Notification of a Proposal to issue a Certification Memorandum

CS 27/29.865 Safety considerations covering External Loads

EASA Proposed CM No.: Proposed CM–HS-004 Issue 01 issued 03 May 2016

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

In accordance with the EASA Certification Memorandum procedural guideline, the European Aviation Safety Agency proposes to issue an EASA Certification Memorandum (CM) on the subject identified below.
All interested persons may send their comments, referencing the EASA Proposed CM Number above, to the e-mail address specified in the "Remarks" section, prior to the indicated closing date for consultation.

EASA Certification Memoranda clarify the European Aviation Safety Agency's general course of action on specific certification items. They are intended to provide guidance on a particular subject and, as non-binding material, may provide complementary information and guidance for compliance demonstration with current standards. Certification Memoranda are provided for information purposes only and must not be misconstrued as formally adopted Acceptable Means of Compliance (AMC) or as Guidance Material (GM). Certification Memoranda are not intended to introduce new certification requirements or to modify existing certification requirements and do not constitute any legal obligation.

EASA Certification Memoranda are living documents into which either additional criteria or additional issues can be incorporated as soon as a need is identified by EASA.

Log of issues

Issue	Issue date	Change description
001	03.05.2016	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” and CS 27/29.1309 “Equipment, systems, and installations”.

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
CS 27.1309	Certification Specifications for Small Rotorcraft => Equipment, systems, and installations	CS-27	Amendment 3	11/12/2012
CS 29.1309	Certification Specifications for Large Rotorcraft => Equipment, systems, and installations	CS-29	Amendment 3	11/12/2012
FAA AC 27.1309	Certification of normal category rotorcraft => Equipment, systems, and installations	AC 27	Change 2	25/07/2014
FAA AC 29.1309	Certification of transport category rotorcraft => Equipment, systems, and installations	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.
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. Since this time this existing AC 27/29.865 was further discussed for potential improvements. This task was given to an External Loads Sub-group (AMC Revision 2012; Task No.: 27&29.029) involving representatives from FAA, EASA, NAAs and manufacturers.

Failure of the external load attaching means may lead to severe consequences, possibly resulting in fatalities on the ground and/or to persons being hoisted. Although in some instances there could be no effect at aircraft level, the loss of function to hold the load was usually determined to be Catastrophic for HEC and Major for NHEC. To better protect persons on the ground, and to compensate for the low NHEC function criticality, operational restrictions were applied (e.g. no flight over populated areas). However, these restrictions are not practicable for, for example, persons involved in the operation attaching loads to the hook and may not be taken into consideration during the safety assessment in the means of compliance with CS 27/29.1309.

This Certification Memorandum provides guidance to complement existing Acceptable Means of Compliance related to the current CS 27/29.865, in line with the draft AC material agreed within the External Loads Sub-group, by applying the agreed reliability values for all new External Loads applications. It reflects the ongoing development in EASA in adequately addressing the safety of persons not belonging to the crew or as passengers. The safety of such persons is now being taken into account when determining the criticality of an external load function.

This Certification Memorandum also seeks to improve future external loads attachment means by detailing certain failure modes that need to be considered and recommending that the number of critical single load paths is minimised.

3. EASA Certification Policy

3.1. EASA Policy

It is in EASA's position that risks to persons other than aircraft occupants should be taken into account when assessing the effects of failure conditions for compliance with CS 27/29.865.

Furthermore, the CS 27/29.865 External Loads Sub-group came to a consensus to reaffirm that the loss of HEC is a Catastrophic event in accordance with the safety objectives in section CS 27/29.1309 of the AC material and the evaluation of the loss of NHEC should be considered to be at least a Hazardous event because of the risk of the load hitting persons on the ground. According to this consensus a new CS 27/29.865 AMC is proposed to reflect this approach in the reliability part.

Furthermore, 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, rescue hoist & cargo hook suppliers who may use the guidance in this CM as part of their design processes.

4. Remarks

1. This EASA Proposed Certification Memorandum will be closed for public consultation on the **14th of June 2016**. Comments received after the indicated closing date for consultation might not be taken into account.

2. Comments regarding this EASA Proposed Certification Memorandum should be referred to the Certification Policy and Safety Information Department, Certification Directorate, EASA. E-mail CM@easa.europa.eu.

3. For any question concerning the technical content of this EASA Proposed Certification Memorandum, please contact:

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