KNOW BEFORE YOU GO

Selecting Assets for Online Vibration Monitoring

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Know Before You Go:
Selecting Assets for Online Vibration Monitoring

by Jude Iyinbor, CEng.

Introduction

Determining when and which assets should be monitored online or offline (i.e., manual handheld data collection) can be a complex process. There are many considerations that impact on if the transition happens gradually (phased approach) starting with critical assets or if a switch to online for all assets is required at once. A thorough review of the entire system is important. Carefully consider the selection criteria for the machines and components to be involved in a transition.

Selection Criteria for Online Vibration Monitoring

When determining which assets (machinery, components) to place on an online vibration monitoring system, you need to review:

- Machine criticality
- Access and location
- Failure history

Machine Criticality

When looking at machine criticality, you need to consider how key that piece of equipment or component is in the context of its place in the production process. A criticality analysis can help determine the answers to questions such as:

- If the machine was to fail, would production cease or is there a work around available?
- What is the total cost of downtime associated with an unplanned downtime of the machine?
- Are there serious safety risks upon machine failure?

- What impact would this asset have on the entire system if it fails?

These criteria and others specific to your facility should be weighed carefully when determining which assets are the most critical to your production process. The most critical machines should be transitioned first before brining others online.

Limited Access to Machines during operation

In some plants, some machines are in harder to reach areas and data collection points are not manually accessible during operation. It becomes a challenge to collect vibration data to ascertain the health status of such machines. In other situations, like with mobile equipment, it is almost impossible to manually collect data from machines such as Wheel Motors during operation. These types of machines are normally surveyed when stationary, however the sets of vibration data collected during static runs are not a true representation of the machine's behavior during normal operating conditions. These types of equipment are better suited to transition to online vibration monitoring.

Unsafe or Uncomfortable Locations

Machines that are in safety critical zones, where access is restricted and controlled due to factors specific to the facility, are good candidates for online vibration monitoring. For example, machines in confined spaces or hot areas may be cordoned off for safety reasons making it difficult to regularly collect vibration data manually.

Working conditions such as machines operating in very warm and humid regions can also make it uncomfortable to manually collect vibration data during normal operation. For example, the temperatures in a Purifier Room of an Oil Tanker during hot months (May to August) in hot regions can easily reach more than 50 Degrees Celsius or higher. Some handheld data collectors will start to shut down at these temperatures or become misty and challenging to use. Plus, the concentration levels of personnel can suffer in these

conditions making it more likely to manually collect wrong data. Machines in these types of locations are perfect candidates for transitioning into an online vibration monitoring program.

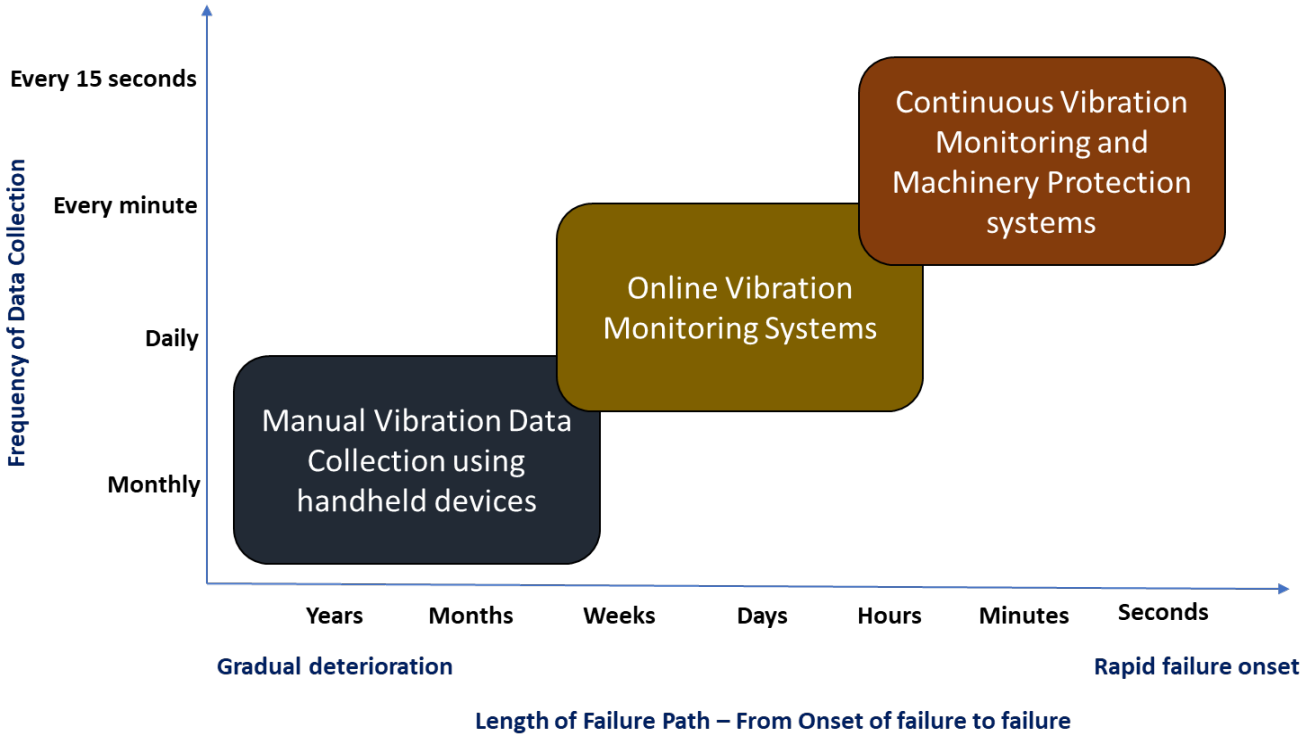
Failure History

A machine with a history of sudden preventable failures is difficult to track by a monthly manual handheld data collection technique. There are lots of cases where a machine is fine during its monthly survey and then it suddenly experiences rapid failure hours or sometimes days later. The "once in month manual vibration snapshot" is considered too infrequent to capture the onset of deterioration. In such cases, it would be better to transition these types of machines to an online vibration monitoring system.

Transition Trade-Offs

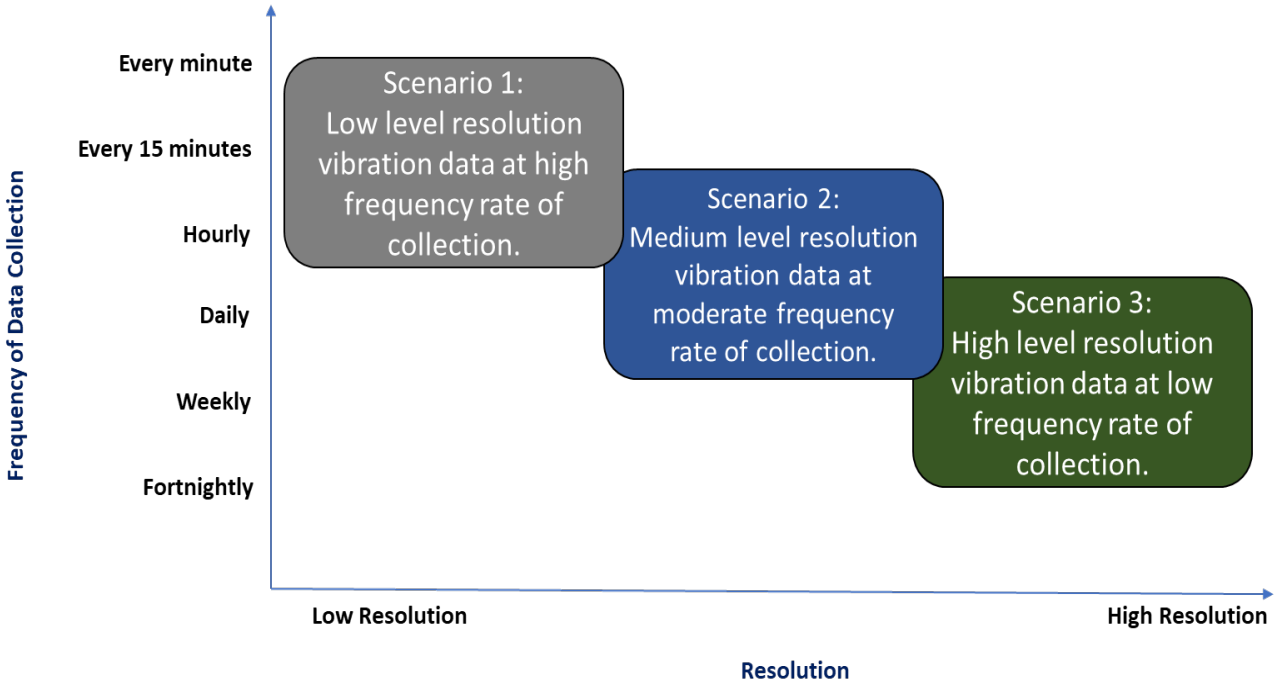
There are some trade-offs that should be noted when moving from offline to online vibration monitoring systems.

Frequency of Data Collection vs Length of Failure Path



In the chart above, we outline three options for data collection: Manual, Online, and Continuous. The trade-off is between the frequency of data collection needed and length of time to failure. If a machine has a steady gradual long-time-to-failure, it could do with less frequent data collection and only require manual data collection. However, if machine's failure onset is sudden, rapid, and short, then more frequent data and some form of continuous monitoring should be considered. Most machines exist in the middle ground where more frequent data is required, but not to the extent of continuous monitoring. This area offers the best value and suitability for an online vibration monitoring program.

Frequency of Data Collection vs Resolution of Spectral Plots



As much as we want to be able to utilize Online systems to collect data as frequently as possible, we need to also be aware of display, storage, and data transfer resources. Many online vibration monitoring programs come against the challenge of streaming high resolution vibration data at a high periodic rate (every minute). Data reduction activities may have to be

employed to reduce the issue with online vibration data processing. Some Online Vibration Monitoring systems offer an optimization between vibration data resolution and periodic rate of data collection. This ensures that vibration data can still be collected at an excellent periodic rate depending on the specific use case and no matter which of the scenarios shown is encountered.

Brain Teasers: Check your Comprehension

Q1: Which one of the following should selection of machines for online vibration monitoring be based on? (A): Weight (B): Color (C): Criticality

Q2: A Boiler Water Feed Pump that often exhibits rapid onset to failure is a good candidate for more frequent vibration data collection using online systems (A): False (B): True (C): Not sure

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