

**Radius-of-Load or Boom  
Angle Indicating Systems—  
SAE J375 APR85**

SAE Recommended Practice  
Completely Revised April 1985

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# φ RADIUS-OF-LOAD OR BOOM ANGLE INDICATING SYSTEMS—SAE J375 APR85

## SAE Recommended Practice

Report of the Off-Road Machinery Technical Committee, Subcommittee 17, approved December 1968, completely revised April 1985.

1. **Purpose**—The purpose of this recommended practice is to establish the minimum performance criteria of systems which measure and display to the operator and/or other responsible persons the radius-of-load or boom angle at which the load is being lifted.

2. **Scope**—This SAE Recommended Practice applies to cranes used in lifting crane service which are equipped with radius-of-load or boom angle indicating devices.

### 3. Definitions

3.1 **Radius-of-Load**—The horizontal distance from a vertical projection of the crane's axis of rotation to the supporting surface, before loading, to the center of the vertical hoist line or tackle with rated load applied.

3.2 **Radius-of-Load Indicating System**—A crane mounted device which measures parameters and displays the radius-of-load.

3.3 **Boom Angle**—The angle between the longitudinal centerline of the boom base section and the horizontal plane.

3.4 **Boom Angle Indicating System**—A crane mounted device which measures and displays boom angle.

3.5 **Rated Load**—The load value shown on the applicable load rating chart of the crane for the particular crane configuration, boom length, boom angle, or functions of these variables. For radii outside those shown on the load rating chart, the rated load is to be considered as zero.

### 4. Performance Criteria

#### 4.1 Accuracy

4.1.1 For Radius-of-Load Indicating Systems, the indicated radius is to be not less than 100% of the actual radius, nor more than 110% of the actual radius.

4.1.2 For Boom Angle Indicating Systems, the indication is to be as follows: For boom angles 65 deg or more, the indicated angle is to be neither greater than the actual boom angle nor more than 2 deg less than the actual boom angle. For boom angles less than 65 deg, the indicated angle is to be neither greater than the actual boom angle nor more than 3 deg less than the actual boom angle.

4.2 **Temperature Effect**—Specified accuracy is to be maintained over ambient temperature variations of -30 to +50°C (-22 to +122°F) without external adjustment.

#### 4.3 Readout

4.3.1 The device readout is to be in units of measure which are compatible with the appropriate load rating chart for the crane.

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

4.4 **Set Points**—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.

4.5 **Operation Check**—The system is to have a means for the operator or other responsible persons to determine that it is operative prior to crane use.

4.6 **Testing**—The 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 paragraph 4.1 and Section 6).

### 5. General Requirements

5.1 **Installation and Maintenance**—Installation and maintenance of the 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:

- Units of measure.
- Operating range of the indicating system for which the accuracy criteria of paragraph 4.1 is met.
- Basic operating instructions and precautions, including recommended intervals for performance testing.
- Device manufacturer's name, address, and device model number.

5.3 **Manual**—Manual(s) containing installation, operation, test, and service information is (are) to be provided by the manufacturer and shall 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 For system calibration, three or more test radii or boom angles are to be employed to establish compliance with paragraph 4.1. Test radii or angles are to be as near as practical to the minimum, mean, and maximum of the operating range.

6.1.3 For periodic calibration checks, two or more radii or boom angles are to be employed.

6.1.4 **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, and test readings.
- A statement that the system met (did not meet) the accuracy criteria of paragraph 4.1, or that recalibration was necessary in order to achieve the required accuracy. The system accuracy calculation is to be part of such report.

6.1.5 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 Procedure

6.2.1 Level the crane to within 0.5 deg in an area that is clear of obstructions, so that the boom may be moved from maximum radius/minimum boom angle to the minimum radius/maximum boom angle.

6.2.2 For radius-of-load indicating systems, the following test procedure or equivalent is used:

At each test position, with rated load applied, the radius-of-load is measured by steel tape, or equivalent calibrated means, and the measurement compared to the radius-of-load indicator.

6.2.3 For boom angle indicating systems, the following test procedure or equivalent is used:

At each test position, the boom angle is measured by an adjustable level, protractor, or equivalent calibrated means and the measurement compared to the boom angle indicator. The adjustable level or protractor must be positioned on a smooth surface of the boom base section parallel with the longitudinal centerline.

#### 6.3 Radius-of-Load Computations

$$\% = \frac{\text{Indicated radius-of-load}}{\text{Actual radius-of-load}} \times 100$$

The φ symbol is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.