GE
Measurement & Control

Is Rod Drop the Right Measurement for My Reciprocating Compressor?

GER-4274A (01/15)

Author:

Roger Hala
Applications Engineer
Bently Nevada™ Asset Condition Monitoring

What is Rod Drop?

Rod drop is the indication of the vertical piston movement inside the cylinder, calculated from the measurement of piston rod movement at the pressure packing case.

Applicability

Inferring piston movement from the measurement of rod movement at the pressure packing case is based on a number of assumptions. In some compressor configurations these assumptions are not valid. The applicability must be evaluated on a case-by-case basis. This document and the decision flow diagram shown in *Figure 1* pertain specifically to rod drop measurements, and are intended to assist users in determining whether the measurement will provide value for their application.

Using the Diagram

To use the diagram, begin at the start location and answer each question in order. To aid in interpreting the questions in the diagram, additional detail is provided in the following list:

- **Is Rider Band Non-Metallic?**
  Rider bands were originally made from babbitt alloy material similar to standard journal/sleeve bearings. Although there are some reciprocating compressors that still use metallic rider bands, non-metallic rider bands are now much more common. However, rod drop measurements should not be used on cylinders that incorporate metallic rider bands since the exposed babbitt thickness is very small.
- **Is HP > 600 (447 kW)?**
  Is the reciprocating compressor frame rating greater than 600 horsepower (447 kW)? Rod drop may not work properly due to excessive flexing of running gear and compressor components on lightweight machines of less than 600 hp.
- **Is RPM < 500?**
  Is the operating speed of the compressor less than 500 revolutions per minute? Experience indicates that rod drop measurements may not work properly on machines with RPM greater than 500.
- **Is L/D < 30?**
  Is the ratio of the piston rod length (L) to the piston rod diameter (D) less than 30? The L/D ratio is an indication of stiffness of the piston rod. Rod drop measurements may not work properly due to excessive flexing of the piston rod on machines with an L/D ratio greater than 30.
- **Is Correction Factor at Top Dead Center < 2.0?**
  The correction factor is defined as the ratio of the piston rod length to the distance between the center of the crosshead and the center of the probe when the piston is at top dead center. On machines with a correction factor greater than 2, the rod drop measurements may not work properly due to excessive crosshead influence.
- **Is Discharge Pressure < 1500 psig (10.2 MPa)?**
  Is the cylinder discharge pressure less than 1500 psig (10.2 MPa)? Rod drop measurements may not work properly due to high-pressure packing case influence on the rod with cylinder pressure greater than 1500 psig.
- **Is Piston Diameter > 20 Inches (508 mm)?**
  Pistons are usually constructed of either cast iron or aluminum, depending on diameter. Larger pistons are made from aluminum to reduce the reciprocating mass. With the high coefficient of thermal expansion of aluminum, piston rise becomes very noticeable on pistons with a diameter greater than 20 inches (508 mm). Users should be aware of this expected rise and use 11 mm probes to accommodate this added movement.
- **Is it a Non-lubed Cylinder?**
  If any answer to the above questions is no, and if the cylinder is not lubricated, experience has shown that the rod drop measurement may provide erratic results. It is recommended that users consult with GE regarding their expectations for the measurement to ascertain whether the installation of rod drop monitoring will provide value.

Rider Band Wear vs. Other Rod Drop Applications

This flow diagram was developed specifically to ascertain whether the rod drop measurement will provide a useable indication of **rider band wear.** However, it is not the only machine condition detectable by measurement of the piston rod motion at the pressure packing case. If the flow diagram indicates that the compressor is a poor rod drop application, consider installing the rod *position* measurement instead. This measurement uses two orthogonally mounted proximity probes in an X-Y configuration, rather than the single-plane measurement used for rod drop. It can provide supporting evidence for diagnosing other machine or process conditions. Your local GE sales professional or field applications engineer can assist you in assessing whether your proposed application can be adequately addressed by a rod drop measurement.

Rod Drop Channel Type Decision Flow

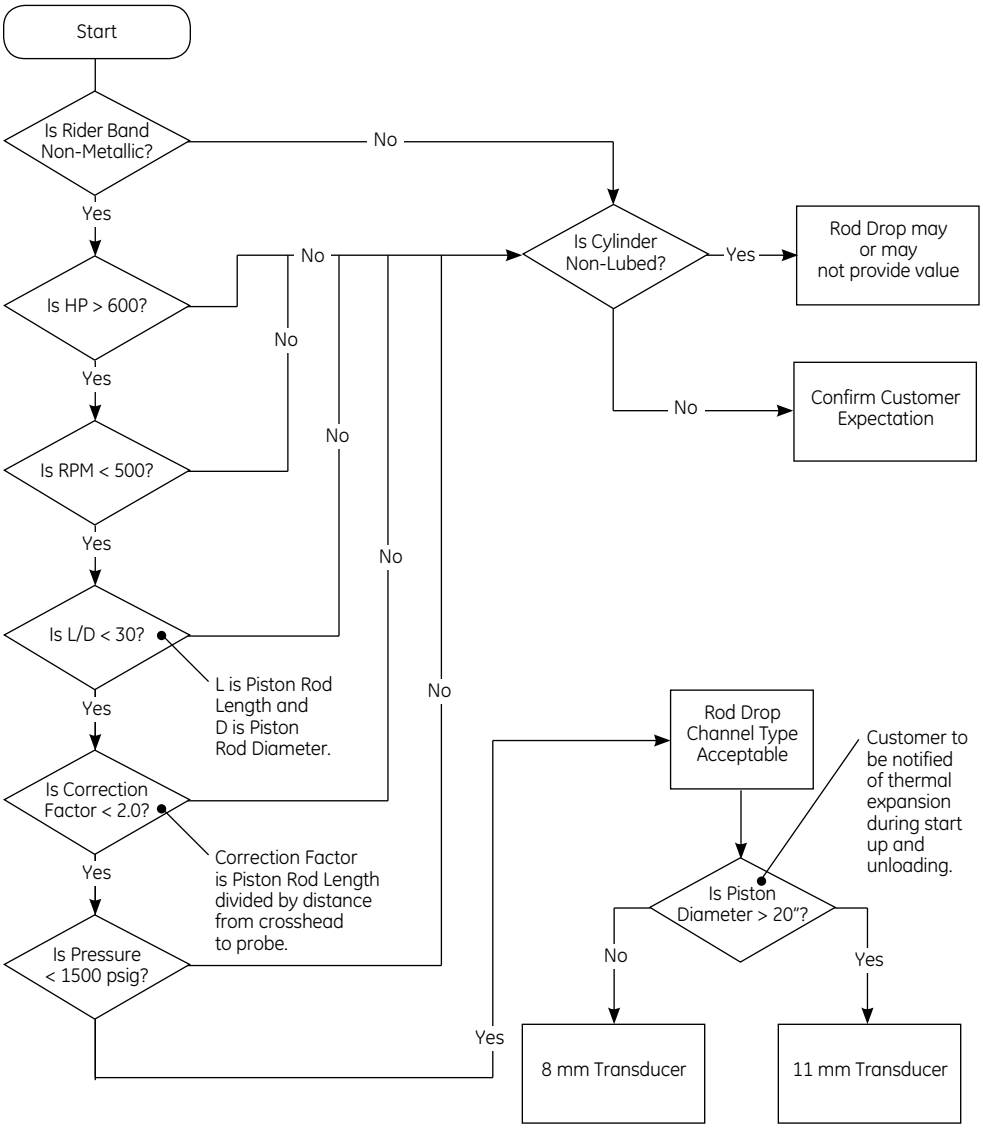

Figure 1. Decision flow diagrams

GE Measurement & Control
1631 Bently Parkway South
Minden, NV 89423

+1 775.782.3611

www.ge-mcs.com/bently

GER-4274A (01/15)