

Electrical Hoist Equipment

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Certification Specifications for European Technical Standard Orders (CS-ETSO)

Amendment 17

31 August 2022¹¹ For the date of entry into force of this Amendment, please refer to Decision 2022/018/R at the [Official Publication](#) of EASA.**ETSO-2C208**

ED Decision 2022/018/R

ELECTRICAL HOIST EQUIPMENT**1 Applicability**

This ETSO provides the requirements for electrical hoist equipment that is designed and manufactured on or after the date of this ETSO.

To be eligible for the ETSO, the hoist equipment shall be equipped with an overload protection device.

Hoist equipment includes the hoist itself, load attachment means (cable, hook, etc.), control and monitoring interfaces, a structural interface to attach the hoist to the boom/rotorcraft structure and the overload protection device. The boom itself is not considered to be a part of the hoist equipment.

Electrical hoist equipment designed in accordance with this ETSO must be identified with the applicable ETSO marking.

This hoist ETSO covers articles which are intended to be operated in the complete range of possible hoist missions.

2 Procedures**2.1 General**

The applicable procedures are detailed in CS-ETSO, Subpart A.

2.2 Specific

None.

3 Technical Conditions**3.1 Basic****3.1.1 Minimum Performance Standard**

The applicable standard for hoist equipment is provided in SAE Aerospace Standard (AS) 6342, Minimum Operation Performance Standard for Helicopter Hoist Systems, dated December 2020, as modified by Appendix 1 to this ETSO.

Whenever the term 'hoist' is used in this SAE document, it is equivalent to the hoist equipment.

3.1.2 Environmental Standard

See CS-ETSO, Subpart A, paragraph 2.1.

3.1.3 Software

See CS-ETSO, Subpart A, paragraph 2.2.

3.1.4 Airborne Electronic Hardware

See CS-ETSO, Subpart A, paragraph 2.3.

3.1.5 Development Assurance

See CS-ETSO, Subpart A, paragraph 2.4.

Hoist Usage Spectrum



Training



SAR



Harbour Piloting



Offshore Services

History of the Hoist ETSO

Starting Point: Occurrence in February 2013

During maintenance flight in 2013 a dummy load (552lb) was lost

- Root cause: overload clutch failure could not be excluded
- Further investigation revealed several design deficiencies
 - Several single load paths with catastrophic effect
 - The overload protection slip point has high variability
 - The cable does not meet the current static and damage tolerance requirements
- EASA AD was issued to ensure continued safe operation of the hoist

Why the need of the hoist ETSO

- Current Hoist designs do not comply directly to the current CS 27/29
- The need to foster new hoist designs
- ETSO allows to work directly on Hoist design
- ETSOA is separated from installation approval and allows definition of clear perimeter between the hoist manufacturer and the hoist installer
 - manufacturer/installer risk-sharing → Requested by the Industry
- Supporting (European) newcomers such as REEL and Vincorion
- Competition of several hoist manufacturers will drive innovation and safety
- ETSO MOPS allow to set more precise performance targets for the Hoist itself the CS 27/29 requirements.



Hoist European Technical Standard Order (ETSO)

- SAE Working Group G-26 „Helicopter Hoists“
 - Developed a standard for hoists **with overload protection** (AS-6342)
 - Consisted of hoist manufacturers, OEMs, operators and Authorities
 - No consensus between Industry, FAA and EASA
 - SAE standard published in December 2020 without EASA agreement
 - SAE AS-6342 does not fulfil CS 27/29 requirements
- EASA has based the ETSO on the SAE AS6342 text
- ETSO has amended AS6342 to be in line with current CS 27/29

Main changes to SAE document

- OLPD as stated in SAE does not fulfil CS 27/29 (Release of load below 2.5g)
- Adding structural requirements such as Critical Parts, Interaction systems and Structures...
- Reference to CS ETSO for Software and Airborne Electronic Hardware
- Limiting possibility of overriding mis-wrap protection
- Clarifying difference between endurance and fatigue
- Providing Clear Definitions

Hoist Equipment Definition

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This hoist ETSO covers articles which are intended to be operated in the complete range of possible hoist missions.

Precise definition

→ Hoist equipment

- A hoist is a device that exerts a vertical pull, usually through a cable and drum system (i.e., a pull that does not typically exceed a 30 degree cone).
- The hoist is equivalent to the hoist equipment.
- Hoist equipment includes the hoist itself, load attachment means (cable, hook, etc.), control and monitoring interfaces (including pendants, controllers and their interconnecting wires), a structural interface to attach the hoist to the boom/rotorcraft structure and the overload protection device. The boom itself is not considered to be a part of the hoist equipment.

→ Hoist system

- the hoist system includes the hoist equipment and other systems needed for integration to the rotorcraft and operation of the hoist.
- This includes but is not limited to, displays, controls within the cockpit and cabin, boom, rotorcraft wiring and the power supply.

Additions for Hoist System

Hoist Boom

Rotorcraft backup
structure

Boom/Rotorcraft
interface

Cockpit displays

Rotorcraft wiring

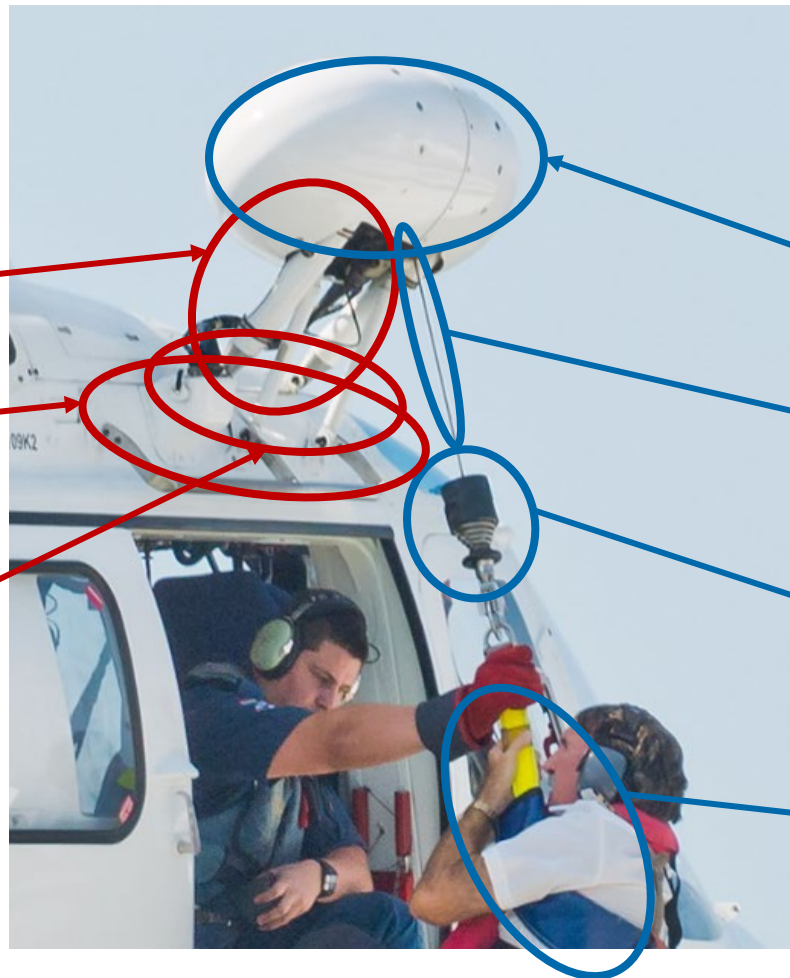
Hoist Equipment

Hoist itself

Cable / Rope

Hook /
Damper

PCDS



Overload Protection Device

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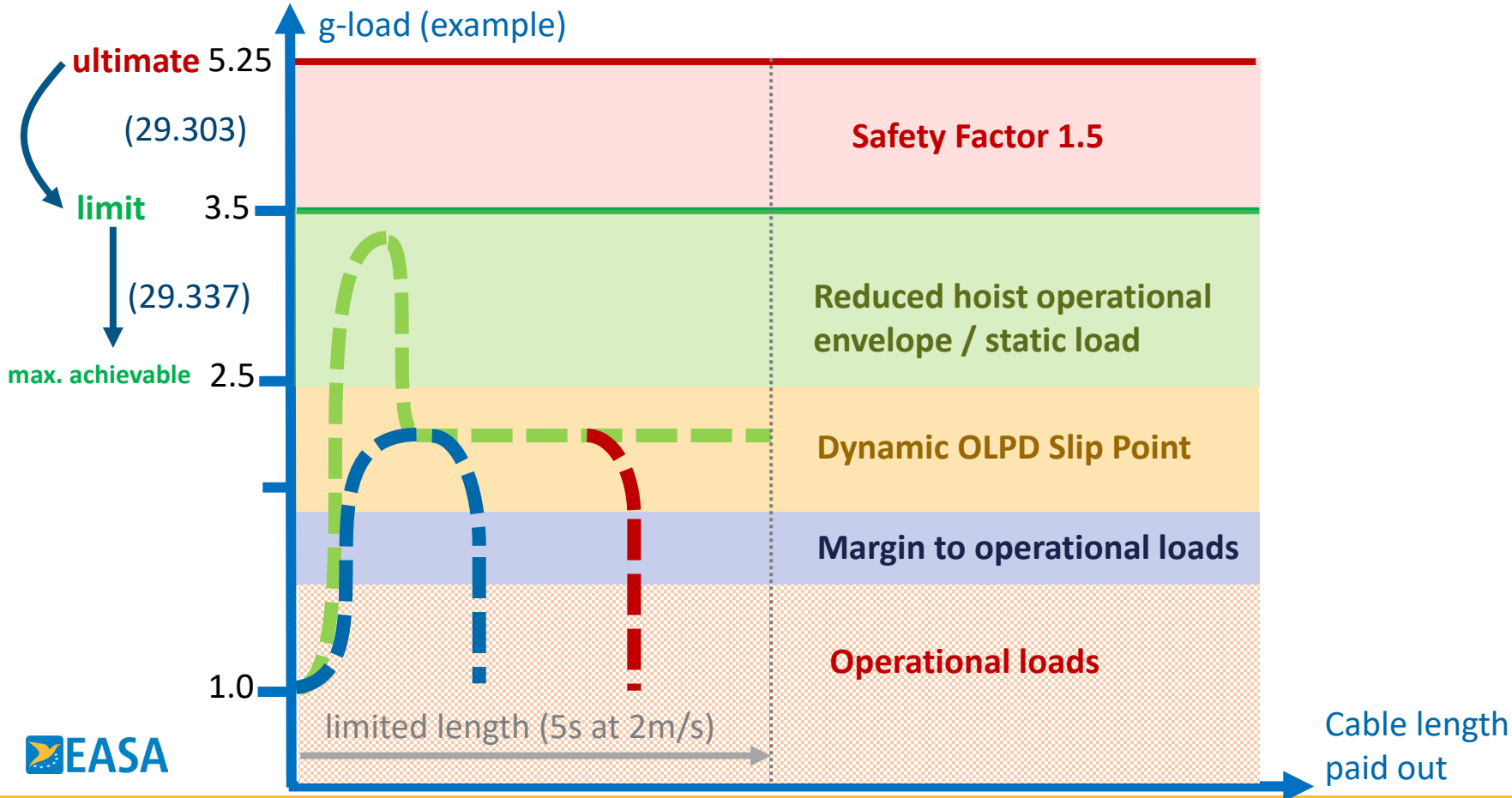
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Why mandatory OLPD

- Increases the reaction time for the pilot in case of entanglement to recover the rotorcraft
- Gives the pilot the necessary time to release the load, if necessary
 - The regulations assumes that the pilot needs 5 seconds to release the load
- Limits the energy in the cable in case of cable rebound
 - Cable could damage the main rotor in case of rebound and caus a catastrophic effect
- Introduces provisions for shock load damping

What does an OLPD?



Current Status

Next Generation Hoists

- EASA has been supporting the development of new hoists
- Currently several hoist certification projects are under investigation by EASA (STC or Major Changes)
- Next Gen hoists will be mandatory for new or recently certified rotorcraft



Reel Class Alpha Hoist



Collins Pegasus



Vincorion Skyhoist

Thank you for your attention

Any Questions?

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