

SURFACE VEHICLE RECOMMENDED PRACTICE

An American National Standard

SAE J376

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(R) LOAD INDICATING DEVICES IN LIFTING CRANE SERVICE

Foreword—This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

1. **Scope**—This SAE Recommended Practice applies to cranes equipped with load indicating devices used in lifting crane service.

1.1 **Purpose**—The purpose of this recommended practice is to establish the minimum performance criteria for systems used to measure and display to the operator, and/or other responsible persons, the weight of the load being lifted. It is not the intent of this recommended practice to define the requirements and use of weight measuring devices used in commerce or other industries.

2. **References**—There are no referenced publications specified herein.

3. Definitions

3.1 **Load Indicating Device**—A device which measures and displays the weight of the load being lifted.

3.2 **Load Indicating System**—A load indicating device applied to a crane including all mounting and crane components that directly affect the performance criteria specified in Section 4.

3.3 **Crane Configuration**—The physical arrangement of the crane as prepared for a particular operation in conformance with the manufacturer's operating instructions and load rating chart.

3.4 **Actual Load**—The weight of the load being lifted and all additional equipment such as blocks, slings, sensors, etc.; also referred to as working load.

4. Performance Criteria

4.1 **Load Indicating System Capacity**—The load indicating system capacity is to be either compatible with the maximum capacity of the crane, as specified by the crane manufacturer, or compatible with the maximum allowable lift for a specific crane configuration less than maximum capacity.

4.2 **Accuracy**—The accuracy of the load indicating system is to be such that the indicated load is not less than 100% of the actual load, nor more than 110% of the actual load. Where the system cannot meet the accuracy criteria at the lower load range, conspicuous labeling or signaling is to be provided indicating that these accuracy criteria cannot be met.

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4.3 Temperature Effect—Specified accuracy is to be maintained over ambient temperature variations of -30 to $+50^{\circ}\text{C}$ (-22 to $+122^{\circ}\text{F}$) without external adjustment.

4.4 Readout

4.4.1 The device readout should be in units of measure which are compatible with the appropriate load rating chart for the crane. Minimum resolution is to permit the clear indication of values within the accuracy criteria of the system, under all conditions of operation.

4.4.2 The device readout shall be located so that the operator, and/or other responsible persons, can obtain readings from the operator's normal operating position and its location shall not create an operational hazard.

4.5 Set Points—Load indicating systems equipped with adjustable working range set points having visual and/or audible warning signals, are to have the visual signal clearly visible and the audible signal clearly distinguishable from engine and machinery noise.

4.6 Strength Margin—When any portion of the load indicating system is employed in the load supporting system so that its failure could cause the load to be dropped, its strength margin is not to be less than the minimum strength margin of the other load supporting members.

4.7 Operation Check—The system shall include a means for the operator, or other responsible persons, to determine that it is operative prior to crane use.

4.8 Testing—The load indicating system is to be performance tested by the installer initially and by the user at intervals recommended by the manufacturer(s), or at any time there is an indication of inaccuracy. (See 4.2 and Section 6.)

5. General Requirements

5.1 Installation and Maintenance—Installation and maintenance of the load indicating device and maintenance of the crane are to be in accordance with the appropriate manufacturer's recommendations to attain system accuracy.

5.2 Identification—Labels, when provided, are to be conspicuously placed on the device readout or in the operator's cab, or both, giving the following information:

- a. Units of measure.
- b. Maximum capacity of the indicating system.
- c. Operating range of the indicating system for which the accuracy criteria of 4.2 are met.
- d. Basic operating instructions and precautions, including the recommended interval for performance testing.
- e. Device manufacturer's name, address, and device model number.

5.3 Manual—Manual(s) containing installation, operation, test, and service information is to be provided by the manufacturer and is to be available to the operator and/or other responsible persons at all times.

6. Performance Evaluation Tests

6.1 General Testing Requirements

6.1.1 Test personnel are to be familiar with the system operation and the manufacturer's recommended test procedures and are to check the system for all functions.

- 6.1.2 System tests are to be conducted using an appropriate configured crane and specified load rating chart.
- 6.1.3 For system calibration, three or more test loads are to be employed to establish compliance with 4.2. Test loads shall be as near as is practical to minimum, mean, and maximum values within the operating limits.
- 6.1.4 For periodic calibration checks, two or more test loads are to be employed.
- 6.1.5 TEST DATA—Test records are to include, but not be limited to, the following information:
- Owner(s).
 - Crane manufacturer, model, and serial number.
 - Device manufacturer, model, and serial number.
 - Crane configuration at time of test, method of test, location of load sensor, and test readings.
 - A statement that the system met (did not meet) the accuracy criteria of 4.2, or that recalibration was necessary in order to achieve the required accuracy. The system accuracy calculation is to be part of such report.
- 6.1.6 All test records are to be signed and dated. A copy of the current test record is to be available at all times.

6.2 Test Procedures—One of the following test procedures or equivalent is to be used:

- 6.2.1 KNOWN WEIGHT
- Test load to be applied by suspending known weights accurate to $\pm 1\%$. If the weights of all additional equipment such as blocks, slings, sensors, etc., are included in the test load, the total load is to be known to an accuracy of $\pm 1\%$.
 - Determine the tested system accuracy in accordance with 6.3.
- 6.2.2 FIXED ANCHOR (DEADMAN)
- Test load to be applied by hoisting against a fixed anchor or deadman equipped with a means for measuring loads accurate to $\pm 1\%$. If the weights of all additional equipment such as blocks, slings, sensors, etc., are included in the test load, the total load is to be known to an accuracy of $\pm 1\%$.
 - Determine the tested system accuracy in accordance with 6.3.

6.3 Computations—The system accuracy is to be determined from the following formula:

$$\frac{\text{Indicated Load}}{\text{Actual Load}} \times 100 = \% \text{ of Load} \quad (\text{Eq. 1})$$

7. Notes

- 7.1 Marginal Indicia**—The change bar (I) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.