

CALLCOTT & DOWNEY

ENGINEERING SERVICES

Dealing with bent hydraulic cylinder rods

By Brendan Casey, HydraulicSupermarket.com

In last month's issue we examined ways to reduce the recurring cost of hydraulic cylinder repairs. If you missed this article or for a recap, it's [available here](#). One of the topics discussed was cylinder rod buckling loads. In response to this article, many of our readers wanted to know how to deal with bent rods in a repair situation.

Checking rod straightness

Rod straightness should always be checked when a hydraulic cylinder is being re-sealed or repaired. This is done by placing the rod on rollers and measuring the run-out with a dial gauge (Figure 1). Position the rod so that the distance between the rollers (L) is as large as possible and measure the run-out at the mid-point between the rollers (L/2).

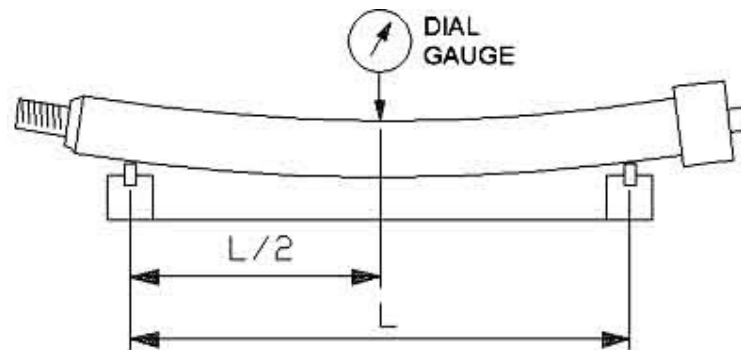


Figure 1. Checking rod straightness.

Allowable run-out

The rod should be as straight as possible, but a run-out of 0.5 millimeters per linear meter of rod is generally considered acceptable. To calculate maximum, permissible run-out (measured at L/2) use the formula:

$$\text{Run-out max. (mm)} = 0.5 \times L / 1000$$

Where: L equals distance between rollers in millimeters.

For example, if the distance between the rollers was 1.2 meters, then the maximum, allowable run-out measured at L/2 would be given by $0.5 \times 1200 / 1000 = 0.6\text{mm}$.

Dealing with bent rods

In most cases, bent rods can be straightened in a press. It is sometimes possible to straighten hydraulic cylinder rods without damaging the hard-chrome plating, however if the chrome is damaged, the rod must be either re-chromed or replaced.

If a rod is bent, then it is wise to check actual rod loading against permissible rod loading based on the cylinder's mounting arrangement and the tensile strength of the rod material. The formulas and procedure for doing this are explained in detail in [Industrial Hydraulic Control](#). If actual road load exceeds permissible load then a new rod should be manufactured from higher tensile material and/or the rod diameter increased to prevent the rod from bending in service.

ABOUT THE AUTHOR: Brendan Casey has more than 25 years experience in the maintenance, repair and overhaul of mobile and industrial hydraulic equipment. For more information on reducing the operating cost and increasing the up-time of your hydraulic equipment, visit his web site: <http://www.HydraulicSupermarket.com>