CHILLER VIBRATION ANALYSIS

OVERVIEW | Supersedes: 50.40-OV32.0 (1098) | Form 50.40-OV32.0 (800)

BACKGROUND

Vibration analysis, when properly accomplished and evaluated, is a tremendously useful tool in determining compressor and open motor operating conditions. Problems such as unbalance and bearing wear, if identified prior to catastrophic failure, can be repaired at a fraction of the cost of a major rebuild. This is especially true on screw compressors where the anti-friction bearing design makes vibration analysis the preeminent means of determining bearing wear and condition. Vibration analysis can be sold as a stand-alone service or incorporated into a maintenance contract proposal.

Vibration equipment, if purchased, can be quite expensive. YORK Service in several locations has been utilizing a national vibration company, DLI Engineering Corporation, to provide equipment and training. You have two options.

The first option provides for DLI training. DLI will visit our first client with us to train the YORK technician(s) on the use of the equipment and proper placement of the vibration accelerometers. Vibration data will be recorded and the DLI engineer will return to DLI and produce the report. Several districts in a region may want to combine their efforts to minimize the cost impact.

After the initial visit, all data collection will be handled by the YORK District office. Upon request, DLI will prepare a vibration data collector and ship it to the YORK District office. YORK will collect the data and return the data collector to DLI for analysis. Finished reports will be forwarded to the field and to the YORK A/V Laboratory for review.

The second option allows YORK to do the data collecting without the initial DLI orientation. DLI has a PowerPoint presentation available covering the placement of the accelerometer pads, bar code labels and use of the data recorder. This is obviously the most cost-effective option.

PRODUCT SCOPE

Screw Compressors

Screw compressors utilize anti-friction bearings in lieu of hydrodynamic film (sleeve) bearings found on centrifugals. By design, anti-friction bearings have a fixed life that is normally expressed in terms of “bearing L10”. A major bearing failure will most likely cause rotor damage and require complete compressor replacement. Vibration analysis will prevent catastrophic failures due to bearing wear. Competitive screw compressors can also be included in this program.

Centrifugal Compressors

Centrifugal compressors utilize hydrodynamic film (sleeve) bearings that are not easily evaluated using vibration analysis. Vibration analysis will identify impeller unbalance and gear related problems such as excessive wear and broken gear teeth. These types of problems can ultimately lead to bearing failure and an extensive compressor overhaul.

Motors

Electric motors from 100 horsepower through 500 horsepower will use anti-friction bearings. Vibration analysis is used to determine bearing condition in the same manner as the screw compressor. In addition, rotor balance and motor rotor bar problems can be detected.

FREQUENCY OF EVALUATION

It is important to start vibration analysis as early in the compressor and/or motor life as possible to allow the development of a baseline vibration signature. Twice per year analysis, once at the beginning of the season and once at the end, will identify potential problems well before a major failure occurs and downtime results.

INSTALLATION LIST

An installation list of screw chiller installations is being distributed under separate cover to each of the District Service offices. Immediate opportunities exist for units shipped from 1990 - 1993, as these units will have between 25,000 and 40,000 hours of operation.

PRICING

Costs and suggested pricing levels are being distributed under separate cover. Contact the local YORK District Service office for pricing guidelines.

PROGRAM DESCRIPTION

Getting Started

1. The District office contacts DLI requesting data collector. The District supplies the quantity, type of equipment (model number), gear code (if centrifugal) to be tested.
2. DLI will request a PO to prepare and ship the vibration equipment.
3. DLI prepares and ships the following: data collector, transducer attachment pads and glue, barcode labels, and testing instructions.
4. YORK technician collects the vibration readings.
5. The data collection device is returned to DLI for evaluation.
6. DLI processes the data and prepares a formal report. The report includes executive summary, fault descriptions, repair recommendations, and vibration spectra. Reports are bound and bear the YORK logo.

Contacts

Scott Crawford at Predict/DLI:

1-800-654-2844 or (206) 842-7656.

email: scrawford@predict-dli.com