (CBM) program for their reciprocating compressors (*Fig. 1*). In this program, a routine engine analysis/inspection (at 1500 hours) is conducted that looks for "signs" of problems in the machine. To save cost, as part of this program, the client eliminated the "traditional" time-based overhauls of these machines, where the compressor would be disassembled and "overhauled".

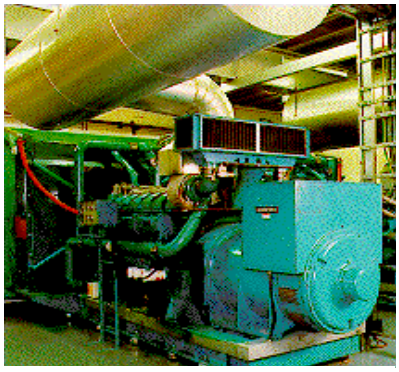

Figure 1: A typical gas compressor

Since the initiation of this CBM program, safety and reliability concerns had been raised on the condition of components that are no longer inspected routinely, or cannot be inspected without an "overhaul". MIS was hired to evaluate this condition and develop cost-effective improvements to the CBM program which can address such concerns.

DISCUSSION

MIS started this work by reviewing past and current maintenance and performance analysis practices. A detailed survey of industry and literature was also conducted to identify major problems and concerns with these machines. Also, historical records were reviewed and engineers, operators, maintenance crews, and supervisors were interviewed.

We determined common problems and modes of failure for these machines. Major components of concern (such as bearings, crank shaft, turbo compressors, pistons, foundation studs, ...) were identified (*Figs. 2 and 3*) and listed along with their potential and their consequence of failures.

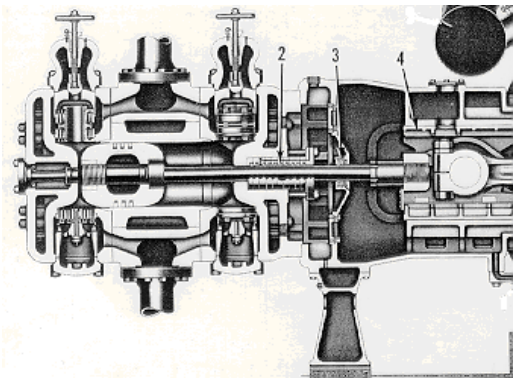

Figure 2: The compressor side of a typical reciprocating compressor (courtesy of Cooper-Bessmer)

Next, working with client personnel, we determined how to inspect components without an overhaul. We identified new techniques for condition assessment of major components, including non-intrusive non-destructive examination (NI-NDE) methods. These methods included trending techniques as well as implementation of new NDE tools.

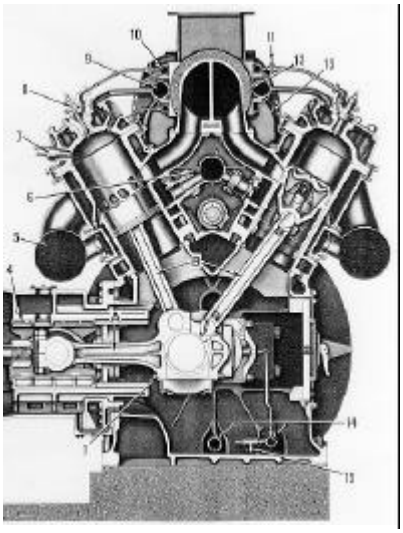

Figure 3: The engine side of a typical reciprocating compressor

CONCLUSION

By working with the clients' team, cost-effective improvements to the existing CBM program were identified. By implementing these improvements, the safety and reliability concerns are addressed. The new improved CBM program significantly reduces failure potential of these compressors with minimal impact on inspection costs. The new program results in increased reliability and safety and saving in maintenance and operational costs of compressor stations.