



# Asset Reliability Services for Mechanical Equipment

## DO YOU REALLY WANT TO SHAKE YOUR MONEY MAKER?

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### MACHINERY INSPECTION AND DIAGNOSTICS

Even well established Machinery Health programs sometimes require additional expertise to diagnose tough problems. To this end, Emerson offers Machinery Inspection and Diagnostic support services. An experienced Machinery Health Analyst is dispatched to your site to inspect and analyze specific machinery. An onsite evaluation of the problem can be provided in most cases. Where more detailed analysis is required, Emerson's in-house staff has sophisticated data analysis and evaluation techniques to get positive results.

The Machinery Inspection and Diagnostic service includes a complete written report of the problem and recommendations for corrective measures. This means an efficient and cost effective resolution of your machinery health problem. From detailed analysis of basic machinery drive trains to sophisticated modal analysis of structures, Emerson has the expertise to solve your problem.

### DYNAMIC BALANCING

Critical plant machinery is susceptible to periodic unbalance from erosion, contamination build-up, and maintenance activities. Dynamic

balancing of plant machinery extends bearing life and eliminates many unnecessary outages. Once imbalance has been identified, Emerson provides balancing services where precision balancing tolerances are achieved in a minimum of trial runs to reduce balancing and machine startup costs.

#### FEATURES INCLUDE:

- A thorough preliminary analysis of the machine's vibration characteristics to confirm the presence of imbalance
- Recording of initial unbalance reading, amplitude, and phase angle for each bearing location on the machine component
- Recommendation of appropriate trial balance weights and their locations
- Calculation of final correction and trim balance weights to achieve acceptable level of rotor balance
- Recording of rotor response characteristics to allow balancing in one run should balancing be necessary at a later date

Emerson performs Dynamic Balancing on single plane, two plane, and multiplane rotors with up to eight supporting bearings and four correction planes. In addition, a "best fit"

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balance may be calculated for vertical and horizontal readings and for up to six operating speeds. Rotors may be balanced above or below the shaft critical speeds.

## LASER ALIGNMENT

Proper machinery alignment is an essential element of a Machinery Health Management Program. Alignment of coupled shafts is necessary for machinery of all types. Misaligned machine trains create additional forces that are transferred to the fixed positions of the machine, namely the bearings. These additional forces cause premature bearing failures as well as other problems such as seal and coupling failures.

Because the most common type of misalignment is a combination of both angular and offset, Emerson Machine Health Analysts use Emerson's CSI dual laser beam system to provide the highest degree of accuracy in precision alignment of your equipment.

Specific features of Emerson alignment services include:

- A thorough preliminary analysis of the machine's vibration characteristics to confirm the presence of misalignment
- Performance of a soft foot check
- Electronically recording the initial readings, each subsequent reading after appropriate moves are made, and the final 'as is' reading
- Use of a 'Live Mode' during machine moves for more accurate repositioning of the machine
- Complete alignment with as little as 45 degrees of shaft rotation.

## ADVANCED VIBRATION TECHNOLOGIES INCLUDE:

- Modal analysis for measuring and computer modeling the structural characteristics of a machine or supporting framework, independent of the operating environment
- Operating Deflection Shape (ODS) analysis for visualizing the actual movement of a machine component of structure as it vibrates in response to operational loads
- Transient analysis for capturing cyclic behaviours typical of impacting, irregular, or unusual events

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