SAE International™

SURFACE VEHICLE STANDARD

An American National Standard

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Personnel Protection—Skid Steer Loaders

RATIONALE

This document was revised to correct the J/ISO references.

1. SCOPE

This SAE Standard is intended to provide personnel protection guidelines for skid steer loaders. This document is intended as a guide towards standard practice, but may be subject to frequent change to keep pace with experience and technical advances. This should be kept in mind when considering its use. This document provides performance criteria for newly manufactured loaders and it is not intended for in-service machines.

2. REFERENCES

2.1 Applicable Publications

The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated, the latest revision of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE J153 Operator Precautions

SAE J674 Safety Glazing Materials—Motor Vehicles and Motor Vehicle Equipment

SAE J1042 Operator Protection for General-Purpose Industrial Machines

SAE J2292 Combination Pelvic/Upper Torso (Type 2) Operator Restraint Systems for Off-Road Work Machines

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: 724-776-4970 (outside USA)
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2.1.2 ISO Publications

Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ISO 2867 Earth-moving machinery—Access systems

ISO 3411 Earth-moving machinery—Human physical dimensions of operators and minimum operator space envelope

ISO 3449 Earth-moving machinery—Falling-object protective structures—Laboratory tests and performance requirements

ISO 3450 Earth-moving machinery—Braking systems of rubber-tyred machines—Systems and performance requirements and test procedures

ISO 3457 Earth-moving machinery—Guards—Definitions and requirements

ISO 3471 Earth-moving machinery—Rollover Protective Structures—Laboratory tests and performance requirements

ISO 5006 Earth-moving machinery—Operator's field of view

ISO 5353 Earth-moving machinery, and tractors and machinery for agriculture and forestry—Seat index point

ISO 6165 Identification terminology of earthmoving machines

ISO 6405-1 Earth-moving machinery—Symbols for operator controls and other displays

ISO 6405-2 Earth-moving machinery—Symbols for operator controls and other displays

ISO 6682 Earth-moving machinery—Zones of comfort and reach for controls

ISO 6683 Earth-moving machinery—Seat belts and seat belt anchorages

ISO 6750 Earth-moving machinery—Operation and maintenance—Format and content of manuals

ISO 7131 Earth-moving machinery—Terminology and commercial specifications

ISO 9244 Earth-moving machinery—Safety signs and hazard pictorials—General principles

ISO 10265 Earth-moving machinery—Crawler machines—Performance requirements and test procedures for braking systems

ISO 10533 Earth-moving machinery—Lift-arm support devices

ISO 10968 Earth-moving machinery—Operator's controls

ISO 12508 Earth-moving machinery—Operator station and maintenance areas—Bluntness of edges

ISO 14397-1 Earth-moving machinery—Loaders and backhoe loaders—Calculation of rated operating capacity and test method for verifying calculated tipping load

ISO 14397-2 Earth-moving machinery—Loaders and backhoe loaders—Test method for measuring breakout forces and lift capacity to maximum lift height

3. DEFINITIONS

3.1 A loader is a self propelled crawler or wheeled machine, having front-mounted equipment primarily designed for loading operation (bucket use), which loads or excavates through forward motion of the machine.

NOTE: A loader work cycle normally comprises filling, elevating, transporting, and discharging material.

3.2 A skid steer loader is a loader normally having an operator station between attachment-supporting structures, and steered by using variation of speed and/or direction of rotation between traction drives on opposite sides of a machine with fixed axles with wheels or with tracks.

NOTE: The component nomenclature is identified in ISO 7131. Earth-moving machinery definition is found in ISO 6165.

3.3 A “guard” or “shield” is a barrier that is intended to prevent inadvertent contact with a potential hazard during normal operation and servicing.

3.4 “Moving machinery part hazard” is a source of potential injury by direct contact or entanglement. This includes, but is not limited to, the projections on rotating parts and the nip points at the acute entry angle of power driven gears, belts, and chains.

3.5 “Nip point” means the pinch point of gears and the run-on point where a belt or chain contacts a sheave, sprocket, or idler.

3.6 “Guarded by location” means a component is guarded during normal operation and servicing, when because of its location, no person can inadvertently come in contact with the potential hazard.

3.7 “Side screens” are barriers that cover the side openings of an operator cab.

3.8 “Normal operation” is the reasonable use of the loader by a trained person using attachments as approved by the loader manufacturer.

3.9 “Field maintenance” is a service performed in accordance with the operator manual, field service manual, or machine sign.

3.10 “Approved lift arm support device” is a mechanical device approved by the manufacturer, used to prevent accidental lowering of the lift arms when the lift arms are required to be held in the elevated position for maintenance, service, or purpose other than loader operation.

4. OPERATION INSTRUCTIONS

General operator instructions and field maintenance procedures shall be provided by manuals and/or machine signs attached to the loader. Manuals should use SAE J153 MAY1987 and ISO 6750 as a guideline.

4.1 Instructions shall be included for loading, traveling, and dumping. Information shall be included regarding the effects of changes of motion and of field conditions such as a slope.

4.2 Instructions shall be provided for transporting the loader.

4.3 Instructions shall be given for lifting the loader as a total unit.

4.4 Instructions shall be provided for field maintenance.

5. OPERATION

5.1 Movement of operator controls shall be in accordance with ISO 10968. It is not necessary to have neutral interlocks or steering controls with a secondary motion when passing through neutral.

5.2 Controls should be identified. If symbols are used, they should be in accordance with ISO 6405-Parts 1 and 2.

5.3 Handholds, steps, or other means to facilitate entry and exit from the loader operator's position shall be provided and comply with ISO 2867.

5.4 Location of operator seat and controls should be within guidelines established by ISO 6682 and ISO 5353.

5.5 Rated operating capacity shall be in accordance with ISO 14397 Parts 1 and 2. Tipping load is defined by ISO 14397-1.

6. OPERATOR CONSTRAINTS

6.1 Loaders shall be equipped with Type 1 seat belt systems which meet ISO 6683 requirements. Type 2 seat belt systems, if provided, shall meet SAE J2292.

6.2 A means to prevent lift arm movement, attachment bracket pivoting and activation of the drive system when the operator is entering or exiting shall be provided.

7. OPERATOR GUARDS AND SHIELDS

7.1 The following shall be shielded or guarded by location.

7.1.1 Nip point of exposed gears, belts, and chain drives.

7.1.2 Outside faces of pulleys, sheaves, sprockets, cooling fans and gears that rotate when the engine is running with all clutches disengaged.

7.1.3 Rotating parts with projections such as exposed bolts, keys, or set screws.

7.1.4 Revolving shafts, except smooth shaft ends, protruding less than one-half the outside diameter of the shaft.

7.2 Fluid System Shielding

7.2.1 Batteries, fuel tanks, oil reservoirs, and coolant systems should be constructed, located, or sealed per guidelines in SAE J1042.

7.3 Guard Design

7.3.1 Guards and shields shall comply with ISO 3457.

7.3.2 Guards which must be opened for frequent lubrication or inspection, such as required for field maintenance, shall be hinged or otherwise permanently attached and latched.

8. OPERATOR CAB

8.1 Skid steer loaders shall be provided with suitable cabs with side screens as follows:

8.1.1 A Rollover Protective Structure (ROPS) which complies with ISO 3471, and is labeled accordingly.

8.1.2 A Falling Object Protective Structure (FOPS) which complies with ISO 3449 Level 1.