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Rough-terrain trucks — Safety requirements and verification —

Part 7:
Longitudinal load moment systems

Chariots tout-terrain — Exigences de sécurité et vérification —

Partie 7: Systèmes longitudinaux de moment de charge

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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 10896-7 was prepared by Technical Committee ISO/TC 110, *Industrial trucks*, Subcommittee SC 4, *Rough-terrain trucks*.

ISO 10896 consists of the following parts, under the general title *Rough-terrain trucks — Safety requirements and verification*:

— *Part 1: Variable-reach trucks*

— *Part 2: Slewing variable-reach trucks*

— *Part 4: Additional requirements for variable-reach trucks handling freely-suspended loads*

— *Part 5: Interface between rough-terrain truck and integrated personnel work platform*

— *Part 6: Tilting operator's cab*

— *Part 7: Longitudinal load moment systems*

Safety requirements and verification for lorry-mounted trucks are to form the subject of future ISO 20297-1.

Introduction

This International Standard is one of a set of standards produced by ISO/TC 110/SC 4 as part of its program of work regarding standardization of terminology, general safety, performance and user requirements for rough-terrain trucks (hereafter also referred to as trucks).

This document is a type-C standard as stated in ISO 12100.

Rough-terrain trucks — Safety requirements and verification —

Part 7: Longitudinal load moment systems

1 Scope

This part of ISO 10896 specifies design, safety and verification requirements for longitudinal load moment systems which can be used on rough-terrain trucks (hereafter referred to as trucks). This standard provides the requirements for both the longitudinal load moment indicator (hereafter referred to as LLMI) and the longitudinal load moment control (hereafter referred to as LLMC) used on rough-terrain trucks, defined in ISO 10896-1, in a stationary position performing loading or placing functions on consolidated, stable and level ground.

It is not applicable to:

— lorry-mounted trucks as defined in ISO 20297-1[1];

— slewing variable-reach trucks as defined in ISO 10896-2[2].

This document deals with significant hazards, hazardous situations or hazardous events relevant to longitudinal load moment systems when used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer.

This standard does not cover the risk due to lateral instability, or instability due to the travelling of the truck. The longitudinal load moment system is not intended for warning of the overturning risk whilst the truck is travelling.

This document is not applicable to longitudinal load moment systems manufactured before the date of its publication.

2 Normative references

The following referenced documents, in whole or in part, are normatively referenced in 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 10896-1, Rough-terrain trucks — Safety requirements and verification — Part 1: Variable-reach trucks

ISO 12100:2010, Safety of machinery — General principles for design — Risk assessment and risk reduction

ISO 13849-1:2015, Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design

IEC 60529, Degrees of protection provided by enclosures (IP Code)

1) To be prepared.

2) Under preparation.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100, ISO 10896-1 and the following apply.

3.1
longitudinal load moment
sum of the moments in the longitudinal plane forward of the tipping line (e.g., wheels, stabilisers) produced by the load, the attachment and the lifting means of the truck

3.2
longitudinal load moment indicator
<LLMI>
device that warns the operator of a change to the load handling geometry which would increase the longitudinal load moment beyond pre-determined limit(s)

3.3
longitudinal load moment control
<LLMC>
device that prevents the operator changing the load handling geometry in direction(s) which would increase the longitudinal load moment beyond the allowable limit(s)

3.4
load handling geometry
relationship of points, lines and angles, described by the position of the load centre of gravity (the position of the boom, carriage and attachment) and tipping line (front wheels or stabilisers – if equipped)

4 Safety requirements and/or protective/risk reduction measures

4.1 General

Machinery shall comply with the safety requirements and/or protective/risk reduction measures of this clause.

In addition, the machine shall be designed according to the principles of ISO 12100:2010 for relevant but not significant hazards which are not dealt with by this document.

4.2 Longitudinal load moment systems

4.2.1 General

4.2.1.1 Longitudinal load moment systems shall comply with the safety requirements and/or measures of this clause for all rated capacities and all configurations described in the operating manual supplied by the truck manufacturer.

4.2.1.2 Longitudinal load moment systems shall be designed taking the following into account:

— the operating environment, e.g. relative humidity, temperature, condensation, dust;

— the truck rated capacity;

— electromagnetic compatibility;

— maintenance activities (e.g., steam cleaning, power washing).

4.2.1.3 The dynamic loading resulting from the operation of the LLMC shall be taken into consideration in the truck design.

4.2.1.4 Longitudinal load moment systems shall be capable of withstanding the shock loads and vibrations transmitted to them during normal usage and maintenance of the truck.

4.2.1.5 Painting or other corrosion protection shall not affect the correct functioning of limiters and indicators.

4.2.1.6 Where a truck can be operated in different configurations, wheels, or stabilising devices, the proper selection of correct longitudinal load moment system settings for the actual configuration shall be automatic (i.e., the operator not being required to provide input to the LLMC settings).

Note This requirement does not cover the interchange of attachments fitted on the load carriage.

4.2.2 Protection against modification of the calibration setting

All adjustments affecting the calibration settings of the longitudinal load moment system shall be so designed that it can only be carried out by authorised persons (e.g., using a special tool, a dedicated key, sequence of operations).

4.2.3 Verification of the correct function

Verification of the correct function of the longitudinal load moment system shall be possible without any special tools. If a special procedure is required, this procedure shall be described in the operator manual.

Longitudinal load moment systems shall enable periodic functional checks to be carried out for verification that systems are operating correctly.

4.2.4 Warning and prevention

The longitudinal load moment system shall function in accordance with this standard for all combination of attachments and motions of the load handling means and attachments authorised by the manufacturer.

4.2.5 Malfunction of the longitudinal load moment system

Any malfunction or functional damage of any part of the system shall be indicated to the operator until the fault is rectified (i.e., continuous illumination of warning lamps, or continuous buzzer or both).

4.2.6 Additional Requirements for Protection

In addition to requirements in ISO 10896-1:2012, clause 4.4.2, the components of the longitudinal load moment system which are exposed to harsh conditions shall:

— be designed or guarded to minimize this exposure;

— have a minimum degree of protection corresponding to IP67 in accordance to IEC 60529 when components are directly exposed to the environment.

4.2.7 Electrical

4.2.7.1 Power supply

The power supply shall be protected against voltage variations and surges, supply voltage reversal, overloading, short circuit, and earth faults.

In case of power supply failure, the longitudinal load moment LLMC system shall either continue to function correctly or default to a fail-safe mode.