



SURFACE VEHICLE RECOMMENDED PRACTICE

J1814™

MAY2020

Issued 1993-02
Revised 2012-08
Stabilized 2020-05

Superseding J1814 MAR2003

Operator Controls - Off-Road Machines

RATIONALE

This recommended practice deals with some existing and legacy machine controls. There have been improvements in the state of the art, but the standard is a good historical reference.

STABILIZED NOTICE

This document has been declared "Stabilized" by the SAE HFTC1, Controls, Visibility, Anthropometrics, Accessibility Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology can exist. ISO 10968, "Earth-Moving Machinery - Operator's Controls" provides guidance on controls.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2020 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
<http://www.sae.org>

SAE WEB ADDRESS:

Full document details: SAE J1814_202005

For more information on this standard, visit
https://www.sae.org/standards/content/J1814_202005

Documents

Document Sharing Hub

1. SCOPE

- 1.1 General criteria are presented as guidelines for: control device location, resistance, and actuation of hand and foot controls by the machine's operator. The criteria are based upon physical limitations as defined by human factors engineering principles.
- 1.2 This SAE Recommended Practice applies to upright seated operators of Road Building and Maintenance, and Specialized Mining Machinery categories of off-road, self-propelled work machines as identified in SAE J1116. The criteria presented should apply to most situations. Each situation, however, must be evaluated as to its own function and its relationship to other functions to achieve the desired operation action in normal and emergency situations with high probability. The values for control displacement and resistance apply only to what is required to achieve the desired performance of the function being controlled for the 5th through the 95th percentile person as defined in ISO 3411.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue 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 J1116	Categories of Off-Road Self-Propelled Work Machines
SAE J1362	Graphical Symbols for Operator Controls and Displays on Off-Road Self-Propelled Work Machines
ISO 3411	Earth-moving machinery - Human physical dimensions of operators and minimum operator space envelope
ISO 6405-1	Earth-moving machinery-Symbols for operator controls and other displays-Part 1: Common symbols
ISO 6405-2	Earth-moving machinery-Symbols for operator controls and other displays-Part 2: Specific symbols for machines, equipment, and accessories
ISO 6682	Earth-moving machinery - Zones of comfort and reach for controls

3. DEFINITIONS

3.1 CONTROL

Device actuated by a person to effect a response of the machine, its equipment, or its tools.

3.1.1 Frequently Operated Control

A control with an average operational interval of 5 min or less between actuations during a normal operational cycle. This control is the same as the primary control defined in ISO 6682.

3.1.2 Infrequently Operated Control

A control with an average operational interval of more than 5 min between actuations during a normal operational cycle. This control is the same as the secondary control defined in ISO 6682.

3.2 CONTROL DISPLACEMENT

Movement of a control through its operational range.

3.3 CONTROL RESISTANCE

The force exerted by the operator to effect a control displacement.

3.3.1 Normal Operational Resistance

Force applied to achieve the desired control function under normal operating conditions.

3.3.2 System Malfunction Resistance

Force applied to achieve the desired control function whenever a malfunction occurs that affects the system's performance or whenever the system serves as a back-up to another primary system such as loss of power resource.

3.3.3 Minimum Control Resistance

Force applied necessary for functional input to the operator senses.

3.4 FORWARD

Direction the operator faces while seated in the operator's seat with the machine and the operator's seat in the position for straight, forward travel as defined by the manufacturer.

3.5 MINIMUM CONTROL STRENGTH

Ability of the control system to withstand a single excessive application of effort or load by the operator without being destroyed or impeding its primary function. The control device may be deformed as long as the primary function can be accomplished.

4. GENERAL CRITERIA

4.1 Enclosure Space Envelope

The minimum normal operator enclosure space envelope and the minimum clearance between the operator controls and enclosure surfaces are provided in ISO 3411.

4.2 Control Response

4.2.1 A control actuation should produce the expected functional response, movement rate, and direction of movement.

4.2.2 Controls shall provide a positive sensory feedback (visual, audio, touch, etc.) of actuation and/or position to the operator.

4.3 Control Location, Displacement Resistance

4.3.1 Control location and direction of movement and reference to the operator while in the normal operation position for that control.

4.3.2 Frequently operated controls, including their displacements shall be located within the zone of comfort as defined in ISO 6682.

4.3.3 Infrequently operated controls including their displacements, shall be located within the zone of reach as defined in ISO 6682.

4.3.4 Control location relative to the operator may be adjustable to enhance compatibility of different size operators.

4.3.5 A control shall not be located where it could cause ambiguity as to its direction of motion to actuate a function. Location of a control on a 30 to 60 degree sloping surface should be avoided if its direction of motion to achieve the same function is dependent upon the plane of the control's mounting surface. For example, a lever control for a raise/lower function should not be located on a 30 to 60 degree sloping surface since its recommended direction of motion changes when it is moved from a vertical to a horizontal plane.

4.3.6 When a sequence of controls is repeated on another panel, the sequence of controls should be the same for each panel.