

Can ILoT Help Optimize Your Material Handling Conveying System?



Part 2: Condition Monitoring Options

CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION

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With any technology there are a nearly unlimited number of choices and levels of commitment and a corresponding capital outlay. Here are the most prevalent approaches:

Route Based Condition Monitoring:

- a. At designated intervals, a technician uses a set of specialized analytical devices and follows a prescribed route to collect a defined set of data on a series of predetermined machines. The analytical devices can range from a screwdriver used as a stethoscope to machine health analyzers costing tens of thousands of dollars. The information collected could be vibration levels and frequencies, acoustics, ultrasonic measurements, thermographs, oil samples, etc.
- b. The dataset is then compared to previous data to establish a trend and is also typically benchmarked against existing standards. A gearbox found to be operating at 300 degrees F, for example would be selected for further study and possible replacement. Below is an example of a series of vibration readings taken at various time intervals. It is evident for this machine the vibration levels vary over time.

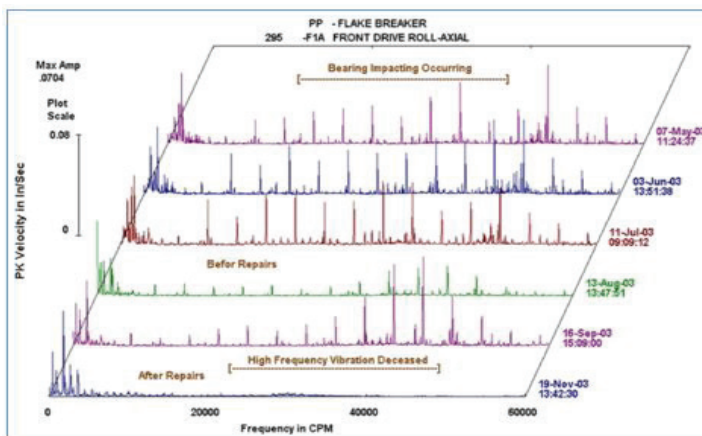


Figure 1: Representative Route Based Vibration Readings on a Waterfall Graph

- c. **Advantages:** More timely information, better tools for more accurate diagnosis of the equipment condition. Will reduce repair costs and unscheduled downtimes. Can be contracted out in many cases to test the benefits of this approach.
- d. **Disadvantages:** Need to invest in the equipment and training. Labor intensive. Need employees or contractors with very specific skill sets. Equipment will be unmonitored for extended periods, and would be subjected to additional damage during that time.

Continuous Monitoring:

- a. In the least sophisticated and most inexpensive systems, sensors simply collect selected data. More sophisticated systems can analyze the data and take predetermined actions.
- b. Advantages: no gaps in data collection, or missed changes or events. Faster detection and proactive, automated responses possible.
- c. Disadvantages: it is the responsibility of the location receiving the information to manually analyze/interpret the data. A simple system can require a trained Asset Reliability person to review the data. More advanced systems are more expensive.

Time based maintenance:

- a. At a specific number of operational hours or calendar days, a set of proscribed maintenance activities are performed. In the case of a belt conveyor, maintenance routine could be vary in scope i.e. change the reducer oil, check for leaks, make sure the breather is not clogged, check drive belt tension, etc.
- b. Advantages: will extend machinery life and improve system reliability, as compared to taking no action. Lower investment in both equipment and labor than the more advanced methods.
- c. Disadvantages: May be performing operations that are not adding value. For example rather than changing the oil every time, perhaps an oil sampling program would indicate the oil does not need to be changed so frequently.
- d. Best for systems used intensively and seasonally, like sugar mills in the USA, where there is a harvest season "campaign".

Run to Failure:

- a. Fill the gearbox with lubricant, align the motor, couplings, etc., connect the motor and turn it on as needed.
- b. Advantages: minimizes first cost for equipment, quickest and simplest to install, no maintenance expense until it fails.
- c. Disadvantage: may fail at an unknown, unplanned time in the future. Device is typically damaged beyond restoration.