Proposed Special Condition on Medical Evacuation- / Ambulance conversion and Temporary Stretcher installation configurations

Applicable to Large Aeroplane category

Issue 4

Introductory note:

The following Special Condition has been classified as an important Special Condition and as such shall be subject to public consultation, in accordance with EASA Management Board decision 12/2007 dated 11 September 2007, Article 3 (2.) of which states:

"2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency."

This proposed Special Condition was consulted before in August 2011 for Medical Evacuation configuration only. Consultation at Issue 4 adds elements for Ambulance Conversions and Temporary Stretcher installations.

Statement of Issue

Large Aeroplanes are frequently used in a Medical Evacuation- or Ambulance conversion configuration. The primary purpose of those flights is transport of patients. Airlines further supplement their cabins with /–Temporary Stretcher installations. The primary purpose of those flights is transporting passengers. -

All those configurations share several common design peculiarities not contained in JAR / CS-25 requirements. This Special Condition that was originally~~is~~ intended to address Medical Evacuation aircraft installations, is additionally offered by EASA to be used as guidance for the other types of installations such as Ambulance conversion- or Temporary Stretcher installation configurations. For reasons of simplicity, the text will remain to address Medical Evacuation only, with limited[1] additional clarifications as per revision marks.

Despite the above, it is generally considered that permanent installations such as Ambulance conversions will feature design solutions allowing full compliance with the products certification basis.

Whether an installation is “permanent” will be assessed by EASA on a case by case basis depending on the particular situation. As general guidance, applicants can assume that spending the majority of operating time in a Medical Evacuation / Ambulance configuration would be considered “permanent”.

[1] Please contact EASA as required for more guidance on particular subjects

Commented [A1]: →Air Medical Services

Commented [A2]: Most important clarifications, a Cert Memo is intended to be developed at a later stage

Some installations might have a considerable impact on ventilation (25.831) or rapid decompression (25.365). For the specific case of a Patient Transport Compartment, applicants are encouraged to contact EASA for additional information.

The conversion of the cabin of a large aeroplane from a standard airline layout into a configuration to be used in case of Medical Evacuation (Medevac) foresees the installation of certain number of stretchers to carry ~~passengers~~patients that could be incapacitated and/or non-ambulant. In some cases, a significant number of incapacitated ~~passengers~~patients could be carried on board.

The stretchers may directly be attached to the aeroplane seat tracks or be restrained to a support unit that is attached to the aeroplane structure. The stretchers and their support units are compliant with §25.561 but do not comply with §25.562. This should be considered during the selection of the installation position(s) to limit the risk to other passengers. Fitting stretchers close to bulky monuments will ~~eliminate~~mitigate the need to consider §25.562. Additional seats for medical attendants are however expected be qualified like passenger seats unless their use for Taxi, Take-off and Landing is prohibited. In case the seat installations feature additional adapters, early coordination with EASA is recommended.

According to Appendix J of JAR/FAR/CS 25, the evacuation demonstration required to comply with §25.803, does not address evacuation of incapacitated ~~passengers~~patients transported on a stretcher. For all large aeroplanes, compliance with §25.803 is demonstrated by ~~performing (or demonstrating similarity to)~~ an evacuation demonstration or by analysis, based on evacuation demonstrations, in which ~~no~~ stretcher installations ha~~ves ever~~ not been assessed. Therefore EASA expects the applicant to provide a concept of evacuation. This concept should include the number of able bodied~~s~~ persons involved in evacuation.

~~In general~~Based on past experience with the installations of ~~, all~~ medical evacuation configurations, EASA has identified the following areas that may not be in full compliance:

~~may foresee areas that are not compliant with~~ §25.785(j), i.e. do not provide to passengers/crew members a means to steady themselves in case of turbulence (firm handhold), ~~and with~~

§25.785(h)(2), i.e. the existing ~~installed~~ cabin crew~~attendant~~ seats in the changed environment ~~are~~ may be ~~not~~ installed so that cabin ~~attendants~~ crew may have no direct view of ~~the~~ all cabin areas~~cabin~~ during TT&L.

~~Medevac configurations may also not be compliant with~~

§25.1447(c)(1) e.g. if stretchers are installed on top of another. ~~In fact, i~~In case of cabin decompression, oxygen masks may not be automatically presented to the ~~passengers~~ patients ~~in~~ on the stretchers and life preservers might not be within easy reach of ~~occupants of the~~ stretcher~~s~~ occupants.

Installation of medical oxygen system provisions (e.g. pressure regulators) and or Lithium Batteries as part of the approved configuration require particular fire protection considerations, e.g. Fire Protection per §25.869. EASA will provide further information upon request.

Commented [A3]: Intention to attach the requirement on O2 Fire Haz Analysis

Applicants are generally encouraged to clearly segregate between installation provisions and parts of the approved configuration. It is understood that equipment may be brought on board together with the patient(s) and considered as loose items.

Commented [A4]: Loose items are outside EASA's competence

Finally, stretchers sometimes incorporate mattresses, which may not be compliant with the overall §25.853 flammability requirement upgrade introduced by the cushion flammability test (oil burner) per CS 25 Appendix F Part II.[1]

As JAR/FAR/CS 25 does not contain requirements that specifically address medical evacuation configurations, Special Conditions are needed to establish a level of safety compatible with that intended by the applicable airworthiness code.

Large Aeroplane category - Special Condition D-xx

- Medical evacuation configuration -

EASA considers that it is reasonable to assume that such ~~passengers~~patients will have reduced mobility and/or are in a reduced state of consciousness. This will impact on their ability to evacuate the aircraft unaided. Although compliance with §25.803 in the normal case assumes all passengers are fully able to themselves evacuate the cabin such an assumption has questionable validity in the case of the subject design.

Commented [A5]: More complex substantiation in case more than one quick installation stretcher per aisle (already indicated 2016)

Designs incorporating temporarily a low number (typically no more than two) of stretchers into airliner cabins primarily used to transport passengers have been approved in the past on the assumption that able bodies persons will be requested to assist in the evacuation of the stretcher occupants and that in doing so the risk that they will endanger either themselves or other occupants is limited. The large number of stretchers in some of the medical evacuation layouts ~~of the subject design change application~~ and the correspondingly relatively low number of seated occupants no longer supports this assumption. It can only be concluded that, in certain cases, evacuation of stretcher borne occupants will be significantly slower than that of other cabin occupants.

The fact that some stretcher occupants will not have

- automatic access to supplemental oxygen in the event of a cabin depressurisation,
- and/or will not have a life preserver within easy reach,
- and/or movement around the cabin will not be aided by the normally expected provision of firm handholds in all areas
- and/or the reduced cabin attendant "direct view" (ref. §25.785(h)(2))

are four additional examples where safety is compromised in comparison to the conventional passenger operations envisaged by JAR/FAR/CS25.

However, EASA appreciates that aeroplane cabins are configured for the medical evacuation of a considerable number of critically ill ~~passengers~~patients who depend on rapid repatriation. The number of flights made with such cabin configurations is assumed to be relatively low.

After consideration of all the above, EASA agrees that practicable design solutions which would remove the above safety concerns are limited. Requiring literal compliance

[1] Refer to **Note** at the end of the Special Condition

~~This~~ may lead to reducing the maximum number of stretchers allowed on the aircraft. This reduction would presumably result in more flights with an increase of the probability of an emergency evacuation of the aeroplane ~~being required~~.

The provision of automatically presented oxygen masks for stretcher occupants whilst not impossible would be difficult to achieve when more than one stretcher is installed on the same support module (i.e. the lower stretcher occupant cannot make use of the PSU located masks). Improved firm handhold provisions and cabin attendant direct view of the cabin during taxi, take-off and landing would similarly be possible but not easy, and bearing in mind the characteristics of the intended operations (i.e. supervision by medical personnel familiar with the cabin interior) this would likely provide small additional safety.

Having considered the benefit of evacuating injured or critically sick people from areas where, for many different reasons, their health and/or safety is at high risk, EASA is of the opinion that non-compliance with §25.803, §25.785(j), §25.785(h)(2), §2~~1~~5.1411(f), §25.1415(e) and §25.1447(c)(1), can be sufficiently compensated by showing compliance with the following Special Conditions :

a) In regards to seated occupants, each crew and passenger area must have emergency means to allow rapid evacuation in crash landings, with the landing gear extended as well as with the landing gear retracted, considering the possibility of the aeroplane being on fire. In regards to stretcher occupants, all practicable design precautions and operational procedures must be developed to facilitate evacuation without compromising the egress of cabin attendants and other passengers. Precautions may include features such as location relative to normal passenger seating and emergency exits, easy release of stretchers from their attachments to the a/c to enable patients to be stretcher borne to emergency exits, easily accessed patient restraint buckles to alternatively allow removal and direct carrying of patients, associated training/briefing procedures for attendants, etc. Proposed design precautions and procedures will be evaluated by the Agency for acceptability. An entry shall be made in an AFM supplement to define the procedure to be followed for the evacuation of the occupants of the stretchers.

b) In areas where closely spaced firm handholds cannot be easily provided as per §25.785(j), (e.g. along aisle portions where stretchers are installed) all practicable efforts must be taken to provide useable handholds to enable passengers to reach their designated seats. The proposed design will be evaluated by the Agency for acceptability. In all other areas where the cabin layout is similar to a standard airline layout (i.e. with seats installed on both sides of the aisle) firm handholds as normally expected for such seating areas must be provided.

c) To the extent practicable, without compromising proximity to a required floor level emergency exit, flight attendant seats must be located to face the cabin area for which the flight attendant is responsible.

d) The stowage provisions for life preservers described in §25.1415 must accommodate one life preserver for each occupant for which certification for ditching is requested. In the case of seated occupants, each life preserver must be within easy reach, whilst seated. For aeroplanes not certificated for ditching under §25.801 and not having approved life preservers for seated occupants, there must be an approved flotation means for each seated occupant. This means must be readily removable from the aeroplane. In the case of each stretcher occupants, regardless

of the fact that the aeroplane is certificated for ditching under §25.801, there must be a life preserver in a stowage location that enables an able bodied assistant to quickly locate it and hand it to the stretcher occupant. Operational procedures must be developed (e.g. pre-flight briefing to appropriate persons) to facilitate that such retrieval and distribution will occur.

e) If certification for operation above 7620 m (25 000 ft) is requested, there must be oxygen dispensing equipment meeting the following requirements (See AMC §25.1447(c)):

(1) There must be an oxygen dispensing unit compliant with §25.1443 (c) connected to oxygen supply terminals immediately available to each cabin occupant.

(2) If certification for operation above 9144 m (30 000 ft) is requested, the dispensing units providing the required oxygen flow must be automatically presented to the occupants of flight attendant and passenger seats and to occupants of the stretchers before the cabin pressure altitude exceeds 4572 m (15 000 ft) and the crew must be provided with a manual means to make the dispensing units immediately available in the event of failure of the automatic system. In case it is not practicable to have oxygen dispensing units automatically presented to all occupants of the stretchers, all efforts should be made to provide the safest alternative possible. In any case, dispensing units should be within easy reach of the occupants of the stretchers and should be such that they can be accessed and operated without assistance. Procedures must be developed to ensure assistance to the occupants of stretchers from cabin attendants as soon as it is reasonably practicable following a depressurisation of the cabin. The design of the dispensing units, any required pre-flight briefing, and/or cabin attendant training and assistance procedures must be substantiated and relevant information and limitations must be included in an AFM supplement.

(3) The total number of dispensing units and outlets must exceed the total number of seats and stretchers by at least 10%. The extra units must be as uniformly distributed throughout the cabin as practicable. (See AMC §25.1447(c)(1).)

f) As well as the entries discussed above, a supplement to the Aeroplane Flight Manual shall be developed containing a limitation stating that fare-paying passengers cannot be transported on the aeroplane.

Commented [A6]: Medevac: unacceptable additional risk for fare-paying passengers

~~In addition, a specific limitation must be indicated in the AFM to prohibit operation of the aeroplane with fare-paying passengers. [see already above]~~

For what concerns §25.562, the intention when the requirement was introduced was to provide an overall increased level of safety to passengers in a survivable accident. However stretchers for medical use were not considered when the requirements of §25.562 were defined. As a matter of fact, appropriate injury criteria for a non-ambulant person occupying a stretcher do not exist for the time being. For the above-mentioned reasons, JAA issued TGM/25/12 in order to exempt medical stretcher from §25.562. EASA considers the content of TGM/25/12 relevant to medical evacuation

configurations. Therefore EASA maintains the interpretation that JAR/FAR/CS §25.562 is not applicable to stretchers.

This is further supported as per CS-25 Amendment 13. At time of this CS-25 amendment, EASA added the following text to CS 25.785(b):
[...] *However, berths intended only for the carriage of medical patients (e.g. stretchers) need not comply with the requirements of CS 25.562.*

It is understood that the stretchers must provide an adequate restraining means for the occupant, taking into consideration the applicable ground and flight loads in addition to the requirements of CS §25.561. Moreover, the stretcher design must take into account the protection of other passengers, e.g. it must foresee appropriate padding of exposed protuberances, etc.

EASA, considering the cushion function of the stretcher mattress, requires the stretcher mattress to comply also with CS §25.853(c), and therefore successfully pass flammability testing of Part II of Appendix F on JAR 25.[1]

It should be noted also that other dimensional requirements related to passageways, width of aisle, and exit size remain applicable without additional provisions for passage of stretcher or highly incapacitated occupant.

Note :
Regarding the compliance with §25.853(c) ~~, and in anticipation of EASA rulemaking activities on flammability requirements, in previous consultations~~ EASA reiterate~~d~~s the policy to require CS §25.853(c), and therefore successfully pass flammability testing of Part II of Appendix F on JAR/FAR/CS 25 for stretcher mattresses. Since EASA was made aware that existing designs for stretcher mattresses vary widely in terms of compliance with this requirement, EASA ~~can~~ agreed to an implementation timeframe of 18 months counted from the end of the Special Condition Issue 3 final publication date which was 8.August 2011.

Commented [A7]: Oil burner test

[1] Refer to **Note** at the end of the Special Condition