

	SURFACE VEHICLE RECOMMENDED PRACTICE	SAE J2703 OCT2008
		Issued 2008-10
		Superseding J185 MAY2003
Cranes—Access and Egress		

RATIONALE

This recommended practice harmonizes with ISO 11660-2 (Cranes – Access, Guards, and Restraints) with only minor change.

FOREWORD

This recommended practice establishes the criteria for access and egress systems for personnel getting on, off, or moving about while servicing or preparing to operate mobile cranes.

1. SCOPE

This recommended practice specifies criteria for steps, stairways, ladders, walkways, platforms, handrails, handholds, guardrails and entrance openings which permit access to and from operator, inspection or maintenance platforms on mobile cranes parked in accordance with the manufacturer's instruction. It also presents requirements for guards and restraints as related to moving parts.

2. REFERENCES

There are no referenced publications specified herein.

3. DEFINITIONS

3.1 Access System

System provided on a machine for entrance to and exit from an operator, inspection or maintenance platform from and to the ground. The primary access system is the access system normally used, while the alternative access system is the access route used during anticipated emergency situations when the primary access system cannot be used.

3.2 Jib Walkway

Walkway used mainly on long jibs, such as on dragline cranes, which are inclined at angles up to 20 degrees from the horizontal.

3.3 Jib Skywalk Platform

Maintenance platform on jib base sections.

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3.4 Controlled Descent Device

Device which can automatically lower a person without power at a fixed speed as part of an alternative access system.

3.5 Enclosure Opening

Opening leading to or from an access system and large enough for a person to pass through.

3.5.1 Primary Opening

Opening normally used for access.

3.5.2 Alternative Opening

Opening for use during emergencies when the primary opening is not usable.

3.5.3 Service Opening

Opening for use during maintenance, service or inspection.

3.6 Foot Barrier

Device to prevent a person's foot from slipping off the edge of a platform or walkway.

3.7 Guardrail

Device along the open sides of walkways or platforms to protect a person from falling.

3.8 Handrail and Handhold

Parts of an access system that may be grasped by the hand as an aid to body support and balance.

3.9 Ladder

Access system or part of an access system, inclined from the horizontal at an angle greater than 50 degrees but not more than 90 degrees, consisting of a series of equally spaced steps that can accommodate one or both feet.

3.9.1 Vertical Ladder

Ladder whose angle of inclination from the horizontal is greater than 75 degrees.

3.9.2 Inclined Ladder

Ladder whose angle of inclination from the horizontal is greater than 50 degrees but not more than 75 degrees.

3.9.3 Rung Ladder

Ladder consisting of side rails and rungs which can accommodate both feet, used for access where the angle of inclination from the horizontal exceeds 75 degrees.

3.9.4 Stepped Ladder

Ladder consisting of side rails and steps which can accommodate both feet, used for access where the angle of inclination from the horizontal exceeds 65 degrees.

3.10 Ladder Fall-Limiting Device

Any device which minimizes or limits the length of fall from a ladder system.

3.11 Operator's Platform

Area from which an operator controls the travel and work functions of the machine.

3.12 Passageway

Walkway with confining barriers on both sides that extend vertically above the walking surface to a height of at least 1200 mm for erect walking or 300 mm for crawling.

3.13 Platform

Horizontal surface for the support of persons engaged in operation, maintenance, inspection or repair work.

3.14 Ramp

Plane inclined at an angle of 20 degrees or less from the horizontal, without steps, but with cleats or other surface treatment for the purpose of traction.

3.15 Cleat

Device added to a walkway or ramp surface to improve traction.

3.16 Rest Platform; Landing

Platform used in conjunction with a ladder system for a person to rest on while standing.

3.17 Riser Height

Height between two consecutive steps or rungs, measured from the tread surface of one step or rung to the tread surface of the next.

3.18 Rung

Device on which one or both feet may be placed, generally installed on vertical ladders or on a single foot-step.

3.19 Stairway

Access system or part of an access system inclined from the horizontal at an angle greater than 33.7 degrees but not more than 67 degrees and consisting of four or more steps.

3.20 Step

Device for placement of one or both feet, either as part of a ladder or stairway, or installed (placed) individually.

3.21 Stride Distance

Horizontal distance from the leading edge of one step to the leading edge of the next step.

3.22 Three-Point Support

Feature of an access system which permits, but does not require, a person to use simultaneously two hands and one foot or two feet and one hand, while ascending, descending or moving about on the crane.

3.23 Tread Depth

Distance from the leading edge to the back of the step.

3.24 Walkway

Part of an access system that permits walking or crawling between locations on a crane.

3.25 Powered or Manually Actuated Access Device

Device that through power or manual actuation provides a complete or partial primary access or alternative access system.

3.26 Slip-Resistant Surface

Access system surface having qualities which improve the traction obtained by the foot. Appendix A presents examples of surfaces that are considered "slip-resistant".

4. GENERAL

The minimum criteria established herein are based on one person using the access system at any one time. It shall also be recognized that some machine designs may require modifications or variances from the requirements presented.

5. GENERAL CRITERIA

5.1 Access system design shall consider:

- a. The probability of a user being inadvertently restrained by protruding devices such as controls, steps or handles catching or holding body appendages or wearing apparel;
- b. Protrusions which could trip the user or increase the severity of an injury in case of a fall;
- c. Providing handrails or handholds with a smooth hand grasp surface;
- d. The probability of user contact with potential hazards such as extreme differences in heat or cold, electrical hazards, moving parts and sharp corners;
- e. Use of the access system shall be easily understood and require no training;
- f. Proper placement of components offering three point support to the user ascending or descending the access system when more than 1 m above the ground.

5.2 Primary access system devices may be portable for convenient storage on the crane but shall be capable of being positively secured when in use or in the stored position.

5.3 An alternative exit shall be provided and shall be clearly indicated if not obvious.

6. PERFORMANCE CRITERIA

6.1 The walking and standing surfaces of access systems shall withstand, without visible permanent deformation, the following minimum forces applied perpendicular to the surface.

- a. 2000 N concentrated through a 125 mm diameter disc applied at any location on the surface; and
- b. 4500 N uniformly distributed per square meter of surface area or fraction thereof if less than a square meter. These forces need not be applied simultaneously.

- 6.2 Openings in walkways and platform surfaces shall not permit the passage of a spherical object of diameter greater than or equal to 40 mm. If the floor surface is above a surface where persons will be walking, standing or working, the opening shall not permit the passage of a spherical object of diameter greater than or equal to 20 mm. Solid surfaces shall be used when necessary to prevent the passage of material that could result in personal injury to a person above or below the surface. For jib walkways and other similar areas that are used only for inspection or maintenance, the standing or stepping surface openings may be increased to twice the above values.
- 6.3 Handrails, handholds and guardrails shall be capable of withstanding a minimum force of 1000 N applied at any point from any direction without visible permanent deformation. Flexible devices shall not deflect under the applied test load more than 80 mm from their normal un-deflected position.
- 6.4 Machinery enclosure roofs used only for support of personnel during inspection, such as cab and canopy roofs, may comply only with 6.1 a).
- 6.5 All surfaces of the access system for e.g. walking, stepping or crawling (including any device or structural component thereof used as part of an access system) shall be slip-resistant.

Crane track shoe and track pad surfaces can be used as access steps if three-point support is provided.

7. STEPS

- 7.1 Steps shall conform to the dimensions given in Figure 1 and Table 1. Where possible, steps should be wide enough to accommodate both feet.
- 7.2 Where lateral body movement is necessary from the top or bottom step of a ladder to the next stepping surface, the distance between the rung and the nearest edge of the bearing surface shall be within a spherical radius R of 300 mm max. (See Figure 1).
- 7.3 Steps shall be coordinated with properly positioned handrails and handholds.
- 7.4 Wherever a foot can protrude through the step and contact a moving part, a shield shall be provided between the step and the moving part.
- 7.5 Step design should incorporate a barrier at the ends of the step which the foot will contact in the event of lateral slippage.
- 7.6 The step tread surface shall not be intended for use as a handhold.
- 7.7 Step design should minimize accumulation of debris and aid in the cleaning of mud and debris from the shoe sole. Crawler tracks, if permitted as steps, do not meet this requirement.