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Earth-moving machinery — Operator's controls

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Australasian Institute of Mining and Metallurgy
Australian Industry Group
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Construction and Mining Equipment Industry Group
Department of Regional NSW
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Institute of Instrumentation, Control & Automation Australia
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Preface

This Standard was prepared by the Standards Australia Committee ME-063, Earthmoving Equipment.

The objective of this document is to specify requirements and guidelines for the operator's controls on earth-moving machinery, as defined in ISO 6165, in as far as those controls relate to any direct-control machine. The recommendations given for finger-, hand- and foot-operated controls are not intended to prevent usage of other types of controls, control locations or control movements. This document is not applicable to devices which are not directly related to machine control.

This document is identical with, and has been reproduced from, ISO 10968:2020, *Earth-moving machinery — Operator's controls*.

As this document has been reproduced from an International Standard, a full point substitutes for a comma when referring to a decimal marker.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 2, *Safety, ergonomics and general requirements*.

This third edition cancels and replaces the second edition (ISO 10968:2004), which has been technically revised. The main changes compared to the previous edition are as follows:

— the document has been reorganized for easier interpretation;

— minimum and normal actuating forces have been removed;

— state-of-the-art solutions have been taken into account.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document specifies design criteria for operator's controls on earth-moving machinery. As machines have gone through significant developments since the first edition of this document in 1995, this document covers both legacy machines and state-of-the-art solutions. This is important to take into account when reading the annexes.

As attachments and controls are becoming more advanced, it was considered important to reorganize the document for easier interpretation whereby base machine, equipment and attachments were separated in different annexes. As graders and dozers often have unique operator's controls, it was also decided to separate these two machine types into separate annexes.

Other important changes made in the third edition include the removal of minimum and normal actuating forces for operator's controls. It was considered that as there is a large variation in actuating forces for different types of controls, providing standardized actuating forces was not feasible. Instead, it is the manufacturer's responsibility that minimum actuating forces are enough to prevent inadvertent activation of the operator's controls caused by machine operation (e.g. machine acceleration/deceleration, vibration).

While preparing this document, it was noted that levers are developing rapidly and there are large differences even within a given machine family, for example excavators. This document therefore tries to also account for the most advanced excavators, whereby more controls are added to levers in order to allow for more functionality. It is recognized that new technologies and new technical measures will be developed as the state-of-the-art changes in order to improve the operation of earth-moving machinery.

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1 Scope

This document specifies requirements and guidelines for the operator's controls on earth-moving machinery as defined in ISO 6165, in as far as those controls relate to any direct-control machine. The recommendations given for finger-, hand- and foot-operated controls are not intended to prevent usage of other types of controls, control locations or control movements. This document is not applicable to devices which are not directly related to machine control.

NOTE For remote operator control of machines, see ISO 15817.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3411, *Earth-moving machinery — Physical dimensions of operators and minimum operator space envelope*

ISO 3450, *Earth-moving machinery — Wheeled or high-speed rubber-tracked machines — Performance requirements and test procedures for brake systems*

ISO 5010, *Earth-moving machinery — Wheeled machines — Steering requirements*

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: Symbols for specific machines, equipment and accessories*

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

ISO 17063, *Earth-moving machinery — Braking systems of pedestrian-controlled machines — Performance requirements and test procedures*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
control
device actuated by an operator to execute a *machine response* (3.4)

3.2
primary control
control (3.1) that is used frequently or continuously by the operator

Note 1 to entry: The primary controls are the following:

a) For the *base machine* (3.5):

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