INTERNATIONAL STANDARD

**ISO 6750-1**

First edition
2019-10

# Earth-moving machinery — Operator's manual —

## Part 1: Contents and format

*Engins de terrassement — Manuel de l'opérateur —*

*Partie 1: Présentation et contenu*



Reference number
ISO 6750-1:2019(E)



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Published in Switzerland

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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 3, *Machine characteristics, electrical and electronic systems, operation and maintenance*.

This document cancels and replaces the third edition (ISO 6750:2005), which has been technically revised. The main changes compared to the previous edition are as follows:

— the required contents of the operator's manual of earthmoving machinery has been updated;

— additional information on the use of electronic media for the operator's manual is now provided.

A list of all parts in the ISO 6750 series can be found on the ISO website.

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.



# Introduction

Operators need to have available an operator's manual giving guidance for the correct use and maintenance of the machine and its equipment and attachments. It is accordingly expected that such an operator's manual be clear and simple to understand, that it contains warnings for reasonably foreseeable hazards as well as definitions of terms, and that the units, symbols and pictorials used comply with the relevant International Standards.

This edition has been prepared such that it is aligned with the similar technical area covered by ISO 3600.

# Earth-moving machinery — Operator's manual —

# Part 1: Contents and format

## 1 Scope

This document specifies the contents of operator's manuals for earth-moving machinery as defined in ISO 6165, and gives guidance on how to structure such operator's manuals. It is intended to assist manufacturers of the machinery in the drafting and presentation of these manuals.

Manuals intended for use by service technicians are not within the scope of this document.

NOTE 1 Annex A provides basic information items to be included in the operator's manual.

NOTE 2 Annex B provides guidance on the presentation and format of hardcopy operator's manuals.

NOTE 3 Annex C provides recommendations on the electronic means of communication that can be used to convey the contents of operator's manuals.

## 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 3864 (all parts), *Graphical symbols — Safety colours and safety signs*

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 6749, *Earth-moving machinery — Preservation and storage*

ISO 7010, *Graphical symbols — Safety colours and safety signs — Registered safety sign*

ISO 7130, *Earth-moving machinery — Operator training — Content and methods*

ISO 9244, *Earth-moving machinery — Machine safety labels — General principles*

ISO 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 17100, *Translation services — Requirements for translation services*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100 and the following 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**
**attachment**
*component* (3.2) or assembly of components that can be mounted onto the base machine or *equipment* (3.5) for specific use

Note 1 to entry: See ISO 6746-1 and ISO 6746-2 for the dimensions and codes of the base machine and the equipment and attachments, and ISO 6016 for measuring their masses.

[SOURCE: ISO 6746-2:2003, 3.5, modified — "component or" added to the definition; Note 1 to entry added.]

**3.2**
**component**
part or an assembly of parts of a base machine, *equipment* (3.5) or an *attachment* (3.1)

[SOURCE: ISO 6746-2:2003, 3.6]

**3.3**
**display**
electronic device capable of visibly communicating information

[SOURCE: ISO 14861:2015, 3.1]

**3.4**
**document**
discrete unit or collection of content

[SOURCE: ISO 22938:2017, 3.1]

**3.5**
**equipment**
set of *components* (3.2) mounted onto the base machine which allows an *attachment* (3.1) to perform the primary design function of the machine

[SOURCE: ISO 6746-2:2003, 3.4]

**3.6**
**falling-object protective structure**
**FOPS**
system of structural members arranged in such a way as to provide *operators* (3.12) with reasonable protection from falling objects (trees, rocks, small concrete blocks, hand tools, etc.)

[SOURCE: ISO 3449:2005, 3.1]

**3.7**
**graphical symbol**
visually perceptible figure with a particular meaning, used to transmit information independently of language

[SOURCE: ISO 9244:2008, 3.5]

**3.8**
**jobsite organization**
rules and procedures for the jobsite that coordinate machines and people working together

[SOURCE: ISO 5006:2017, 3.7, modified — The example has been deleted.]

**3.9**
**operating mass**
mass of the base machine, with *equipment* (3.5) and empty *attachment* (3.1) in the most usual configuration as specified by the manufacturer, and with the *operator* (3.12) (75 kg), full fuel tank and all fluid systems (i.e. hydraulic oil, transmission oil, engine oil, engine coolant) at the levels specified by the manufacturer and, when applicable, with sprinkler water tank(s) half full

Note 1 to entry: The mass of an operator is not included for non-riding machines.

Note 2 to entry: Ballast mass at delivery can be included if specified by the manufacturer.

[SOURCE: ISO 6016:2008, 3.2.1, modified — The accepted term "OM" has been eliminated.]

**3.10**
**maintenance**
all activities necessary to prevent failure and retain a machine in operable condition

[SOURCE: ISO 8927:1991, 3.5.7, modified — The word “item” has been replaced with “machine”, the phrase "maintenance can be detailed as scheduled maintenance and conditioning monitoring" has been eliminated and Note 1 to entry has been eliminated.]

**3.11**
**modification**
changes made to the form, fit, or function/functional range of a product in order to alter its specified intended use

**3.12**
**operator**
person who operates and could perform routine *maintenance* (3.10) of earth-moving machinery

[SOURCE: ISO 7130:2013, 3.1, modified — The Note 1 to entry has been eliminated.]

**3.13**
**operator’s manual**
*document* (3.4) that identifies machines covered and containing information describing and illustrating the safe operation, *maintenance* (3.10), and safety precautions applicable to the machine

**3.14**
**periodic maintenance**
scheduled *maintenance* (3.10) performed at prearranged time intervals

[SOURCE: ISO 8927:1991, 3.5.9]

**3.15**
**personal protective equipment**
any device or appliance designed to be worn or held by an individual for protection against one or more health and safety hazards

[SOURCE: ISO 11660-1:2008, 3.1.15]

**3.16**
**repair**
activity necessary to restore a machine to the operable condition after a failure has occurred

[SOURCE: ISO 8927:1991, 3.5.12, modified — “all activities necessary to restore an item” has been replaced with “activity necessary to restore a machine”, and “Repair can be detailed as non-urgent repair and urgent repair.” has been deleted.]

**3.17**
**roll-over protective structure**
**ROPS**
system of structural members whose primary purpose is to reduce the possibility of a seat-belted *operator* (3.12) being crushed in the event of a machine roll-over

Note 1 to entry: It can include *components* (3.2) such as sub-frame, bracket, mount, bolt, pin, suspension or flexible shock absorber.

Note 2 to entry: Non-load-carrying members (posts) are not considered.

[SOURCE: ISO 3471:2008, 3.13, modified — Original Note 1 to entry has been deleted and later notes have been renumbered, also an internal referencing term number 3.12 in the bracket has been added to the word "operator" within the definition.]

**3.18**
**spare part**
replacement part
single, or multiple, part or subassembly used to replace a worn or failed part or subassembly

**3.19**
**tip-over protective structure**
**TOPS**
system of structural members whose primary purpose is to reduce the possibility of a seat-belted *operator* (3.12) being crushed by a machine tip-over

[SOURCE: ISO 12117:1997, 3.1, modified — The definition has been slightly reworded and Note 1 to entry has been deleted.]

**3.20**
**target group**
group of persons identified as target readers of the *operator's manual* (3.13)

EXAMPLE *Operators* (3.12), persons responsible for the installation, *repair* (3.16) or *maintenance* (3.10).

# 4 General information for operator's manuals

## 4.1 General information

An operator's manual is the primary source of information for the operator. It shall provide a description of the machine, its functional elements, and operational instructions for the intended use of the machine.

Different intended target groups can be specified at the beginning of the operator's manual, for example, in the foreword.

## 4.2 Machine configurations

If more than one machine configuration is addressed by one operator's manual, the identifier of a specific configuration shall be clearly recognizable in the operator's manual and on the machine in order to ensure unambiguous identification by the operator. As a consequence, the relationship between content and operational features of different machine configurations shall be unambiguous. There are different ways to organize the information, for example:

— each machine configuration has its own sections. Common parts are repeated in each machine configuration section.

— all machine configurations have one common section. Machine configuration specific information is highlighted either typographically or by document structure.

### 4.3 Attachments, tools, additional equipment

The operator's manual for any given machine shall include, if applicable, instructions on how to connect, disconnect, and use attachments, tools or additional equipment as approved by the machine manufacturer. Those instructions may be provided in a separate operator's manual.

### 4.4 Units of measurement

Units of measurement used in the operator's manual and on the machine shall be stated in the operator's manual.

### 4.5 Original language and translations

Operator's manual shall be supplied in a language in accordance with the local or regional legal and regulatory requirements or customs.

Where an operator's manual is translated from the original language, the translation shall be done in accordance with ISO 17100 or equivalent requirements.

### 4.6 Graphical symbols

Graphical symbols, including machine safety labels, used on the machine or within the operator's manual shall be explained in the operator's manual so that they are easily recognized and understood by the operator.

### 4.7 Meaning of audible and visual signals on the machine

The meaning of visual or audible signals on the machine, such as flashing lights, use of colours or audible alarms, shall be explained in the operator's manual so that they are easily recognized and understood by the operator.

### 4.8 Basic information

The manual shall contain instruction aimed at the target group on how to approach the machine in an appropriate way and get acquainted with its intended use as well as with its reasonably foreseeable misuse, physical boundary conditions, and risks related to application of the machine in its intended operation.

Annex A provides a list of items to be included in the operator's manual, which are indispensable for regulatory compliance in certain regional/national contexts.

## 5 Content of operator's manuals

### 5.1 General

The information as specified in 5.2 through 5.13 shall give a complete overview over the machine's functional range and operation as appropriate and applicable to the machine.

### 5.2 Identification of the operator's manual

An operator's manual drafted in accordance with this document shall be identified as relevant to a specific machine by the following information on the cover:

— manufacturer or distributor of machine;

— model and type designation of machine;

— name or type of publication;

— information on original text or translation of the original text; whilst specifying the language of origin;

NOTE This information can be placed elsewhere in the manual, such as the inside front cover.

— part number or publication number by which the operator's manual can be ordered;

— revision number or publication code, that can be used to fully identify the publication.

## 5.3 Table of contents

The operator's manual shall include a table of contents identifying the main categories of information and where they can be found. Page numbers for the beginning of each major section shall be clearly indicated.

## 5.4 Identification of the machine

Operator's manuals shall provide information that enables the operator to readily identify the machine to which the operator's manual relates. The following information shall be included:

— model designations of the machines to which the manual applies;

— serial numbers, serial number range, beginning of the range or a date of manufacture to which the manual applies, as appropriate;

— description, either by words or pictorially, or both, of the location of serial numbers of the machine and of serialized components;

— spaces to record serial numbers pertaining to the particular machine the manual accompanies.

The section covering the identification of the machine shall include a detailed description of the base machine (see ISO 6746-1) and its systems, and the optional equipment and attachments (see ISO 6746-2) permitted by the manufacturer to be used with the machine. Furthermore, the following shall be considered:

— presentation and nomenclature of major components, for example, engine, transmission, brake systems, steering system, pressure vessels, operator's enclosure;

— presentation of equipment, its functions, location and relationship with the machine;

— illustrations showing the location of product and component plates, for example, PIN, cab number, engine number, axle number; see Figure 1;

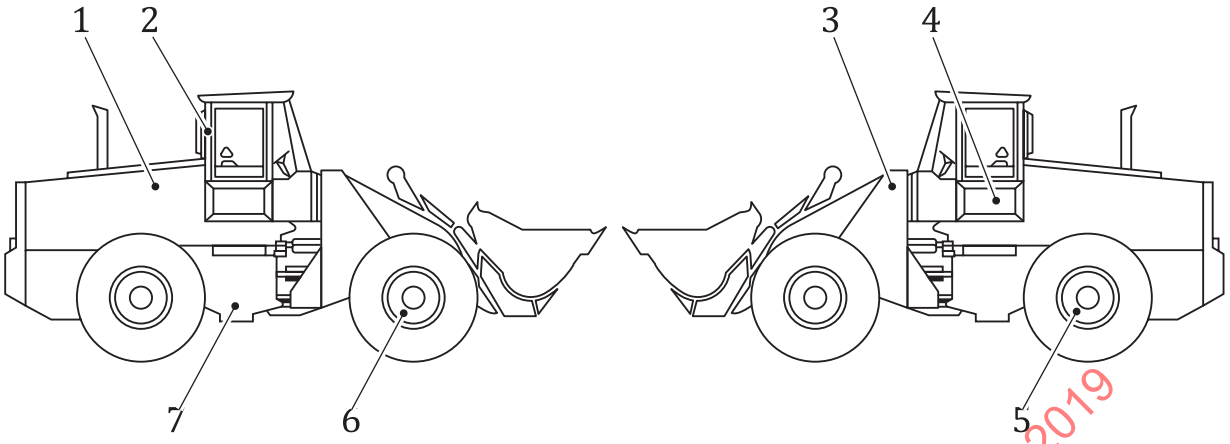
— illustrations showing the location of instructions; the layout of panels, for example, switches, gauges, control lamps, hour meter.

Where appropriate, components shall be identified, and terms unique to a specific type of earth-moving machine defined, utilizing the terms and definitions according to the respective terminology and commercial specification standards.

The operator's manual shall indicate either by words or pictorially, or both, the location and content of the product identification plate attached to the machine.






**Key**

1 engine plate with, for example, type designation, product and serial number
2 operator protection system plate with, for example, model, certification and operator protection system serial number
3 product plate, with PIN and, for example, model/type designation
4 seat plate, in accordance with ISO 7096
5 component plate, rear drive axle, with, for example, product and serial number
6 component plate, front drive axle, with, for example, product and serial number
7 component plate, transmission, with, for example, product and serial number

**Figure 1 — Example of how to indicate the location of identification plates**

## 5.5 Introduction

The introduction to the operator's manual shall explain that it is important to provide the operator's manual along with the machine and that the operator's manual should be read completely prior to starting or operating the machine for the first time. The same holds for any maintenance to be carried out. It shall state that the operator's manual shall be replaced immediately if lost, damaged or unreadable.

The operator's manual shall therefore:

a) contain provisions for the need for an adequately trained operator, according to, for example ISO 7130;

b) include instructions requiring the operator to immediately remedy faults that would compromise safety;

c) provide information on the intended use of the machine and reasonably foreseeable misuse;

d) give the manufacturer's instructions for operation and periodic maintenance of the machine and the equipment and attachments permitted by the manufacturer to be used with it, including the precautions to be taken for minimizing hazards. Those instructions may be provided in a separate operator´s manual;

e) include a warning concerning unauthorized modifications to the machine;

f) stipulate that, if the machine is used in coordination with other machines, vehicles and people on the jobsite, the operator shall follow jobsite organization rules where the machine is supposed to be used;

g) provide information related to personal safety, which shall be identified by using the relevant warning symbols from ISO 9244, ISO 7010 or the ISO 3864 (all parts);

h) provide a list of all abbreviations used in the operator's manual or provide a definition of each abbreviation in close proximity to where the abbreviation appears in the text of the operator's manual.

## 5.6 Safety information

### 5.6.1 Residual risks

Manufacturers of machines shall ensure that the risks related to the intended use of the machine, and its reasonably foreseeable misuse, have been assessed in accordance with ISO 12100. Residual risks resulting from that risk assessment shall be covered in the operator's manual by appropriate warnings. Those warnings shall include a signal word, the hazard identification and avoidance [see ISO 3864 (all parts) or ISO 9244 for guidance].

### 5.6.2 Safety alert symbol

The operator's manual shall draw attention to the use of the safety alert symbol in the manual and on the machine, to highlight information about potential safety concerns. The meaning of the safety alert symbol shall be included in the manual.

The safety alert symbol shall be either the general warning sign, ISO 7010-W001, or alternatively a black triangle with white exclamation mark or an outlined version with the white triangle with black exclamation mark. These black and white alternatives may be used when the operator's manual is published in black and white.

NOTE The general warning sign can be found on the ISO online browsing platform.

### 5.6.3 Signal words

The operator´s manual shall explain the meaning of signal words (DANGER, WARNING, CAUTION per ISO 9244), if used in conjunction with safety messages in the operator's manual or on machine safety labels on the machine. The meaning of other signal words not associated with safety messages, such as NOTICE and IMPORTANT, shall also be explained, if used in the operator's manual.

NOTE For translations of the signal words refer to ISO 3864-2.

### 5.6.4 Safety messages

Information shall be given regarding hazards and precautions to help avoid or minimize the effect of hazards associated with the following aspects of machine use:

— preparation for use;

— normal operation and service;

— clearing blockages and cleaning;

— transport;

— maintenance and adjustment;

— preservation and storage.

Safety messages that are specific to particular hazards shall appear in the pertinent sections of the operator's manual and shall precede the functional instructions to which they apply. These messages may also be included in the safety section.



### 5.6.5 Machine safety labels

The operator's manual shall indicate the location and content of machine safety labels and other instructions that appear on the machine. The machine safety labels may be shown in black and white when the operator's manual is published in black and white. Figure 2 illustrates an example.

Information shall be provided regarding all machine safety labels that are affixed to the machine. This information shall include the following:

— reproduction of the machine safety labels, in legible size;

— location of the machine safety labels on the machine;

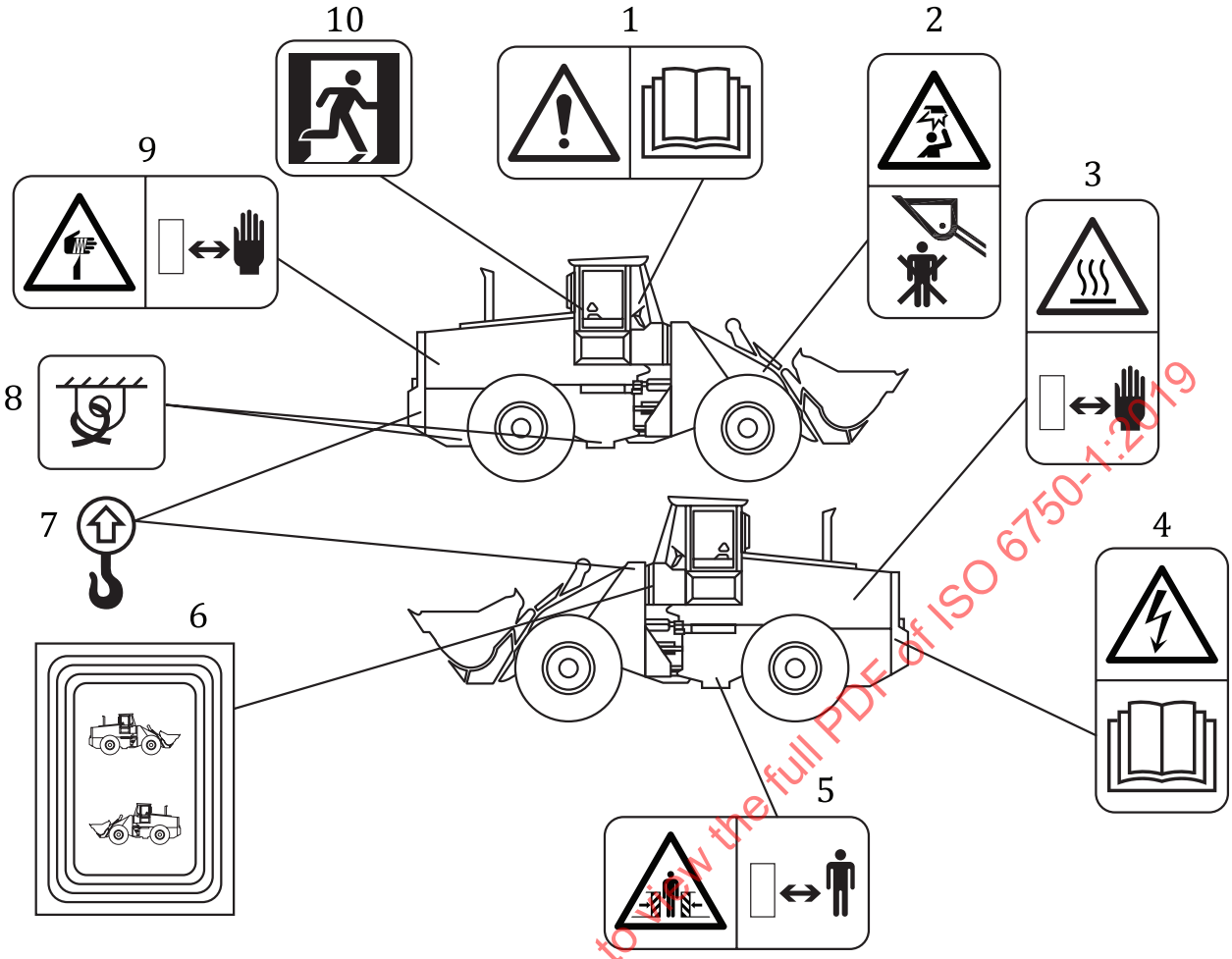
— explanation of meaning of the machine safety labels, in particular if the machine safety label does not contain a written message;

— instruction to keep the machine safety labels clean and visible;

— instruction to replace machine safety labels, if they are missing or illegible;

— instruction regarding affixing machine safety labels to spare parts, as applicable;

— information on how to obtain replacement machine safety labels.




**Key**

1 general warning (ISO 7010-W001) – read operator's manual (ISO 7000-0790)
2 overhead crushing hazards (ISO 7010-W020 + supplementary signs)
3 hot surfaces (ISO 7010-W017 + supplementary signs)
4 electrical hazard (ISO 7010-W012) – read operator's manual (ISO 7000-0790)
5 crushing hazard (ISO 7010-W019 + supplementary signs)
6 lubrication and service chart
7 lifting attachment points (ISO 7000-1368)
8 tying down attachment points (ISO 7000-2069)
9 cutting hazard (ISO 7010-W022 + supplementary signs)
10 emergency exit (ISO 7010-W002)

NOTE Symbols and instructions can be added as applicable.

**Figure 2 — Example of reproduction and indication of location and content of machine safety labels and other instructions**

## 5.7 Operation

### 5.7.1 General

The operator's manual shall provide the operator with instructions for the intended use and reasonably foreseeable misuse of the machine. The operating instructions shall furnish important rules and advice in respect to:

a) inspecting the machine before use to ensure that maintenance and safety related elements are in proper order;

b) reading and understanding the instructions on how to use the machine;

c) properly adjusting and cleaning visibility aids (e.g. mirrors, cameras) and ensuring that visibility is not impaired;

d) inspecting the operator protective structures [e.g. ROPS (roll-over protective structure)] and seat belt system if the machine is so equipped;

e) inspecting and using all necessary safety equipment related to the operation of the machine;

f) checking of control devices;

g) being alert for malfunctions;

h) needing to be trained adequately according to, for example ISO 7130;

i) taking appropriate measures with respect to the machine work site and personnel;

j) understanding the use of fire extinguishers or other emergency equipment on the machine;

k) using the machine on slopes or in confined areas.

### 5.7.2 Controls and displays

Illustrations and descriptions shall be provided for all controls and displays, including:

— location relative to the operator's position;

— purpose, function, and mode of operation;

— explanation of any symbols used.

### 5.7.3 Operating instructions

Information shall be provided for proper operation of the machine or equipment, including, as applicable:

— pre-start instructions;

— instructions for starting, stopping, and shutdown, including emergency procedures, if applicable;

— operation of all functions, including any adjustments made during normal operation.

## 5.8 Troubleshooting

Information shall be provided for fault diagnosis and remedy of problems in normal operation, as applicable to an operator.

## 5.9 Maintenance and adjustments

### 5.9.1 General

Information shall be provided on those maintenance tasks that the operator is expected to carry out based on the required qualification profile for operators. Tasks that require any particular expertise, specialized knowledge, or tools shall be identified. Those tasks shall be clearly qualified as to be performed by a qualified service technician.

Maintenance and adjustments that the operator is expected to carry out shall be specified as follows:

— information on each individual task, and recommended intervals;

— identification of specialized tools if applicable;

— identification of any test equipment;

— spare parts, including specification of fuels, lubricants, and coolants, together with quantities or capacities;

— other services required.

A tabular or graphical presentation of periodic maintenance and adjustments is recommended.

If the maintenance instructions use symbols, then those symbols shall be in accordance with ISO 6405-1 or ISO 6405-2 unless the required instruction is not covered by a symbol for either of these standards. In the latter case, ISO 7000 should be consulted for potentially applicable symbols.

The maintenance section of the operator's manual shall include the safety rules related to the maintenance and adjustments work on the machine. It shall include information on interference that would affect the warranty of the machine.

### 5.9.2 Precautions prior to maintenance

The instructions shall be given so that the machine shall be placed on a level surface and in a "servicing position". The instructions include the following:

— connecting the articulated framework (if any),

— lowering the equipment on the ground or in the case the machine has raised equipment, e.g. lift arms, dumper bodies, these shall be locked by mechanical means,

— applying the parking brake,

— stopping the engine and removing the ignition key (if any),

— releasing stored energy in hydraulic and electrical systems,

— blocking the wheels,

— disconnecting the battery, if necessary, and

— attaching a warning tag to the instrument panel to inform other service staff of ongoing maintenance.

### 5.9.3 Maintenance instructions for the operator

Further to what is stipulated in 5.9.1, this section of the operator's manual shall include safety rules applicable when the operator is checking and attending to maintenance of the machine. The manual shall state that the operator shall have sufficient knowledge and training to perform maintenance. If considered required, the operator shall be advised to use personal protective equipment.

Items for periodic maintenance shall be identified.

## 5.10 Spare parts list

The spare parts list can be provided in a separate document. However, the operator's manual shall identify those parts that are subject to wear and tear and that need to be in place in order to protect the health and safety of the operator (e.g. seat belt assembly, machine safety label, removable guards).

## 5.11 Preservation and storage

### 5.11.1 General

This section of the operator's manual shall provide the operator with instructions and information, precautions to be taken, and any tools or special equipment required, to prepare the machine for long-term as well as for short-term storage. Storage requirements, supplies and services needed, periodic inspections, tests, limitations of storage life, storage temperatures, etc., shall be explained.

NOTE Short-term storage covers periods up to two months and long-term storage covers periods exceeding two months (see ISO 6749).

### 5.11.2 Prior to long-term storage

The operator's manual shall include the following instructions to be completed before long-term storage:

— wash the machine and touch up the paint finish to avoid rusting;

— treat exposed parts with anti-rust agent, lubricate the machine thoroughly and apply grease to unpainted surfaces such as lifting and tilting cylinders. Retract the hydraulic cylinders as far as possible (if appropriate);

— inflate the tyres to the recommended tyre pressure as described in the operator's manual;

— fill or drain fluids such as aqueous urea solution (Diesel Exhaust Fluid, DEF), lubricants, hydraulic fluids, coolants and water in tanks as recommended by the manufacturer;

— check the anti-freeze properties, if applicable;

— cover the exhaust pipe, if applicable (to prevent water or objects from intruding into the exhaust system).

### 5.11.3 After long-term storage

Procedures for preparing the machine for use after its long-term storage shall be specified according to ISO 6749.

## 5.12 End of service life information

Operator's manual should contain information relating to handling, recycling or disposal of the machine after it is no longer needed.

If the machine contains any hazardous substance, or if any hazardous substance is supplied together with the machine, the necessary information on its constituents and the correct disposal procedure should be given with due regard to safety and legal requirements.

Operator's manual should include information about waste disposal and environmental considerations.

## 5.13 Specifications — Machine technical data

Operator's manual shall specify all major data relating to the functioning of the machine. At a minimum the following technical data of the machine shall be specified, as applicable, using the terms defined in this document:

— electrical system (battery, bulbs, fuses, etc.);

— cab ROPS, TOPS (tip-over protective structure), FOPS (falling-object protective structure) or operator guards, protective structures, heating and ventilation, operator seat, and if tested according to applicable standards;

— machine capacity with relevant drawings as applicable for, for example, lift height; reach; overall length; maximum height; clearance circle; tipping load; load capacity (payload); permissible load on front, rear, and bogie axles; excavating depth; machine and operating mass; ground speed (determined in accordance with ISO 6014); turning dimensions (determined in accordance with ISO 7457) with different attachments and equipment where applicable;

NOTE See definition of dimensions and codes in ISO 6746-1 for the base machine, in ISO 6746-2 for the equipment and attachments; see also ISO/TS 9250-1 and ISO/TS 9250-2.

— fluid capacity when changing/filling and total volume in, for example, engine including filter; transmission and torque converter including filter; front/rear axles including hub reduction gears; hydraulic systems; hydraulic tank; fuel tank; aqueous urea solution (Diesel Exhaust Fluid, DEF) tank; cooling system; water tank; oil-bath pre-cleaner and air-pressure vessel capacity.

# Annex A
(normative)

# Basic information for inclusion in operator's manual

The operator's manual shall cover the following basic information items.

NOTE In certain regional/national contexts, these are indispensable for regulatory compliance.

a) machine description (e.g. description of the information of the machine data plate);

b) if applicable, the essential contents of the declaration of conformity (e.g. as required within the specific markets such as the European Union);

c) descriptions of the instrumentation and the operator's controls;

d) instructions for adjustment and maintenance of the operator's seat;

e) information on whether personal protective equipment is necessary;

f) relevant safe operation technical data (e.g. brake slope capability, wear limit indicators, maximum grade that the machine is allowed to climb);

g) instructions that operators fully acquaint themselves with the operator's manual before operating the machine;

h) description of the hazard zone around the machine and instructions that all unauthorized persons be kept outside the hazard zone during operation;

i) safety instructions concerning the stability of the machine including its attachments and a warning that all rated operating capacities or rated lift capacities are based on the criteria of the machine being level on a firm supporting ground. Instructions that, when the machine is operated in conditions that deviate from these criteria (e.g. on soft or uneven ground, on a slope or when subject to side loads), these conditions shall be considered by the operator;

j) information on the machine configuration and the setting of any safety devices to ensure stability when travelling, if applicable;

k) instructions on the position of the control to lower the attachment. Also, instructions on procedures to safely release residual or stored energy;

l) safety precautions to determine whether special hazards exist in machine's applications, for example, toxic gases, ground (underfoot) conditions, contaminated areas that require special precautionary measures to reduce the risk to an acceptable level;

m) guidance for operation in areas where special hazards exist [e.g. lines (gas, electricity) in the ground; close to overhead electric lines; below ground in confined spaces];

n) safety precautions to minimize chemical hazards during operation, maintenance and dismantling of the machine;

o) the temperature range including humidity range, if needed, in which the machine is intended to operate;

p) guidance on the selection of the appropriate operator station ventilation filter elements and the proper disposal of the used ones;

q) guidance on the need for FOPS or operator guards and the selection of the level of FOPS or operator guards, where applicable;

r) guidance on the need for ROPS and the selection of TOPS/ROPS, where applicable;

s) operating instructions;

t) safety instructions for lifting operations, as applicable;

u) rated lift capacity charts shall be provided for machines configured for lifting operations as intended by the manufacturer;

NOTE There are, however, national provisions that set out restrictions on the use of earth-moving machinery in certain lifting activities, for example, prohibition to provide rated lift capacity charts.

v) instructions on secure locking of stabilisers, outriggers;

w) instructions on rubber tyres, their proper inflation procedures and pressure values, and the need to regularly have tyres visually checked for physical damage or wear;

x) instructions for retrieving, towing and transportation (e.g. clear indication of attachment points for retrieving and towing, respective attachment points for transportation, permissible forces, the correct use when towing as well as the maximum towing speed and distance);

y) safety instructions for lifting the machine, heavy attachment or parts of the machine;

z) safety instructions for maintenance, repair, assembling, dismantling and transportation;

aa) if applicable, instructions on how to safely carry out maintenance operations that require the engine running or other machine power source activated;

ab) information about reuse/replacement of hoses/hose fittings;

ac) information that no alterations or repairs to a protective structure (e.g. ROPS, TOPS, FOPS) are permitted except where authorized by the manufacturer or according to the manufacturer's specifications;

ad) recommendations for specific tools and accessories, as required for periodic maintenance jobs;

ae) safety instructions for preservation and storage according to ISO 6749;

af) provisions for limiting proximity hazards;

ag) a warning not to transport or lift persons or goods with earth-moving machinery if the machinery is not designed and equipped for these purposes;

ah) information and instructions to ensure that the whole-body and hand/arm vibrations during machine use is minimized by:

— describing how to appropriately adjust the operator's seat according to the seat manufacturer's instructions,

— warning about the importance of preserving good ground conditions at the work site,

— warning about the intended use of the machine taking into account the actual ground conditions, and

— giving specific instructions for vibration effects resulting from the actual work to be done, for example, hammering, breaking, demolition.

ai) instructions and any necessary diagrams/schematics for the mounting of equipment and attachments, and related information such as masses and working circuit pressures;



aj) the identification of the spare parts to be used, when these affect the health and safety of operators, see 5.10;

ak) warning for ballasted tyres and instructions for safe handling, where applicable;

al) information on defined position for fire extinguisher, if applicable;

am) instructions on how to disconnect the battery;

an) instructions on how to start the engine using auxiliary starting aids;

ao) information on the location and capacity of the electric socket for lighting;

ap) diagrams showing areas of restricted visibility and information on the residual risk.

# Annex B
(informative)

# Presentation and format of the operator's manual — Recommendations

## B.1 General consideration

### B.1.1 General

This annex provides guidance on the presentation and format of operator's manual for earth-moving machinery.

Within each section of the operator's manual, the learning process demanded of the reader should, as far as possible, be broken down into a series of small steps. Building understanding in a continuous sequence can be reinforced by numbering operational steps and/or by referring the operator (at each step) to an illustration representing each action visually or its effect schematically. Each step should provide a single action.

Where possible (and particularly for assembly) the reader should be led to read a single instructional step, then perform it, appreciate the effect, then read the next step.

The function of information sections (for example, the description of the product or information about troubleshooting) should be readily identifiable and different types of information should be clearly identified. For procedural instructions, preconditions for the sequence of necessary steps should be given before the sequence of operation.

Instructions for use should be structured in a way that supports the correct use of the machine. General aspects should be described in an overview chapter, specific aspects in the relevant context.

The use of illustrations increases comprehensibility of operator's manual. An effective balance of text and illustrations is recommended. Illustrations should be provided with a unique number to which reference can be made in the text.

### B.1.2 Paper size

The preferred paper size is A4 (210 mm × 297 mm). Where appropriate, a different size book can be used, for example A5 (210 mm × 148 mm) or "letter size" [216 mm × 279 mm (8,5 inch × 11 inch)].

### B.1.3 Covers

The cover of the operator´s manual should have the same size as the pages of the operator´s manual and preferably be made of stiff, durable material resistant to oil, lubricants and water.

### B.1.4 Notes

One or two blank pages can be included at the back of the operator´s manual for notes on individual conditions.

### B.1.5 Inks

Inks used should be durable, water resistant, and smudge resistant.

## B.2 Presentation of the text

### B.2.1 General

The operator´s manual should be written in a style and language which can be readily understood by the operator. The operator´s manual should be available in the language of each country where the machine is sold.

### B.2.2 Style of text

The text of the operator's manual should be brief and simple and adapted to the category of operators who are expected to use the machine. Sentences should be short and direct.

Instructions should be positive and given in the imperative mood. Negative statements should be used sparingly.

## B.3 Typographic design

### B.3.1 Type size and font

The type size of the main text should not be less than 10 points. The font used should be clear and readable.

### B.3.2 Columns

Text on A4 format paper should usually be presented in two columns and that on A5 format paper in a single column.

### B.3.3 Headings

Headings should be used consistently throughout the operator´s manual. Headings should be in a larger type size than the text and in a bolder typeface or an alternative colour. To avoid confusing the reader, the number of levels should be kept to a minimum; normally three levels provide sufficient subdivision of topics.

## B.4 Text conventions

### B.4.1 General

Consistent forms of language spelling, numbering, symbols, etc. should be used throughout the operator´s manual.

### B.4.2 Terminology and dimensions

Dimensional drawings in accordance with ISO 6746-1 and ISO 6746-2 and terms in accordance with the relevant terminology or commercial specifications standards should be used consistently throughout the operator´s manual.

### B.4.3 Symbols

Graphical symbols for operator controls and displays should conform to ISO 6405-1 and ISO 6405-2. All terms and symbols should be defined.

### B.4.4 Upper case letters

Normal sentence case should be used for text. Words set in upper-case letters should be used sparingly. It is usually preferable to use bold lower-case letters to emphasize key words or phrases. When