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Self-propelled machinery for forestry — Laboratory tests and performance requirements for roll-over protective structures —

Part 2: Machines having a rotating platform with a cab and boom on the platform

Machines forestières automotrices — Essais de laboratoire et exigences de performance pour les structures de protection au retournement —

Partie 2: Machines ayant une tourelle d'orientation avec une cabine et une flèche sur la tourelle

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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.

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 8082-2 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 15, *Machinery for forestry*.

ISO 8082 consists of the following parts, under the general title *Self-propelled machinery for forestry — Laboratory tests and performance requirements for roll-over protective structures*:

— *Part 1: General machines*

— *Part 2: Machines having a rotating platform with a cab and boom on the platform*

Introduction

Earth-moving excavators used in cross-over applications involving sites with trees, but excluding forestry applications, are covered by ISO 12117-2. Because of the similarity between excavators and forestry machines having a rotating platform with a cab, a fixed cab riser and a boom on a platform, this part of ISO 8082 specifies test methods and procedures similar to those of ISO 12117-2 and ISO 3471.

Self-propelled machinery for forestry — Laboratory tests and performance requirements for roll-over protective structures —

Part 2: Machines having a rotating platform with a cab and boom on the platform

1 Scope

This part of ISO 8082 establishes a consistent and reproducible means of evaluating the load-carrying characteristics of roll-over protective structures (ROPS) on self-propelled forestry machines under static loading, and gives performance requirements for a representative specimen under such loading. It is applicable to machines configured as forestry machines or defined as such in ISO 6814, having a rotating platform with a cab — with or without a fixed cab riser — and boom on the same or a separate platform, intended to be operated by an operator wearing a seat-belt.

It is not applicable to forestry machines with elevating cabs. [1)]

2 Normative references

The following referenced documents are indispensable for the application 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 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs with specified property classes — Coarse thread and fine pitch thread*

ISO 898-2, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 2: Nuts with specified property classes — Coarse thread and fine pitch thread*

ISO 3164, *Earth-moving machinery — Laboratory evaluations of protective structures — Specifications for deflection-limiting volume*

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

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

ISO 6814, *Machinery for forestry — Mobile and self-propelled machinery — Terms, definitions and classification*

1) The roll-over behaviour of such machines needs more study.

3 Terms and definitions

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

3.1
bedplate
substantially rigid part of the test fixtures to which the machine frame is attached for the purpose of the test

[ISO 12117-2]

3.2
boundary plane
BP
plane defined as the vertical projected planes of the back, side and knee area of the DLV

NOTE The boundary plane is used to determine the load application zone.

[ISO 12117-2]

3.3
deflection-limiting volume
DLV
orthogonal approximation of a large, seated, male operator as defined in ISO 3411 wearing normal clothing and a protective helmet

[ISO 8082-1]

3.4
deflection of ROPS
movement of the ROPS, mounting system and frame section as measured at the load application point, excluding the effect of any movement of the test fixture(s)

[ISO 12117-2]

3.5
elevating cab
additional means for raising and lowering the cab relative to the rotating platform

3.6
fixed cab riser
additional structure that changes the height position of the cab relative to the rotating platform and which is considered a ROPS structural member

3.7
lateral simulated ground plane
LSGP
for a machine coming to rest on its side, the plane 15° away from the DLV about the horizontal axis within the plane established in the vertical plane passing through the outermost point of the ROPS

See Figure 1.

NOTE 1 The LSGP is established on an unloaded ROPS and moves with the member to which the load is applied while maintaining its 15° angle with respect to the vertical.

NOTE 2 Adapted from ISO 8082-1:2009, definition 3.5.1.

3.8
locating axis
LA
horizontal axis for positioning the DLV with respect to the seat index point (SIP)

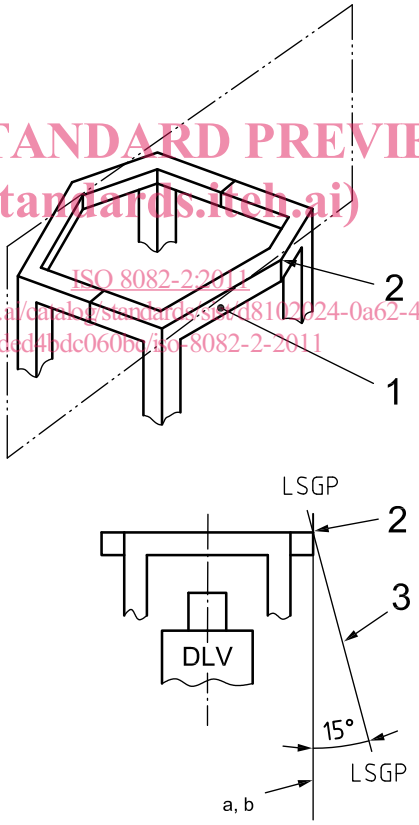
[ISO 3164]

3.9
load application point
LAP
point on the ROPS structure where the test load force (F) is applied

[ISO 12117-2]

3.10
load distribution device
LDD
device used to prevent localized penetration of the ROPS members at the load application point

[ISO 12117-2]



Key
1 upper ROPS member to which the lateral load is applied
2 outermost point from the end view of ROPS member (1)
3 lateral simulated ground plane (LSGP)
a vertical line passing through the point (2)
b vertical plane parallel to the machine longitudinal centreline through line a

Figure 1 — Determination of lateral simulated ground plane (LSGP)

3.11
machine mass
m
maximum mass declared by the manufacturer, including attachments in the operating condition and with tools, ROPS and all reservoirs filled, but excluding towed equipment (e.g. chippers, planters, discs) and any load that could be carried on the machine

[ISO 8082-1]

3.12
operator protective structure
OPS
system of structural members arranged in such a way as to minimize the possibility of operator injury from penetrating objects (such as whipping saplings, branches and broken winch lines)

[ISO 8082-1]

3.13
representative specimen
ROPS, mounting hardware and machine/rotating platform (complete or partial and including elements connecting the ROPS to the frame) used for test purposes that is within the range of material and manufacturing variances designated by the manufacturer's production specifications

NOTE 1 The intent is that all ROPS manufactured to these specifications are capable of meeting or exceeding the stated levels of performance.

NOTE 2 Adapted from ISO 12117-2:2008, definition 3.17.

3.14
roll-over protective structure
ROPS
system of structural members whose primary purpose is to reduce the possibility of a seat-belted operator being crushed should the machine roll-over

[ISO 8082-1]

NOTE These structural members include any sub-frame, bracket, mounting, socket, bolt, pin, suspension or flexible shock absorber used to secure the system to the machine rotating platform.

3.15
ROPS structural member
member designed to withstand applied force and/or absorb energy

NOTE 1 This may include components such as sub-frame, bracket, fixed cab riser, mounting, socket, bolt, pin, suspension or flexible shock absorber.

NOTE 2 Adapted from ISO 12117-2:2008, definition 3.20.

3.16
socket
S
test component that allows unrestricted point loading of the load distribution device (LDD)

[ISO 3471]

3.17
rotating platform
structural member(s) of the machine to which the ROPS is permanently attached during normal operation

NOTE For the purposes of this part of ISO 8082, all bolt-on and normally detachable components may be removed from the rotating platform. It is necessary only that this frame constitute a replication of the rotating platform as it attaches to the top of the rotating bearing.

3.18
vertical projection of DLV
cross-sectional area of the column formed by vertically projecting the outside corners of the deflection-limiting volume (DLV), excluding the foot section

NOTE Adapted from ISO 12117-2:2008, definition 3.25.

4 Symbols

U energy absorbed by the structure, related to the manufacturer's declared machine mass (m), expressed in joules (J)

F load force, expressed in newtons (N)

m machine mass, expressed in kilograms (kg)

L length of the ROPS, expressed in millimetres (mm):

— For ROPS with cantilevered load-carrying structural members, L is the longitudinal distance from the outer surface of the ROPS post(s) to the outer surface of the furthest cantilevered load-carrying members, if applicable, at the top of the ROPS. See Figures 2 and 7.

— For ROPS without cantilevered load-carrying structural members, L is the distance between the front and rear surface of the ROPS post. It is not necessary for the ROPS structural members to cover the complete vertical projection of the DLV.

— For multiple-post ROPS, L is the greatest longitudinal distance from the outer surface of the front to the outer surface of the rear posts. See Figure 2.

— For ROPS with curved structural members, L is defined by the intersection of plane A with the outer surface of the vertical member at Y. Plane A is the bisector of the angle formed by the intersection of planes B and C. B is the tangent line at the outer surface parallel to plane D. Plane D is the plane intersecting the intersections of the curved ROPS members with the adjacent members. Plane C is the projection of the top surface of the upper ROPS structural member. See Figure 3.

W width of ROPS, expressed in millimetres:

— For ROPS with cantilevered load-carrying structural members, W is that portion of the cantilevered load-carrying members that covers at least the vertical projection of the width of the DLV, as measured at the top of the ROPS from the outside faces of the cantilevered load-carrying members. See Figures 2 and 8.

— For all other ROPS, W is the greatest total width between the outside of the left and right ROPS posts, as measured at the top of the ROPS from the outside faces of the load-carrying members. See Figure 2.

— For ROPS with curved structural members, W is defined by the intersection of plane A with the outer surface of the vertical member at Y. Plane A is the bisector of the angle formed by the intersection of planes B and C. B is the tangent line at the outer surface parallel to plane D. Plane D is the plane intersecting the intersections of the curved ROPS members with the adjacent members. Plane C is the projection of the top surface of the upper ROPS structural member. See Figure 3.