Process Safety Beacon
Messages for Manufacturing Personnel
www.aiche.org/ccps/process-safety-beacon

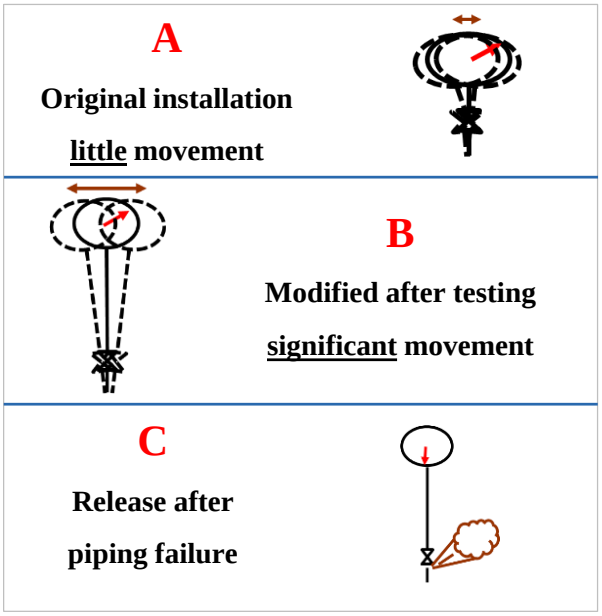
An AIChE Technology Alliance
CCPS Center for Chemical Process Safety
aiche.org/ccps

This issue sponsored by
ioMosaic®
Minimizing risk. Maximizing potential.®
www.iomosaic.com

# Not all vibrations in process equipment are 'good vibrations*'

November 2020

Some equipment such as vibratory conveyors and screens are meant to move, but in most other equipment, vibration is not desirable. It can lead to piping and equipment damage including premature failure.




**Pressure Gauge Connection Failure**

A new compressor system was starting operation (Diagram A) The pressure gauge connection was modified during a temporary troubleshooting procedure. (Diagram B). A longer pipe was left in place and the pressure gauge reattached to it. Vibration from the compressor and the longer pipe increased the amount of movement. The connection failed and caused a large release of flammable vapor which, fortunately, did not ignite, but caused a significant environmental release.(Diagram C )

In another incident, during a routine walk-around, an operator pointed out a pipe that was moving about 1" (2.5cm). He explained that this was seen when the rotor on a wiped film evaporator was out of balance. The imbalance forced a 50% reduction in production to meet quality limits. After repairing the main bearings and the evaporator rotor, the movement disappeared, and the production rate returned to the normal level.

## Did You Know?

- Vibration can be caused by several things:
  - imbalanced rotating equipment
  - flow induced vibration
  - pulsating equipment such as reciprocating pumps
  - equipment subject to ocean waves
- Fluid shock or 'hammer' can be caused by rapidly stopping or starting flow.
- To isolate vibration, flexible connections may be used, but they are also weaker components that can fail.
- Rotating equipment may have vibration monitoring sensors with alarms to warn of excess vibration and impending failure.
- Both the amplitude (amount of movement) and the frequency (rate of movement) can affect how quickly vibration can cause equipment to fail.
- Technology exists to test and analyze vibration to determine the exact source.

## What Can You Do?

- When walking through the plant, watch and listen for vibrating equipment and report concerns to your supervisor. You may see or hear something that is not being monitored by maintenance inspections
- Changes in vibration can go unnoticed. If the vibration seems worse, it may indicate an impending failure.
- Vibration monitoring alarms are indicating a pending equipment failure. They should be taken as seriously as other process alarms. When you notice vibrating pipe or equipment follow your procedures for reporting equipment problems.

* https://www.youtube.com/watch?v=Eab_beh07HU

***Vibration is the process telling you something is wrong. Listen to it !***