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Calibration of DBR Floor Furnace Loading System Stanzak, W. W.

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No.
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TECHNICAL NOTE

PREPARED BY W. W. Stanzak CHECKED BY G. W. S. APPROVED BY N. B. H.

DATE July, 1967

PREPARED FOR Record purposes

SUBJECT CALIBRATION OF DBR FLOOR FURNACE LOADING SYSTEM

The DBR floor furnace is provided with a loading frame having 30 hydraulic jacks with 2 1/2-inch bore and 12-inch stroke, rated at 3000 lb each. The position of the jacks can be manipulated for specific purposes, such as the loading of individual beams.

Beam specimens tested at DBR are normally 16 ft 0 in. long and are loaded at two points, 36 in. on either side of the beam center-line. The loading at each point is via two hydraulic jacks connected by a cross-beam. Maximum permissible depth of beam (or beam and floor assembly) which can be loaded is 12 inches.

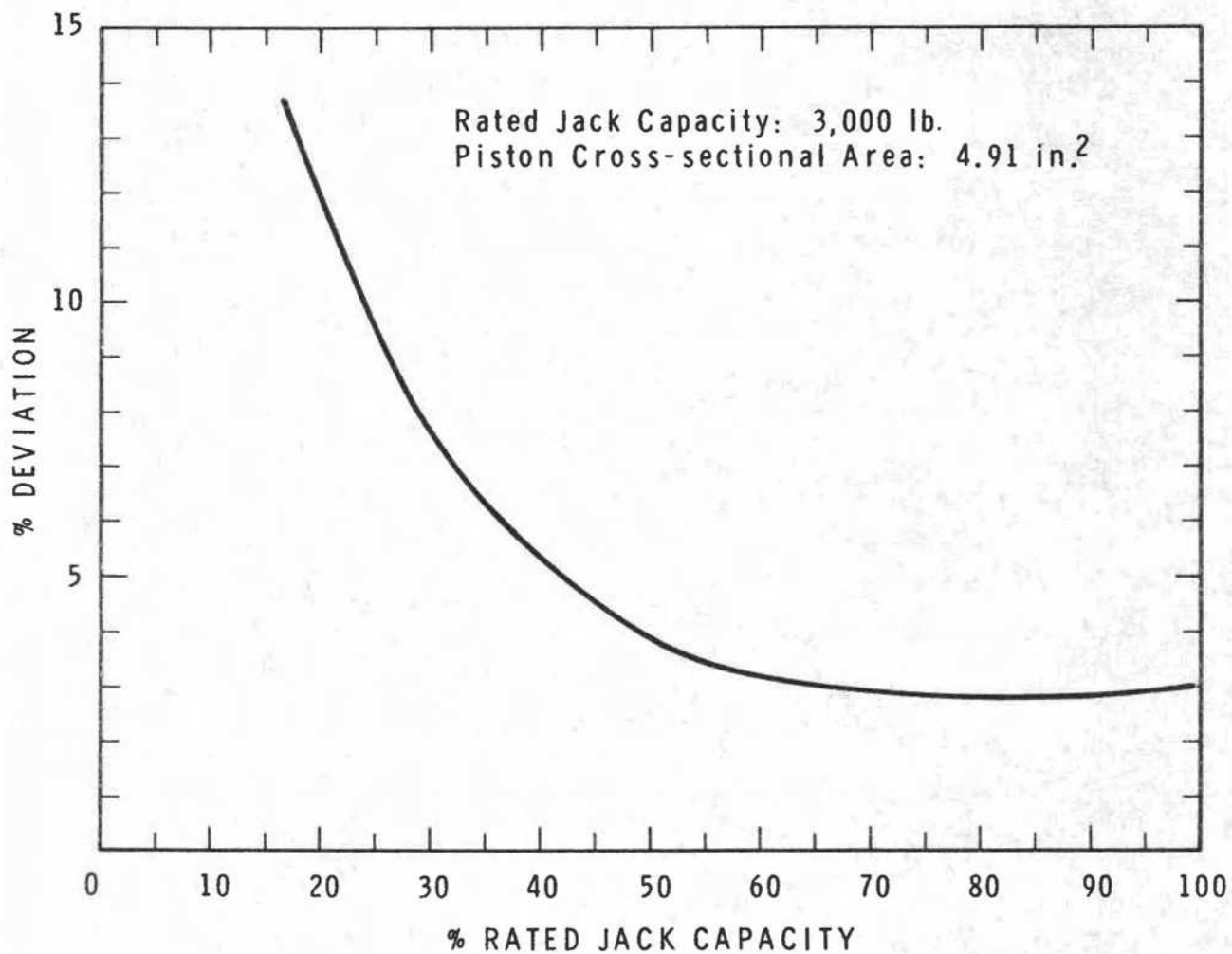
The deviation from calculated loads in hydraulic systems is normally small (in the order of -2 per cent at 75 per cent rated capacity), and hence neglected. In systems serving under adverse conditions, however, the deviation may be somewhat greater and should be known for cases where extreme accuracy of loading is desirable.

The four jacks used for beam loading were calibrated employing an elastic loop dynamometer, Type MS689 manufactured by A. J. Amsler & Co., Switzerland. This instrument was calibrated to read a specified deflection at a given load. The calibration was done by loading with dead weight at the factory and is guaranteed to be accurate. The percentage deviation shown in the figure was taken as:

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$$\% \text{ DEVIATION} = \frac{\text{CALIBRATED DEFLECTION} - \text{DIAL READING}}{\text{CALIBRATED DEFLECTION}} \times 100$$

The percentage deviation is very high at small loads but reduces to about -3 per cent at normal working loads. The absolute deviation remains relatively constant at between -70 and -90 pounds throughout the entire loading range. Therefore a correction of approximately +15 pounds per square inch hydraulic pressure during fire tests will ensure that the desired live load is being applied. The accuracy of the instrumentation and control for the loading system does not warrant use of a more refined correction technique.



DEVIATION IN DBR FLOOR FURNACE LOADING JACKS

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