

Certification Memorandum

CS 27/29.865 Safety considerations covering External Loads

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Regulatory requirement(s): CS 27.865; CS 29.865 and related AC material

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Log of issues

Issue	Issue date	Change description
001	25.07.2016	First issue.

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1. Introduction

1.1. Purpose and scope

The purpose of this Certification Memorandum is to provide specific guidance for new applications for carrying of external loads, for which the applicable regulations are CS 27/29.865 “External Loads”.

1.2. References

It is intended that the following reference materials be used in conjunction with this Certification Memorandum:

Reference	Title	Code	Issue	Date
CS 27.865	Certification Specifications for Small Rotorcraft => External loads	CS-27	Amendment 3	11/12/2012
CS 29.865	Certification Specifications for Large Rotorcraft => External loads	CS-29	Amendment 3	11/12/2012
FAA AC 27.865B	Certification of normal category rotorcraft => External Loads	AC 27	Change 2	25/07/2014
FAA AC 29.865	Certification of transport category rotorcraft => External Loads	AC 29	Change 2	25/07/2014

1.3. Abbreviations

AC	Advisory Circular
AMC	Acceptable means of Compliance
CM	Certification Memorandum
CS	Certification Specification
EASA	European Aviation Safety Agency
HEC	Human External Cargo
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
JAR	Joint Aviation Regulation
NHEC	Non-Human External Cargo

1.4. Definitions

HEC	The definition of HEC is in FAA AC 27/29.865: Human external cargo (HEC). A person(s) that at some point in the operation is carried external to the rotorcraft.
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NHEC The definition of NHEC is in FAA AC 27/29.865: Nonhuman external cargo (NHEC). Any external cargo operation that does not at any time involve a person(s) carried external to the rotorcraft

2. Background

The standards for external load attaching means related to large and small rotorcraft were originally contained in Subpart D, “Airworthiness Requirements” of 14 CFR Part 133, “Rotorcraft External-Load Operations”. 14 CFR Part 29 Amendment 29-12, issued in 1977, added a new § 29.865, which moved these standards from Part 133 to Part 29. An identical transfer occurred in 1977 for Part 27.

Since 1999 European certifications for external loads refer only to human external cargo –HEC– or non-human external cargo –NHEC– (introduced in JAR 27/29 adapting FAR Amendment 29-43 or 27-36). The rotorcraft load combinations in Part 133 (Class A – D) do not exist anymore.

The previously existing external loads AC 27/29 Miscellaneous Guidance (MG) 12 was revised at the time of AC 29-2C issuance (25.04.2006) to be incorporated into a new paragraph § AC 27/29.865B. The AC refers to potential failure modes of the hoist system. The European Aviation Safety Agency has performed a review of hoist service history and is aware of 44 incidents/accidents involving cable entanglement and 11 involving cable rebound (most cable rebounds followed entanglements) resulting in 12 fatalities and losses of hull.

This Certification Memorandum provides guidance to complement existing Acceptable Means of Compliance related to the current CS 27/29.865.

3. EASA Certification Policy

3.1. EASA Policy

In accordance with the existing AC 27/29.865, all potential failure modes of the hoist system which may result in catastrophic failures, serious injuries, or fatalities should be shown to be extremely improbable. In making this assessment, the following failure modes, among others, should be addressed:

- overload, e.g. due to entanglement, manoeuvring or shock load,
- sudden structural failure in overload condition,
- rebound (also called backlash or spring up) of the cable following rupture.

Quick Release Systems alone are not considered to be sufficient to prevent an overload due to the delay induced by pilot/operator reaction times, e.g. if an entanglement is not immediately recognized or if entangled on a heaving ship.

Any overload protection system is considered to be part of the rotorcraft external load attaching means for compliance with CS 27/29.865 (a) and thus should not allow the hoist to unspool below 2.5 times the rated load.

The operating limitations that may result from compliance to CS 27/29.865, e.g. weight or fleet angle, and other information necessary for safe operation must be made available to the crew members.

In addition this Certification Memorandum seeks to improve future designs of external load attachment means by recommending that the use of single load paths which, after failure, could have a Catastrophic or Hazardous effect is minimised. Some current designs have a high number of such load paths which should be reduced in future applications to a minimum necessary to fulfil the intended function. An appropriate level of rigour should be applied in the design of external load attachment means, commensurate with the quantitative and qualitative safety objectives.

EASA intends to apply the above considerations to all new applications.



3.2. Who this Certification Memorandum affects

This Certification Memorandum affects applicants (Rotorcraft TC holders, STC holders), who need to demonstrate compliance with CS 27.865 and CS 29.865 concerning External Loads. It also affects External load attaching means suppliers such as hoist suppliers who may use the guidance in this CM as part of their design processes.

4. Remarks

1. Suggestions for amendment(s) to this EASA Certification Memorandum should be referred to the Certification Policy and Safety Information Department, Certification Directorate, EASA. E-mail CM@easa.europa.eu.
2. For any question concerning the technical content of this EASA Certification Memorandum, please contact:

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