

Load Indicating Devices in Lifting Crane Service — SAE J376 FEB80

SAE Recommended Practice
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ed. **LOAD INDICATING DEVICES IN LIFTING
CRANE SERVICE—SAE J376 FEB80**

SAE Recommended Practice

Report of the Construction and Industrial Machinery Technical Committee, approved December 1968, last revised October 1974, editorial change February 1980.

- ed. 1. **Scope**—This SAE Recommended Practice applies to cranes used in lifting crane service which are equipped with load indicating devices.
- ed. 2. **Purpose**—The purpose of this recommended practice is to establish the minimum performance requirements of devices used to measure and display to the operator, 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.
3. **Definitions**
- ed. 3.1 **Load Indicating Device**—A device which measures and displays the weight of the load being lifted.
- ed. 3.2 **Load Indicating System**—A load indicating device applied to a crane including all mounting and crane components that affect operational performance.
- ed. 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.
- ed. 3.4 **Actual Load**—The weight of the load being lifted and all additional equipment such as blocks, slings, sensors, etc.
4. **Minimum Performance Requirements**
- 4.1 **Load Indicating System Capacity**—The load indicating system capacity shall be either:
- (a) Compatible with the maximum capacity of the crane as specified by the crane manufacturer; or,
- (b) Compatible with the maximum allowable lift for a specific crane configuration of lesser capacities specified by the user.
- ed. 4.2 **Accuracy**—The accuracy of the load indicating system shall be such that the indicated load is within 97–110% of the actual load. When operating at rated load, the 97% value establishes a limit of 3% above the rated load, the 110% value establishes a limit of 10% under the rated load. Where the system cannot meet the accuracy requirement at the lower load range, conspicuous labeling shall be provided indicating that the required tolerance cannot be met.
- ed. 4.3 **Temperature Effect**—Specified accuracy shall be maintained over ambient temperature variations of -30–50°C (-22–122°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 shall permit the clear indication of values within the accuracy requirements of the system, under all conditions of operation.
- 4.4.2 The device readout shall be located so that the operator or other responsible person can obtain readings from his normal operating position and its location shall not create an operational hazard.
- 4.5 **Set Points**—Load indicating systems may be equipped with manually adjustable working range set points having a visual or audible warning signal. When so equipped, visual signals shall be clearly visible and audible signals shall be clearly distinguishable above the noise of engines and machinery.
- 4.6 **Operation Check**—The system shall have a means for the operator or other responsible person to determine that it is operative prior to use.
- ed. 4.7 **Testing**—The load indicating system shall be performance tested by the installer initially and by the user at intervals recommended by the manufacturer or at any time there is an indication of inaccuracy. (See accuracy requirements in paragraph 4.2 and testing procedure in Section 6.)
- ed. 4.8 **Strength Margin**—When any portion of the load indicating system is employed in the supporting system so that its failure could cause the load to be dropped, its strength margin shall not be less than the minimum strength margin of the other supporting members such as block, hoisting ropes, and rope fittings.
5. **General Requirements**
- 5.1 **Installation and Maintenance**—Installation and maintenance of the load indicating device and maintenance of the crane should be in accordance with the manufacturer's recommendations to assure system accuracy.
- ed. 5.2 **Labeling**—Labels, when appropriate, shall be conspicuously placed

on the device readout or in the operator's cab, or both, giving the following information:

- Units of measure.
- Maximum capacity of the load indicating system.
- Operating range of the indicating system for which the accuracy requirement of paragraph 4.2 is met.
- Basic operating instructions and precautions.
- Device manufacturer's name, address, and device model number.
- Statement of compliance with appropriate SAE Recommended Practice.

5.3 **Manual**—An operation, installation, and service manual(s) shall be provided by the manufacturer and shall be available to the operator or other responsible persons at all times.

6. **Performance Evaluation Tests**

6.1 **General Testing Requirements**

- 6.1.1 Specific test instructions for the device shall be provided by the manufacturer. ed.
- 6.1.2 Test personnel shall be thoroughly familiar with manufacturer's manuals for the system and shall check system for all functions.
- 6.1.3 All required equipment shall be on hand prior to start of test.
- 6.1.4 System test shall be conducted using an appropriately configured crane and specified load rating chart. ed.
- 6.1.5 For initial system calibration, three or more test loads shall be employed to establish compliance with paragraph 4.2. Test loads shall be as near as is practical to maximum, mid-range, and minimum values within the operating limits. ed.
- 6.1.6 For periodic calibration checks a minimum of two test loads should be employed. ed.
- 6.1.7 Test Data—Test forms shall include, but not be limited to, the following information: ed.
- Owner(s).
 - Crane manufacturer, model, and serial number.
 - Device manufacturer, model, and serial number.
 - Crane configuration at time of test, method of test load application, location of load sensor and test readings.
 - A statement that the system met (did not meet) the accuracy requirement of paragraph 4.2 or that recalibration was necessary in order to achieve the required accuracy. The system accuracy calculation shall be a part of this report.
- 6.1.8 All test records shall be signed and dated. A copy of the current test record shall be available at all times. ed.
- 6.2 **Test Procedures**—Test procedures shall include one of the two methods described below or equivalent.
- 6.2.1 **Known Weight**
- Test load to be applied by suspending known weights accurate to ±1%. If the weights of all additional equipment such as blocks, slings, sensors, etc., are included in the test load, the total load shall be known to an accuracy of ±1%. ed.
 - Determine the tested system accuracy in accordance with paragraph 6.3. System accuracy shall be within the tolerance of paragraph 4.2. ed.
- 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 ±1%. If the weights of all additional equipment such as blocks, slings, sensors, etc., are included in the test load, the total load shall be known to an accuracy of ±1%. ed.
 - Determine the tested system accuracy in accordance with paragraph 6.3. System accuracy shall be within the tolerance of paragraph 4.2. ed.
- 6.3 **Computations**—The system accuracy shall be determined from the following formula: ed.

$$\frac{\text{Indicated Load}}{\text{Actual Load}} \times 100 = \% \text{ of Load}$$