



THE NETHERLANDS MILITARY AVIATION REGULATIONS

Military Certification Specifications for Occupant Safety of Large Transport Rotorcraft

NLD-MCS-OS 29

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Preamble

Background

The first issue of the Military Certification Specifications for Occupant Safety for Large Transport Rotorcraft, NLD-MCS-OS 29, is based on the scope of the JAR-29 Amendment 3 requirements originally listed in Airworthiness Directive Occupant Safety (AD-OS) MAA-NLD 12-001, Table 2 “Occupant Safety requirements for CH-47D and AS532-U2”, plus the requirements JAR 29.562, JAR 29.865 and JAR 29.1359, also at Amendment 3.

This NLD-MCS-OS 29 supersedes AD MAA-NLD 12-001.

Future amendments to NLD-MCS-OS 29 will be documented in this Preamble.

In 2012, the Military Aviation Authority The Netherlands (MAA-NLD) issued an Airworthiness Directive Occupant Safety (AD-OS) MAA-NLD 12-001 to establish, amongst others, the formal certification requirements regarding occupant safety for Dutch military large transport aircraft. The requirements consisted of a subset of the civil certification requirements per JAR-25 Change 15 for aeroplanes and a subset of the civil certification requirements per JAR-29 Amendment 3 for rotorcraft. Equivalent sets of FAR-25 and FAR 29 requirements were also provided.

The AD-OS has been used to support Cabin Safety Improvement Programs (CSIMP) to improve occupant safety in specific types of Dutch military large transport aeroplanes and rotorcraft. This has led to the identification of various non-compliances with the minimum certification requirements listed in the AD-OS. Subsequently, those non-compliances have been processed as Certification Review Items (CRI).

Some of the conclusions from the CRIs are considered by the MAA-NLD to be not only relevant for the specific aircraft for which the CRIs were initiated, but also for new to be certified Dutch military large transport aircraft. This is the case when these conclusions result from specific military needs not considered in the civil requirements. Therefore, the MAA-NLD has decided to update the requirements referred to in the AD-OS in line with the relevant conclusions of the CRIs and issue them, for rotorcraft, as the Military Certification Specifications for Occupant Safety for Large Transport Rotorcraft NLD-MCS-OS 29 (this document). CRIs for rotorcraft as well as for aeroplanes were taken into account based on the applicability of the subject.

NLD-MCS-OS 29 must be used when establishing the type certification base for a Dutch military large transport rotorcraft for which the certification project for the initial MTC is applied for after the date of entry in to force of this NLD-MCS-OS 29. Use of NLD-MCS-OS 29 is not mandatory for certification of changes to existing MTCs. Changes to existing MTCs may be based on the existing type certification base stated on the MTCDS of the type, except for significant changes.

As stated above, the NLD-MCS-OS 29 is based on requirements taken from JAR 29 Amendment 3 which became effective on 1-4-2002. When a new Dutch military large transport rotorcraft is introduced that has previously been certified by a recognized authority against a more recent civil type certification base, the amendment level of that more recent civil type certification base should be maintained in the type certification base for the MTC. Where the requirements in the NLD-MCS-OS 29 are adapted for military use (presented in [blue text](#), see under ‘Presentation’), it must be determined per requirement how this will be implemented in the type certification base. Any deviations in the type certification base relative to the requirements in NLD-MCS-OS 29 must be agreed with the MAA-NLD in a CRI-process.

This NLD-MCS-OS 29 includes Acceptable Means of Compliance (AMC) that are related to changes in the certification requirements relative to the original civil certification requirements. In addition, some AMC are provided to state specific MAA-NLD policy in cases where the original civil requirements themselves were not changed. However, if not in conflict, the Acceptable Means of Compliance as published by EASA and FAA for the original civil certification requirements may be used too. For each certification project the means of compliance are subject to agreement with the MAA-NLD.

Presentation

The format of this NLD-MCS-OS 29 is primarily based on the format of JAR-29 Amendment 3, including naming and numbering conventions and paragraph numbering. Subparagraph numbering is maintained to the extent practical.

Each paragraph number and subject in this NLD-MCS-OS 29 corresponds with the same paragraph number and subject in JAR 29, Amendment 3. It should be noted that using this NLD-MCS-OS 29 in combination with other civil certification codes of different origin (e.g. CS, FAR) or amendment level could result in mismatches in (sub)paragraph numbers and subjects.

Text in Section 2, 3 and 4 which is identical to the corresponding JAR-29 paragraphs is written in black. Text in Section 2, 3 and 4 which is altered based on CRIs and new insights, is written in blue.

References to JAR-29 paragraphs refer to JAR 29 Amendment 3.

Definitions and abbreviations of terms used in this NLD-MCS-OS 29 are contained in NLD-MAD-1.

Section 1 – General

NLD-MCS-OS 29.1 Entry into force

This NLD-MCS-OS 29 version 1.0 enters into force starting 1 August 2025.

NLD-MCS-OS 29.2 Applicability

(a) This NLD-MCS-OS 29 –

- (1) Prescribes airworthiness requirements for the issue of military type certificates, and changes to those certificates, for transport helicopters with a maximum weight greater than 3175 kg (7000 lbs) or certified in at least one configuration to carry more than 10 occupants excluding the pilot(s);
- (2) Is limited to airworthiness requirements regarding Occupant Safety only. This also applies for the generic requirements (e.g. NLD-MCS-OS 29.602), which only apply within the context of the specific Occupant Safety requirements in this NLD-MCS-OS 29.

Section 2 – Airworthiness requirements

- SUBPART C – STRENGTH REQUIREMENTS

- - EMERGENCY LANDING CONDITIONS

NLD-MCS-OS 29.561 General

- (a) The rotorcraft, although it may be damaged in emergency landing conditions on land or water, must be designed as prescribed in this paragraph to protect the occupants under those conditions.
- (b) The structure must be designed to give each occupant every reasonable chance of escaping serious injury in a crash landing when –
 - (1) Proper use is made of seats, belts, and other safety design provisions;
 - (2) The wheels are retracted (where applicable); and
 - (3) Each occupant and each item of mass inside the cabin that could injure an occupant is restrained when subjected to the following ultimate inertial load factors relative to the surrounding structure ([See AMC-OS 29.561\(b\)\(3\)](#)):
 - (i) Upward – 4 g
 - (ii) Forward – 16 g
 - (iii) Sideward – 8 g
 - (iv) Downward – 20g, after the intended displacement of the seat device
 - (v) Rearward – 1.5 g.
 - (4) If the combined transport of occupants and cargo in the same compartment is to be allowed, or when evacuation routes are routed through a cargo compartment, the following applies:
 - (i) Adequate tie-down provisions shall be installed in the compartment to restrain the cargo to the following ultimate inertial load factors relative to the surrounding structure:
 - (A) Upward – 4 g, applicable only to configurations with evacuation routes for passengers positioned over the cargo, otherwise 3 g
 - (B) Forward – 8 g, applicable only to configurations with passengers or evacuation routes for passengers positioned forward of the cargo, otherwise 4 g
 - (C) Sideward – 8 g, applicable only to configurations with passengers or evacuation routes for passengers positioned sideward of the cargo, otherwise 3 g
 - (D) Rearward – 2 g.
 - (ii) The Flight Manual, or equivalent document, must include or reference ultimate inertial load factors for the restraint of cargo for the condition with

passengers present in that compartment and for the condition without passengers present in that compartment (See AMC-OS 29.561(b)(4)).

- (c) The supporting structure must be designed to restrain under any ultimate inertial load factor up to those specified in this paragraph, any item of mass above and/or behind the crew and passenger compartment that could injure an occupant if it came loose in an emergency landing. Items of mass to be considered include, but are not limited to, rotors, transmission and engines. The items of mass must be restrained for the following ultimate inertial load factors:
- (1) Upward – 1.5 g
 - (2) Forward – 12 g
 - (3) Sideward – 6 g
 - (4) Downward – 12 g
 - (5) Rearward – 1.5 g.
- (d) Any fuselage structure in the area of internal fuel tanks below the passenger floor level must be designed to resist the following ultimate inertia factors and loads, and to protect the fuel tanks from rupture, if rupture is likely when those loads are applied to that area:
- (1) Upward – 1.5 g
 - (2) Forward – 4.0 g
 - (3) Sideward – 2.0 g
 - (4) Downward – 4.0 g.

NLD-MCS-OS 29.562 Emergency landing dynamic conditions

(See AMC-OS 29.562)

- (a) The rotorcraft, although it may be damaged in a crash landing, must be designed to reasonably protect each occupant when –
- (1) The occupant properly uses the seats, safety belts, and shoulder harnesses provided in the design; and
 - (2) The occupant is exposed to loads equivalent to those resulting from the conditions prescribed in this paragraph.
- (b) Each seat type design or other seating device approved for crew or passenger occupancy during take-off and landing must successfully complete dynamic tests or be demonstrated by rational analysis based on dynamic tests of a similar type seat in accordance with the following criteria. The tests must be conducted with an occupant simulated by an anthropomorphic test dummy (ATD), sitting in the normal upright position. The weight of the ATD must reflect the occupant weight as agreed with the MAA-NLD in NLD-MCS-OS 29.785(f).
- (1) A change in downward velocity of not less than 9.1 metres per second (30 ft/s) when the seat or other seating device is oriented in its nominal position with respect to the rotorcraft's reference system, the rotorcraft's longitudinal axis is canted upward 60°, with respect to the impact velocity vector, and the rotorcraft's

lateral axis is perpendicular to a vertical plane containing the impact velocity vector and the rotorcraft's longitudinal axis. Peak floor deceleration must occur in not more than 0.031 seconds after impact and must reach a minimum of 30 g.

- (2) A change in forward velocity of not less than 12.8 metres per second (42 ft/s) when the seat or other seating device is oriented in its nominal position with respect to the rotorcraft's reference system, the rotorcraft's longitudinal axis is yawed 10°, either right or left of the impact velocity vector (whichever would cause the greatest load on the shoulder harness), the rotorcraft's lateral axis is contained in a horizontal plane containing the impact velocity vector, and the rotorcraft's vertical axis is perpendicular to a horizontal plane containing the impact velocity vector. Peak floor deceleration must occur in not more than 0.071 seconds after impact and must reach a minimum of 18.4 g.
- (3) Where floor rails or floor or sidewall attachment devices are used to attach the seating devices to the airframe structure for the conditions of this paragraph, the rails or devices must be misaligned with respect to each other by at least 10° vertically (i.e. pitch out of parallel) and by at least a 10° lateral roll, with the directions optional, to account for possible floor warp.

(c) Compliance with the following must be shown:

- (1) The seating device system must remain intact although it may experience separation intended as part of its design.
- (2) The attachment between the seating device and the airframe structure must remain intact, although the structure may have exceeded its limit load.
- (3) The ATD's shoulder harness strap or straps must remain on or in the immediate vicinity of the ATD's shoulder during the impact.
- (4) The safety belt must remain on the ATD's pelvis during the impact.
- (5) The ATD's head either does not contact any portion of the crew or passenger compartment, or if contact is made, the head impact does not exceed a head injury criteria (HIC) of 1000 as determined by this equation.

$$HIC = (t_2 - t_1) \left[\frac{1}{(t_2 - t_1)} \int_{t_1}^{t_2} a(t) dt \right]^{2.5}$$

Where $a(t)$ is the resultant acceleration at the centre of gravity of the head form expressed as a multiple of g (the acceleration of gravity) and $t_2 - t_1$ is the time duration, in seconds, of major head impact, not to exceed 0.05 seconds.

- (6) Loads in individual shoulder harness straps must not exceed 7784 Newtons (1750 pounds). If dual straps are used for retaining the upper torso, the total harness strap loads must not exceed 8896 Newtons (2000 pounds).
 - (7) The maximum compressive load measured between the pelvis and the lumbar column of the ATD must not exceed 6674 Newtons (1500 pounds).
- (d) An alternate approach that achieves an equivalent or greater level of occupant protection, as required by this paragraph, must be substantiated on a rational basis.

NLD-MCS-OS 29.563 Structural ditching provisions

If certification with ditching provisions is requested, structural strength for ditching must meet the requirements of this paragraph and [NLD-MCS-OS 29.801\(e\)](#).

- (a) *Forward speed landing conditions.* The rotorcraft must initially contact the most critical wave for reasonably probable water conditions at forward velocities from zero up to 30 knots in likely pitch, roll, and yaw attitudes. The rotorcraft limit vertical descent velocity may not be less than 1.52 metres per second (5 ft/s) relative to the mean water surface. Rotor lift may be used to act through the centre of gravity throughout the landing impact. This lift may not exceed two-thirds of the design maximum weight. A maximum forward velocity of less than 30 knots may be used in design if it can be demonstrated that the forward velocity selected would not be exceeded in a normal one-engine-out touchdown.
- (b) *Auxiliary or emergency float conditions*
 - (1) *Floats fixed or deployed before initial water contact.* In addition to the landing loads in sub-paragraph (a) of this paragraph, each auxiliary or emergency float, or its support and attaching structure in the airframe or fuselage, must be designed for the load developed by a fully immersed float unless it can be shown that full immersion is unlikely. If full immersion is unlikely, the highest likely float buoyancy load must be applied. The highest likely buoyancy load must include consideration of a partially immersed float creating restoring moments to compensate the upsetting moments caused by side wind, unsymmetrical rotorcraft loading, water wave action, rotorcraft inertia, and probable structural damage and leakage considered under [NLD-MCS-OS 29.801\(d\)](#). Maximum roll and pitch angles determined from compliance with [NLD-MCS-OS 29.801\(d\)](#) may be used, if significant, to determine the extent of immersion of each float. If the floats are deployed in flight, appropriate air loads derived from the flight limitations with the floats deployed shall be used in substantiation of the floats and their attachment to the rotorcraft. For this purpose, the design airspeed for limit load is the float deployed airspeed operating limit multiplied by 1.11.
 - (2) *Floats deployed after initial water contact.* Each float must be designed for full or partial immersion prescribed in sub-paragraph (b)(1) of this paragraph. In addition, each float must be designed for combined vertical and drag loads using a relative limit speed of 20 knots between the rotorcraft and the water. The vertical load may not be less than the highest likely buoyancy load determined under paragraph (b)(1) of this paragraph.

- SUBPART D – DESIGN AND CONSTRUCTION

- - GENERAL

NLD-MCS-OS 29.601 General

- (a) The rotorcraft may have no design features or details that experience has shown to be hazardous or unreliable.
- (b) The suitability of each questionable design detail and part must be established by tests.

NLD-MCS-OS 29.602 Material

The suitability and durability of materials used for parts, the failure of which could adversely affect safety, must –

- (a) Be established on the basis of experience or tests;
- (b) Meet approved specifications that ensure their having the strength and other properties assumed in the design data; and
- (c) Take into account the effects of environmental conditions, such as temperature and humidity, expected in service.

NLD-MCS-OS 29.625 Fitting factors and visual inspection of attachments

For each fitting (part or terminal used to join one structural member to another) the following apply:

- (a) For each fitting whose strength is not proven by limit and ultimate load tests in which actual stress conditions are simulated in the fitting and surrounding structures, and that if it came loose could cause direct injury to the occupants, or penetrate fuel tanks or lines or cause fire or explosion hazard by damage to adjacent systems, or nullify any of the escape facilities provided after an emergency landing, a fitting factor of at least 1.15 must be applied to each part of –
 - (1) The fitting;
 - (2) The means of attachment; and
 - (3) The bearing on the joined members.
- (b) No fitting factor need be used –
 - (1) For joints made under approved practices and based on comprehensive test data (such as continuous joints in metal plating, welded joints, and scarf joints in wood); and
 - (2) With respect to any bearing surface for which a larger special factor is used.
- (c) For each integral fitting, the part must be treated as a fitting up to the point at which the section properties become typical of the member.

- (d) Each seat, berth, litter, safety belt and harness attachment to the structure, and each attachment to the structure concerning an item in the cabin that can be optionally installed, and that if it came loose could cause direct injury to the occupants, or penetrate fuel tanks or lines or cause fire or explosion hazard by damage to adjacent systems, or nullify any of the escape facilities provided after an emergency landing (see AMC-OS 29.625(d)), -
- (1) Must be shown by analysis, tests, or both, to be able to withstand the inertia forces prescribed in NLD-MCS-OS 29.561(b)(3) multiplied by a fitting factor of 1.33; and
 - (2) If the attachment is subject to wear and tear, a visual inspection as to its condition must be incorporated in the installation instructions of the concerning item. (See AMC-OS 29.625(d)(2))

- - PERSONNEL AND CARGO ACCOMMODATIONS

NLD-MCS-OS 29.783 Doors

- (a) Each closed cabin must have at least one adequate and easily accessible external door.
- (b) Each external door must be located, and appropriate operating procedures must be established, to ensure that persons using the door will not be endangered by the rotors, propellers, engine intakes, and exhausts when the operating procedures are used.
- (c) There must be means for locking crew and external passenger doors and for preventing their opening in flight inadvertently or as a result of mechanical failure. It must be possible to open external doors that are designated as emergency exits from inside and outside the cabin with the rotorcraft on the ground even though persons may be crowded against the door on the inside of the rotorcraft. The means of opening must be simple and obvious and so arranged and marked that it can be readily located and operated. (See AMC-OS 29.783(c))
- (d) There must be reasonable provisions to prevent the jamming of any external door in a minor crash as a result of fuselage deformation under the following ultimate inertial forces except for cargo or service doors not suitable for use as an exit in an emergency:
 - (1) Upward – 1.5 g
 - (2) Forward – 4.0 g
 - (3) Sideward – 2.0 g
 - (4) Downward – 4.0 g
- (e) There must be means for direct visual inspection of the locking mechanism by crew members to determine whether the external doors (including passenger, crew, service, and cargo doors) are fully locked. There must be visual means to signal to appropriate crew members when normally used external doors are closed and fully locked.
- (f) For outward opening external doors usable for entrance or egress, there must be an auxiliary safety latching device to prevent the door from opening when the primary latching mechanism fails. If the door does not meet the requirements of sub-paragraph (c) of this paragraph with this device in place, suitable operating procedures must be established to prevent the use of the device during take-off and landing.
- (g) If an integral stair is installed in a passenger entry door that is qualified as a passenger emergency exit, the stair must be designed so that under the following conditions the effectiveness of passenger emergency egress will not be impaired:
 - (1) The door, integral stair, and operating mechanism have been subjected to the inertial forces specified in sub-paragraph (d) of this paragraph, acting separately relative to the surrounding structure.
 - (2) The rotorcraft is in the normal ground attitude and in each of the attitudes corresponding to collapse of one or more legs, or primary members, as applicable, of the landing gear.

- (h) Non jettisonable doors used as ditching emergency exits must have means to enable them to be secured in the open position and remain secure for emergency egress in sea state conditions prescribed for ditching.
- (i) Doors that may be opened in flight must have a means for locking that door in the opened position during flight and for preventing their closure in flight inadvertently or as a result of mechanical failure.

NLD-MCS-OS 29.785 Seats, berths, safety belts and harnesses

(See AMC-OS 29.785)

- (a) Each seat, safety belt, harness, and adjacent part of the rotorcraft at each station designated for occupancy during take-off and landing must be free of potentially injurious objects, sharp edges, protuberances, and hard surfaces and must be designed so that a person making proper use of these facilities will not suffer serious injury in an emergency landing as a result of the inertial factors specified in [NLD-MCS-OS 29.561\(b\)](#) and dynamic conditions specified in [NLD-MCS-OS 29.562](#). (See [AMC-OS 29.785\(a\)](#))
- (b) Each occupant must be protected from serious head injury by a safety belt plus a shoulder harness that will prevent the head from contacting any injurious object except as provided for in [NLD-MCS-OS 29.562\(c\)\(5\)](#). (See [AMC-OS 29.785\(b\)](#))
- (c) Each occupant's seat must have a combined safety belt and shoulder harness with a single-point release. Each pilot's combined safety belt and shoulder harness must allow each pilot when seated with safety belt and shoulder harness fastened to perform all functions necessary for flight operations. There must be a means to secure belts and harnesses, when not in use, to prevent interference with the operation of the rotorcraft and with rapid egress in an emergency.
- (d) Deleted.
- (e) Each projecting object that would injure persons seated in the rotorcraft in normal flight must be padded.
- (f) Each seat and its supporting structure must be designed for an occupant weight as agreed with the MAA-NLD (see [AMC-OS 29.785\(f\)](#)) and shall consider the maximum load factors, inertial forces, and reactions between the occupant, seat, and safety belt or harness corresponding with the applicable flight and ground load conditions, including the emergency landing conditions of [NLD-MCS-OS 29.561\(b\)](#). In addition –
 - (1) Each pilot seat must be designed for the reactions resulting from the application of the limit pilot control forces; and
 - (2) The inertial forces prescribed in [NLD-MCS-OS 29.561\(b\)](#) must be multiplied by a factor of 1.33 in determining the strength of the attachment of –
 - (i) Each seat to the structure; and
 - (ii) Each safety belt or harness to the seat or structure.
- (g) When the safety belt and shoulder harness are combined, the rated strength of the safety belt and shoulder harness may not be less than that corresponding to the inertial forces specified in [NLD-MCS-OS 29.561\(b\)](#), considering the occupant weight as agreed under sub-paragraph (f), considering the dimensional characteristics of the restraint system installation, and using a distribution of at least a 60% load to the safety belt and at least a 40% load to the shoulder harness. If the safety belt is

capable of being used without the shoulder harness, the inertial forces specified must be met by the safety belt alone.

- (h) When a headrest is used, the headrest and its supporting structure must be designed to resist the inertia forces specified in NLD-MCS-OS 29.561, with a 1.33 fitting factor and a head weight, including helmet, as agreed with the MAA-NLD.
- (i) Each seating device system includes the device such as the seat, the cushions, the occupant restraint system, and attachment devices.
- (j) Each seating device system may use design features such as crushing or separation of certain parts of the seat in the design to reduce occupant loads for the emergency landing dynamic conditions of NLD-MCS-OS 29.562; otherwise, the system must remain intact and must not interfere with rapid evacuation of the rotorcraft.
- (k) For the purposes of this paragraph, a litter is defined as a device designed to carry a non-ambulatory person, primarily in a recumbent position, into and on the rotorcraft; Each berth or litter designed as part of the rotorcraft must be designed to withstand the load reaction of an occupant weight agreed under sub-paragraph (f) when the occupant is subjected to the forward inertial factors specified in NLD-MCS-OS 29.561(b). A berth or litter installed within 15° or less of the longitudinal axis of the rotorcraft must be provided with a padded end-board, cloth diaphragm, or equivalent means that can withstand the forward load reaction. A berth or litter oriented greater than 15° with the longitudinal axis of the rotorcraft must be equipped with appropriate restraints, such as straps or safety belts, to withstand the forward reaction.
In addition -
 - (1) The berth or litter must have a restraint system and must not have corners or other protuberances likely to cause serious injury to a person occupying it during emergency landing conditions; and
 - (2) The berth or litter attachment to the structure and the occupant restraint system attachments to the berth, litter or the structure must be designed to withstand the critical loads resulting from flight and ground load conditions and from the conditions prescribed in NLD-MCS-OS 29.561(b). The fitting factor required by NLD-MCS-OS 29.625(d) shall be applied
- (l) For structural provisions designed for installation of NATO standard litters complying with STANAG 2040 and STANAG 3204, the following applies:
 - (1) The Flight Manual must mention that the provisions are designed for use with NATO standard litters that comply with STANAG 2040 and STANAG 3204.
 - (2) The structural provisions must be designed to support a stretcher installation that complies with the strength and space requirements prescribed in STANAG 3204 when compatible stretchers with compatible stretcher safety harnesses are installed.
- (m) Floor seating positions do not need to comply with sub-paragraphs (a) to (j). If floor seating is to be allowed, the Flight Manual must contain the following data:
 - (1) A warning stating that occupants seated on the floor, also when restrained, are exposed to a higher risk of injuries in emergency landings and during flight manoeuvres and turbulence.
 - (2) A warning stating that only belts with single-point release may be used for floor seating.
 - (3) Identification of the fitting points that may be used for floor seating.

- (n) If the combined transport of occupants and cargo in the same compartment is to be allowed, the Flight Manual must include head strike envelope geometry data for any allowed seating position next to a cargo or baggage stowing position, taking into account the installed type of seat and occupant restraint system (See AMC-OS 29.785).

NLD-MCS-OS 29.787 Cargo and baggage compartments

- (a) Each cargo and baggage compartment must be designed for its placarded maximum weight of contents and for the critical load distributions at the appropriate maximum load factors corresponding to the specified flight and ground load conditions, except the emergency landing conditions of [NLD-MCS-OS 29.561](#).
- (b) There must be means to prevent the contents of any compartment from becoming a hazard by shifting under the loads specified in sub-paragraph (a) of this paragraph.
- (c) Under the emergency landing conditions of [NLD-MCS-OS 29.561](#), cargo and baggage compartments must –
- (1) Be positioned so that if the contents break loose they are unlikely to cause injury to the occupants or restrict any of the escape facilities provided for use after an emergency landing; or
- (2) Have sufficient strength to withstand the conditions specified in [NLD-MCS-OS 29.561](#), including the means of restraint and their attachments required by sub-paragraph (b) of this paragraph. Sufficient strength must be provided for the maximum authorised weight of cargo and baggage at the critical loading distribution.
- (d) If cargo compartment lamps are installed, each lamp must be installed so as to prevent contact between lamp bulb and cargo.

NLD-MCS-OS 29.801 Ditching

- (a) If certification with ditching provisions is requested, the rotorcraft must meet the requirements of this paragraph and [NLD-MCS-OS 29.807\(d\)](#), [NLD-MCS-OS 29.1411](#) and [NLD-MCS-OS 29.1415](#).
- (b) Each practicable design measure, compatible with the general characteristics of the rotorcraft, must be taken to minimise the probability that in an emergency landing on water, the behaviour of the rotorcraft would cause immediate injury to the occupants or would make it impossible for them to escape.
- (c) The probable behaviour of the rotorcraft in a water landing must be investigated by model tests or by comparison with rotorcraft of similar configuration for which the ditching characteristics are known. Scoops, flaps, projections, and any other factors likely to affect the hydrodynamic characteristics of the rotorcraft must be considered.
- (d) It must be shown that, under reasonably probable water conditions, the flotation time and trim of the rotorcraft will allow the occupants to leave the rotorcraft and enter the life rafts required by [NLD-MCS-OS 29.1415](#). If compliance with this provision is shown by buoyancy and trim computations, appropriate allowances must be made for probable structural damage and leakage. If the rotorcraft has fuel tanks (with fuel jettisoning provisions) that can reasonably be expected to withstand a ditching without leakage, the jettisonable volume of fuel may be considered as buoyancy volume.

- (e) Unless the effects of the collapse of external doors and windows are accounted for in the investigation of the probable behaviour of the rotorcraft in a water landing (as prescribed in sub-paragraphs (c) and (d) of this paragraph), the external doors and windows must be designed to withstand the probable maximum local pressures.

NLD-MCS-OS 29.803 Emergency evacuation

- (a) Each crew and passenger area must have means for rapid evacuation in a crash landing, with the landing gear –
- (1) extended; and
 - (2) retracted;
- considering the possibility of fire.
- (b) Passenger entrance, crew, and service doors may be considered as emergency exits if they meet the requirements of this paragraph and of [NLD-MCS-OS 29.805](#) to [NLD-MCS-OS 29.815](#).
- (c) Reserved.
- (d) Except as provided in sub-paragraph (e) of this paragraph, the rotorcraft must be tested in accordance with the requirements of Appendix A of this NLD-MCS-OS to demonstrate that the maximum allowed number of occupants, including the crew-members required by the operating rules, can be evacuated from the rotorcraft to the ground within 90 seconds, for each allowed configuration and each allowed cargo loading condition, using only the accessible side-of-fuselage and ramp emergency exits, if installed, and taking into account the following (see AMC-OS 29.803(d)):
- (1) The evacuation capacity of each individual emergency exit must be demonstrated by test with occupants wearing typical clothing (see AMC-OS 29.803(d)(1)); and
 - (2) Where any emergency exit is obstructed due to installation of equipment, it must be regarded as inoperable unless it can be cleared by an occupant in a simple and obvious manner and without requiring exceptional effort. The time required to clear the exit and the effects due to any remaining obstruction left must be taken into account in establishing the evacuation capacity of that emergency exit (see AMC-OS 29.803(d)(2)); and
 - (3) Placards must be installed that accurately state or illustrate the method of operation of devices needed for evacuation, if these cannot be considered simple and obvious by themselves. The placards must be displayed in a conspicuous place, and their adequacy must be shown by test; and
 - (4) Exits, other than ramp exits, must be grouped into exit pairs, where each pair consists of an exit on the left hand side and the nearest exit on the right hand side. Exits of an exit pair need not be diametrically opposite each other nor of the same size. However, the evacuation capacity allocated to the exit pair must be the lowest evacuation capacity of the two exits; and
 - (5) The allocated evacuation capacity for a ramp exit shall be the lowest of –
 - (i) The evacuation capacity established under point (1); and
 - (ii) 40 for ramp exits with dimensions equal to or larger than 2300 mm (90.5 inch) wide and 800 mm (31.5 inch) high, and

- (iii) 20 for ramp exits with smaller dimensions, and;
- (6) The maximum allowed number of occupants during taxi, take-off or landing in any compartment may not be higher than the sum of the under points (4) and (5) allocated evacuation capacities of the available exit pairs and the ramp exit, if installed, in that compartment (see AMC-OS 29.803(d)(6)); and
- (7) The maximum allowed number of occupants during taxi, take-off or landing in any compartment that has either only a single ramp exit or a single exit pair, may not be higher than 20 (see AMC-OS 29.803(d)(7)).
- (e) A combination of analysis and tests may be used to show that the rotorcraft is capable of being evacuated within 90 seconds under the conditions specified in [NLD-MCS-OS 29.803\(e\)\(d\)](#) if the [MAA-NLD](#) finds that the combination of analysis and tests will provide data, with respect to the emergency evacuation capability of the rotorcraft, equivalent to that which would be obtained by actual demonstration.
- (f) [Compliance with the time constraint of 90 seconds as stated in NLD-MCS-OS 29.803\(d\) is not applicable to medevac configurations for the evacuation of patients with reduced mobility. Otherwise, rapid evacuation of such patients must remain possible through simple and obvious means.](#)

NLD-MCS-OS 29.805 Flight crew emergency exits

- (a) For rotorcraft with passenger emergency exits that are not convenient to the flight crew, there must be flight crew emergency exits, on both sides of the rotorcraft or as a top hatch, in the flight crew area.
- (b) Each flight crew emergency exit must be of sufficient size and must be located so as to allow rapid evacuation of the flight crew. This must be shown by test.
- (c) Each exit must not be obstructed by water or flotation devices after a ditching. This must be shown by test, demonstration, or analysis.

NLD-MCS-OS 29.807 Passenger emergency exits

- (a) *Type.* For the purpose of this [NLD-MCS-OS-29](#), the types of passenger emergency exit are as follows:
 - (1) *Type I.* This type must have a rectangular opening of not less than 609.6 mm wide by 1.219 m (24 inches wide by 48 inches) high, with corner radii not greater than one-third the width of the exit, in the passenger area in the side of the fuselage at floor level and as far away as practicable from areas that might become potential fire hazards in a crash.
 - (2) *Type II.* This type is the same as Type I, except that the opening must be at least 508 mm wide by 1.12 m (20 inches wide by 44 inches) high.
 - (3) *Type III.* This type is the same as Type I, except that –
 - (i) The opening must be at least 508 mm wide by 914.4 mm (20 inches wide by 36 inches) high; and
 - (ii) The exits need not be at floor level.
 - (4) *Type IV.* This type must have a rectangular opening of not less than 482.6 mm wide by 660.4 mm (19 inches wide by 26 inches) high, with corner radii not

greater than one-third the width of the exit, in the side of the fuselage with a step-up inside the rotorcraft of not more than 736.6 mm (29 inches).

Openings with dimensions larger than those specified in this paragraph may be used, regardless of shape, if the base of the opening has a flat surface of not less than the specified width.

(b) *Deleted*

(c) *Passenger emergency exits; other than side-of-fuselage.*

- (1) There must be enough openings in the top, bottom, or ends of the fuselage to allow evacuation with the rotorcraft on its side; or
- (2) The probability of the rotorcraft coming to rest on its side in a crash landing must be extremely remote.

(d) *Ditching emergency exits for passengers.* If certification with ditching provisions is requested, ditching emergency exits must be provided in accordance with the following requirements and must be proven by test, demonstration, or analysis unless the emergency exits required by paragraph [NLD-MCS-OS 29.803\(d\)](#) already meet these requirements:

- (1) For rotorcraft that have a passenger seating configuration, excluding pilots seats, of nine seats or less, one exit above the waterline in each side of the rotorcraft, meeting at least the dimensions of a Type IV exit.
- (2) For rotorcraft that have a passenger seating configuration, excluding pilots seats, of 10 seats or more, one exit above the waterline in a side of the rotorcraft meeting at least the dimensions of a Type III exit, for each unit (or part of a unit) of 35 passenger seats, but no less than two such exits in the passenger cabin, with one on each side of the rotorcraft. However, where it has been shown through analysis, ditching demonstrations, or any other tests found necessary by the [MAA-NLD](#), that the evacuation capability of the rotorcraft during ditching is improved by the use of larger exits, or by other means, the passenger seat to exit ratio may be increased.
- (3) Flotation devices, whether stowed or deployed, may not interfere with or obstruct the exits.

(e) *Ramp exits.* A ramp exit is an exit at the rear end of the cabin near the centreline of the fuselage that can be used with the landing gear extended and with the landing gear retracted. Ramp exits need not be part of an exit pair.

(f) *Tests.* The proper functioning of each emergency exit must be shown by test.

NLD-MCS-OS 29.809 Emergency exit arrangement

- (a) Each emergency exit must consist of a movable door or hatch in the external walls of the fuselage and must provide an unobstructed opening to the outside.
- (b) Each emergency exit must be openable from the inside and from the outside.
- (c) The means of opening each emergency exit must be simple and obvious and may not require exceptional effort. ([See AMC-OS 29.809\(c\)](#))
- (d) There must be means for locking each emergency exit and for preventing opening in flight inadvertently or as a result of mechanical failure.

- (e) There must be means to minimise the probability of the jamming of any emergency exit in a minor crash landing as a result of fuselage deformation under the ultimate inertial forces in [NLD-MCS-OS 29.783\(d\)](#). (See [AMC-OS 29.809\(e\)](#))
- (f) [Each land-based rotorcraft emergency exit must have an approved rope, or its equivalent, if the exit threshold is more than 1.829 m \(6 ft\) above the ground –](#)
 - (1) With the rotorcraft on the ground and with the landing gear extended;
 - (2) With one or more legs or part of the landing gear collapsed, broken, or not extended; and
 - (3) [With the rotorcraft resting on its side, unless the probability of the rotorcraft coming to rest on its side in a crash landing is extremely remote.](#)
- (g) Deleted
- (h) Deleted
- (i) [If a rope, with its attachment, is used for compliance with sub-paragraph \(f\) of this paragraph, it must –](#)
 - (1) Withstand a 181.6 kg (400-pound) static load; and
 - (2) Attach to the fuselage structure at or above the top of the emergency exit opening, or at another approved location if the stowed rope would reduce the pilot's view in flight.

NLD-MCS-OS 29.811 Emergency exit marking

- (a) Each passenger emergency exit, its means of access, and its means of opening must be conspicuously marked for the guidance of occupants using the exits in daylight or in the dark. Such markings must be designed to remain visible for rotorcraft equipped for overwater flights if the rotorcraft is capsized and the cabin is submerged.
- (b) The identity and location of each passenger emergency exit must be recognizable from a distance equal to the width of the cabin.
- (c) The location of each passenger emergency exit must be indicated by a sign visible to occupants approaching along the main passenger aisle. There must be a locating sign –
 - (1) Next to or above the aisle near each floor emergency exit, except that one sign may serve two exits if both exits can be seen readily from that sign; and
 - (2) On each bulkhead or divider that prevents fore and aft vision along the passenger cabin, to indicate emergency exits beyond and obscured by it, except that if this is not possible the sign may be placed at another appropriate location.
- (d) [Each passenger emergency exit marking and each locating sign –](#)
 - (1) [Must have white letters on a red background, or vice versa. Alternatively, markings in yellow on a black background, or vice versa, may be used.](#)
 - (2) [Must be self or electrically illuminated, and have a minimum luminescence \(brightness\) of at least 160 micro lamberts.](#)

- (3) Must have letters of 25 mm (1 inch) high on a background of 50 mm (2 inch) high. A smaller letter size may be used under the condition that the markings and signs are readable from a sufficient distance, per NLD-MCS-OS 29.811(b).
- (e) The location of each passenger emergency exit operating handle and instructions for opening must be shown –
- (1) For each emergency exit, by a marking on or near the exit that is readable from a distance of 762 mm (30 inches). The marking must have a minimum letter height of 12.7 mm (0.5 inch); and
 - (2) For each Type I or Type II emergency exit with a locking mechanism released by rotary motion of the handle, by –
 - (i) An arrow, with a shaft at least 19 mm ($\frac{3}{4}$ inch) wide and a head twice the width of the shaft, extending along at least 70° of arc at a radius approximately equal to three-fourths of the handle length; and
 - (ii) The word 'open' in letters 25 mm (1 inch) high, placed horizontally near the head of the arrow.
 - (iii) The arrow and letters must be red on a white background, or vice versa. Alternatively, markings in yellow on a black background, or vice versa, may be used (See AMC-OS 29.811(e)(2)).
- (f) Each emergency exit, and its means of opening, must be marked on the outside of the rotorcraft. In addition the following apply:
- (1) Each emergency exit must be outlined by a continuous line around its periphery. The width, colour and contrast of the line must be chosen such that the emergency exits can be easily distinguished from a distance of 10m in dusk lighting conditions by average rescue personnel. Compliance with this requirement must be shown by actual demonstration unless the MAA-NLD finds that a combination of analysis and testing will provide data equivalent to that which would be obtained by actual demonstration. (See AMC-OS 29.811)
 - (2) The colour and contrast for the textual markings for each emergency exit shall be chosen such that the emergency opening instructions can be easily read from a distance of 1m in dusk lighting conditions by average rescue personnel. The selected colour shall be used for all textual markings and symbols related to the emergency exits, including those for the 'normal' operating controls, if applicable. Compliance with this requirement must be shown by actual demonstration unless the MAA-NLD finds that a combination of analysis and testing will provide data equivalent to that which would be obtained by actual demonstration. The exit marking must have a minimum letter height of 25.4 mm (1 inch) and the emergency opening instructions must have a minimum letter height of 12.7 mm (0.5 inch). (See AMC-OS 29.811)
- (g) Emergency exits need only be marked with the word 'exit' or equivalent symbology in place of the term 'emergency exit'.
- (h) For exits in excess of the required emergency exits as determined under NLD-MCS-OS 29.803(d), the following applies:
- (1) They need not meet the emergency exit requirements of NLD-MCS-OS 29.807 to 29.813.
 - (2) They may be marked as emergency exits when it is substantiated that any likely use of these excess emergency exits will not negatively interfere with the minimum emergency evacuation performance required by NLD-MCS-OS

29.803(d) or otherwise endanger the safety of the occupants (See AMC-OS 29.811(h)).

- (3) Other exits shall not be marked as emergency exits, and shall not use the word 'exit' or equivalent symbology in their markings.

NLD-MCS-OS 29.812 Emergency lighting

For transport rotorcraft, the following apply:

- (a) A source of light with its power supply independent of the main lighting system must be installed to –
- (1) Illuminate each passenger emergency exit marking and locating sign; and
 - (2) *Passenger cabins.* Provide enough general lighting in the passenger cabin so that the average illumination, when measured at 1016 mm (40-inch) intervals at seat armrest height on the centre line of the main passenger aisle, is at least 0.5 lux; and
 - (3) *Compartments used for the combined transport of occupants and cargo.* Provide enough general lighting in the cabin with lighting placed such that obstruction by internal cargo (conform NLD-SMAR-3) is not possible, so that the average illumination, when measured at 1016 mm (40-inch) intervals at a height of 25 inch on the centreline of the evacuation route, is at least 0.5 lux.
- (b) Exterior emergency lighting must be provided at each emergency exit. The illumination may not be less than 0.5 lux (measured normal to the direction of incident light) for minimum width on the ground surface, with landing gear extended, equal to the width of the emergency exit where an evacuee is likely to make first contact with the ground outside the cabin. The exterior emergency lighting may be provided by either interior or exterior sources with light intensity measurements made with the emergency exits open. (See AMC-OS 29.812)
- (c) Each light required by sub-paragraph (a) or (b) of this paragraph must be operable manually from the cockpit station and from a point in the passenger compartment that is readily accessible. The cockpit control device must have an 'on', 'off', and 'armed' position so that when turned on at the cockpit or passenger compartment station or when armed at the cockpit station, the emergency lights will either illuminate or remain illuminated upon interruption of the rotorcraft's normal electric power.
- (d) Any means required to assist the occupants in descending to the ground must be illuminated so that the erected assist means is visible from the rotorcraft.
- (1) The assist means must be provided with an illumination of not less than 0.3 lux (measured normal to the direction of the incident light) at the ground end of the erected assist means where an evacuee using the established escape route would normally make first contact with the ground, with the rotorcraft in each of the attitudes corresponding to the collapse of one or more legs of the landing gear.
 - (2) If the emergency lighting subsystem illuminating the assist means is independent of the rotorcraft's main emergency lighting system, it –
 - (i) Must automatically be activated when the assist means is erected;
 - (ii) Must provide the illumination required by sub-paragraph (d)(1); and

- (iii) May not be adversely affected by stowage.
- (e) The energy supply to each emergency lighting unit must provide the required level of illumination for at least 10 minutes at the critical ambient conditions after an emergency landing.
- (f) If storage batteries are used as the energy supply for the emergency lighting system, they may be recharged from the rotorcraft's main electrical power system provided the charging circuit is designed to preclude inadvertent battery discharge into charging circuit faults.

NLD-MCS-OS 29.813 Emergency exit access

- (a) Each passageway between passenger compartments, and each passageway leading to an emergency exit, must be –
 - (1) Unobstructed, unless, at the acceptance of the MAA-NLD, the obstruction can be immediately cleared by an occupant in case of an emergency, without the use of tooling, in a simple and obvious manner, and when its effect on egress is demonstrated or analysed in accordance with NLD-MCS-OS 29.803(d) or (e); and
 - (2) At least 381 mm (15 inches) wide up to 635 mm (25 inches) from the floor, and at least 508 mm (20 inches) wide at 635 mm (25 inches) and more from the floor.
- (b) For each emergency exit covered by NLD-MCS-OS 29.809(f), there must be enough space adjacent to that exit to allow a crew member to assist in the evacuation of passengers without reducing the unobstructed width of the passageway below that required for that exit.
- (c) Deleted.

NLD-MCS-OS 29.815 Main aisle width

- (a) The main passenger aisle width between seats must equal or exceed the values in the following table:

Passenger seating capacity	Minimum main passenger aisle width	
	Less than 635 mm (25 in) from floor	635 mm (25 in) and more from floor
	mm (in)	mm (in)
10 or less	305 (12)*	381 (15)
11 to 19	305 (12)	508 (20)
20 or more	381 (15)	508 (20)

* A narrower width not less than 9 inches may be approved when substantiated by tests found necessary by the MAA-NLD.

- (b) Sideways seating configurations which cannot meet the minimum aisle width as defined in NLD-MCS-OS 29.815(a) when the seats are occupied may be approved when:
 - (1) They meet the minimum aisle width when the seats are unoccupied; and
 - (2) Their effect on egress is demonstrated or analysed in accordance with NLD-MCS-OS 29.803(d) or (e).

NLD-MCS-OS 29.831 Ventilation

- (a) Each passenger and crew compartment must be ventilated, and each crew compartment must have enough fresh air (but not less than 0.3 cubic metres (10 cu ft) per minute per crew member) to let crew members perform their duties without undue discomfort or fatigue.
- (b) Crew and passenger compartment air must be free from harmful or hazardous concentrations of gases or vapours.
- (c) The concentration of carbon monoxide may not exceed one part in 20 000 parts of air during forward flight. If the concentration exceeds this value under other conditions, there must be suitable operating restrictions.
- (d) There must be means to ensure compliance with sub-paragraphs (b) and (c) of this paragraph under any reasonably probable failure of any ventilating, heating, or other system or equipment.

- - FIRE PROTECTION

NLD-MCS-OS 29.851 Fire extinguishers

(a) *Hand fire extinguishers.* For hand fire extinguishers the following apply:

- (1) Each hand fire extinguisher must be approved (See AMC-OS 29.851).
- (2) The kinds and quantities of each extinguishing agent used must be appropriate to the kinds of fires likely to occur where that agent is used (See AMC-OS 29.851);
 - (i) For combined transport of occupants and cargo in the same compartment, at least the following applies:
 - (A) The total minimum fire extinguishing capacity for class B fires in the cabin is 10B (UL711) or 70B (EN 3-7). This capacity may be composed of multiple fire extinguishers with a minimum rating of 5B (UL711) each or 34B (EN 3-7) each (See AMC-OS 29.851);
 - (B) The fire extinguishing capacity for class A fires in the cabin must be sufficient to extinguish a starting fire in the cargo or baggage, or suppress the fire for a minimum of 5 minutes;
 - a. This must be demonstrated by test using a representative test setup.
 - b. There is no minimum UL711 or EN 3-7 rating required.
 - c. The total fire extinguishing capacity may only be composed of multiple fire extinguishers if a suitable procedure for the use of multiple extinguishers is shown during the test to either extinguish the fire or suppress it for a minimum of 5 minutes.
 - (ii) A fire extinguisher must be installed in the cockpit with a Halon free agent equivalent to Halon 1211 and a minimum rating of 5B:C (UL711) or 34B (EN 3-7).
 - (iii) At least the following number of hand fire extinguishers with a minimum rating of 5B:C (UL711) or 34B (EN 3-7) each, must be conveniently located in passenger compartments:

Passenger capacity	Fire extinguishers
7 to 30	1
31 to 60	2
61 or more	3

(iv) Fire extinguishers must be suitable for use on electrically powered equipment (See AMC-OS 29.851).

- (3) Each extinguisher for use in a personnel compartment must be designed to minimise the hazard of toxic gas concentrations.

(b) *Built-in fire extinguishers.* If a built-in fire extinguishing system is required –

- (1) The capacity of each system, in relation to the volume of the compartment where used and the ventilation rate, must be adequate for any fire likely to occur in that compartment.

- (2) Each system must be installed so that –
 - (i) No extinguishing agent likely to enter personnel compartments will be present in a quantity that is hazardous to the occupants; and
 - (ii) No discharge of the extinguisher can cause structural damage.

NLD-MCS-OS 29.853 Compartment interiors

For each compartment to be used by the crew or passengers –

- (a) The materials (including finishes or decorative surfaces applied to the materials) must meet the following test criteria as applicable:
 - (1) Interior ceiling panels, interior wall panels, partitions, galley structure, large cabinet walls, structural flooring, and materials used in the construction of stowage compartments (other than under seat stowage compartments and compartments for stowing small items such as magazines and maps) must be self-extinguishing when tested vertically in accordance with the applicable portions of Appendix F of [EASA CS-25](#), or other approved equivalent methods. The average burn length may not exceed 152 mm (6 in) and the average flame time after removal of the flame source may not exceed 15 seconds. Drippings from the test specimen may not continue to flame for more than an average of 3 seconds after falling.
 - (2) Floor covering, textiles (including draperies and upholstery), seat cushions, padding, decorative and non-decorative coated fabrics, leather, trays and galley furnishings, electrical conduit, thermal and acoustical insulation and insulation covering, air ducting, joint and edge covering, cargo compartment liners, insulation blankets, cargo covers, and transparencies, moulded and thermoformed parts, air ducting joints, and trim strips (decorative and chafing) that are constructed of materials not covered in sub-paragraph (a)(3) of this paragraph, must be self-extinguishing when tested vertically in accordance with the applicable portion of Appendix F of [EASA CS-25](#), or other approved equivalent methods. The average burn length may not exceed 203 mm (8 in) and the average flame time after removal of the flame source may not exceed 15 seconds. Drippings from the test specimen may not continue to flame for more than an average of 5 seconds after falling.
 - (3) Acrylic windows and signs, parts constructed in whole or in part of elastomeric materials, edge lighted instrument assemblies consisting of two or more instruments in a common housing, seat belts, shoulder harnesses, and cargo and baggage tiedown equipment, including containers, bins, pallets, etc., used in passenger or crew compartments, may not have an average burn rate greater than 64 mm (2.5 in) per minute when tested horizontally in accordance with the applicable portions of Appendix F of [EASA CS-25](#), or other approved equivalent methods.
 - (4) Except for electrical wire and cable insulation, and for small parts (such as knobs, handles, rollers, fasteners, clips, grommets, rub strips, pulleys, and small electrical parts) that the [MAA-NLD](#) finds would not contribute significantly to the propagation of a fire, materials in items not specified in sub-paragraphs (a)(1), (a)(2), or (a)(3) of this paragraph may not have a burn rate greater than 102 mm (4 in) per minute when tested horizontally in accordance with the applicable portions of Appendix F of [EASA CS-25](#), or other approved equivalent methods.
(See [AMC-OS 29.853](#))

- (b) In addition to meeting the requirements of sub-paragraph (a)(2), seat cushions, except those on flight-crew member seats, must meet the test requirements of Part II of Appendix F of [EASA CS-25](#), or equivalent.
- (c) [If smoking is to be allowed](#) –
 - (1) There must be an adequate number of self-contained, removable ashtrays; and
 - (2) Where the crew compartment is separated from the passenger compartment, there must be at least one illuminated sign (using either letters or symbols) notifying all passengers when smoking is prohibited. Signs which notify when smoking is prohibited must –
 - (i) When illuminated, be legible to each passenger seated in the passenger cabin under all probable lighting conditions; and
 - (ii) Be so constructed that the crew can turn the illumination on and off.
- (d) Each receptacle for towels, paper, or waste must be at least fire-resistant and must have means for containing possible fires.
- (e) [Deleted.](#)
- (f) [Deleted.](#)

NLD-MCS-OS 29.855 Cargo and baggage compartments

- (a) Each cargo and baggage compartment must be constructed of, or lined with, materials in accordance with the following:
 - (1) For accessible and inaccessible compartments not occupied by passengers or crew, the material must be at least fire-resistant.
 - (2) Materials must meet the requirements in [NLD-MCS-OS 29.853\(a\)\(1\)](#), [\(a\)\(2\)](#), and [\(a\)\(3\)](#) for cargo or baggage compartments in which –
 - (i) The presence of a compartment fire would be easily discovered by a crew member while at the crew member's station;
 - (ii) Each part of the compartment is easily accessible in flight;
 - (iii) [Deleted.](#)
 - (iv) [Deleted.](#)
- (b) No compartment may contain any controls, wiring, lines, equipment, or accessories whose damage or failure would affect safe operation, unless those items are protected so that –
 - (1) [They cannot be damaged by – \(See AMC-OS 29.855\)](#)
 - (i) [The movement of cargo in the compartment; and](#)
 - (ii) [Fire in the cargo compartment; and](#)
 - (iii) [Fire extinguishing agents likely to be used; and](#)
 - (iv) [Sources of heat within the compartment; and](#)

- (2) Their breakage or failure will not create a fire hazard.
- (c) The design and sealing of inaccessible compartments must be adequate to contain compartment fires until a landing and safe evacuation can be made.
- (d) Each cargo and baggage compartment that is not sealed so as to contain cargo compartment fires completely without endangering the safety of a rotorcraft or its occupants must be designed, or must have a device, to ensure detection of fires or smoke by a crew member while at his station and to prevent the accumulation of harmful quantities of smoke, flame, extinguishing agents, and other noxious gases in any crew or passenger compartment. This must be shown in flight.
- (e) For rotorcraft used for the carriage of cargo only, the cabin area may be considered a cargo compartment and, in addition to sub-paragraphs (a) to (d) of this paragraph, the following apply:
 - (1) There must be means to shut off the ventilating airflow to or within the compartment. Controls for this purpose must be accessible to the flight crew in the crew compartment.
 - (2) Required crew emergency exits must be accessible under all cargo loading conditions.
 - (3) Deleted.
- (f) Sources of heat within any compartment used to carry cargo or baggage must be shielded and insulated to prevent igniting the cargo or baggage.

NLD-MCS-OS 29.863 Flammable fluid fire protection

- (a) In each area where flammable fluids or vapours might escape by leakage of a fluid system, there must be means to minimise the probability of ignition of the fluids and vapours, and the resultant hazards if ignition does occur.
- (b) Compliance with sub-paragraph (a) of this paragraph must be shown by analysis or tests, and the following factors must be considered:
 - (1) Possible sources and paths of fluid leakage, and means of detecting leakage.
 - (2) Flammability characteristics of fluids, including effects of any combustible or absorbing materials.
 - (3) Possible ignition sources, including electrical faults, overheating of equipment, and malfunctioning of protective devices.
 - (4) Means available for controlling or extinguishing a fire, such as stopping flow of fluids, shutting down equipment, fireproof containment, or use of extinguishing agents.
 - (5) Ability of rotorcraft components that are critical to safety of flight to withstand fire and heat.
- (c) If action by the flight crew is required to prevent or counteract a fluid fire (e.g. equipment shutdown or actuation of a fire extinguisher), quick acting means must be provided to alert the crew.
- (d) Each area where flammable fluids or vapours might escape by leakage of a fluid system must be identified and defined.

- - EXTERNAL LOADS

NLD-MCS-OS 29.865 External loads

- (a) It must be shown by analysis, test, or both, that the rotorcraft external load attaching means for rotorcraft-load combinations to be used for nonhuman external cargo applications can withstand a limit static load equal to 2.5, or some lower load factor approved by the MAA-NLD for gust and manoeuvring conditions, multiplied by the maximum external load for which authorisation is requested. It must be shown by analysis, test, or both that the rotorcraft external load attaching means and corresponding personnel-carrying device system for rotorcraft-load combinations to be used for human external cargo applications can withstand a limit static load equal to 3.5 or some lower load factor, not less than 2.5, approved by the MAA-NLD for gust and manoeuvring conditions, multiplied by the maximum external load for which authorisation is requested. The load for any rotorcraft-load combination class, for any external cargo type, must be applied in the vertical direction. For jettisonable rotorcraft-load combinations, for any applicable external cargo type, the load must also be applied in any direction making the maximum angle with the vertical that can be achieved in service but not less than 30°. However, the 30° angle may be reduced to a lesser angle if—
- (1) An operating limitation is established limiting external load operations to such angles for which compliance with this paragraph has been shown; or
 - (2) It is shown that the lesser angle cannot be exceeded in service.
- (b) The external load attaching means, for jettisonable rotorcraft-load combinations, must include a quick-release system to enable the pilot to release the external load quickly during flight. The quick-release system must consist of a primary quick-release subsystem and a backup quick-release subsystem that are isolated from one another. The quick-release system, and the means by which it is controlled, must comply with the following:
- (1) A control for the primary quick-release subsystem must be installed either on one of the pilot's primary controls or in an equivalently accessible location and must be designed and located so that it may be operated by either the pilot or a crew member without hazardously limiting the ability to control the rotorcraft during an emergency situation.
 - (2) A control for the backup quick-release subsystem, readily accessible to either the pilot or another crew member, must be provided.
 - (3) Both the primary and backup quick-release subsystems must—
 - (i) Be reliable, durable, and function properly with all external loads up to and including the maximum external limit load for which authorisation is requested.
 - (ii) Be protected against electromagnetic interference (EMI) from external and internal sources and against lightning to prevent inadvertent load release.
 - (A) The minimum level of protection required for jettisonable rotorcraft-load combinations used for non-human external cargo is a radio frequency field strength of 20 volts per metre.
 - (B) The minimum level of protection required for jettisonable rotorcraft-load combinations used for human external cargo is a radio frequency field strength of 200 volts per metre.

- (iii) Be protected against any failure that could be induced by a failure mode of any other electrical or mechanical rotorcraft system.
- (c) For rotorcraft-load combinations to be used for human external cargo applications, the rotorcraft must—
 - (1) For jettisonable external loads, have a quick-release system that meets the requirements of sub-paragraph (b) and that—
 - (i) Provides a dual actuation device for the primary quick-release subsystem, and
 - (ii) Provides a separate dual actuation device for the backup quick-release subsystem.
 - (2) Have a reliable, approved personnel-carrying device system that has the structural capability and personnel safety features essential for external occupant safety,
 - (3) Have placards and markings at all appropriate locations that clearly state the essential system operating instructions and, for the personnel carrying device system, ingress and egress instructions,
 - (4) Have equipment to allow direct intercommunication among required crew members and external occupants,
 - (5) Have the appropriate limitations and procedures incorporated in the flight manual for conducting human external cargo operations, and
 - (6) Have one-engine-inoperative hover performance data and procedures in the flight manual for the weights, altitudes, and temperatures for which human external load approval is requested.
- (d) The critically configured jettisonable external loads must be shown by a combination of analysis, ground tests, and flight tests to be both transportable and releasable throughout the approved operational envelope without hazard to the rotorcraft during normal flight conditions. In addition, these external loads must be shown to be releasable without hazard to the rotorcraft during emergency flight conditions.
- (e) A placard or marking must be installed next to the external-load attaching means clearly stating any operational limitations and the maximum authorised external load as demonstrated under this paragraph and compatible with the structural strength of the airframe.
- (f) A fatigue evaluation must be applied to rotorcraft-load combinations to be used for human external cargo. The fatigue evaluation must be applied to the critical structural elements of the airframe and the entire quick-release and personnel-carrying device structural systems and their attachments. (See AMC-OS 29.865(f))

- SUBPART F – EQUIPMENT

- - ELECTRICAL SYSTEMS AND EQUIPMENT

NLD-MCS-OS 29.1359 Electrical system fire and smoke protection

- (a) Components of the electrical system must meet the applicable fire and smoke protection provisions of [NLD-MCS-OS 29.831](#) and [NLD-MCS-OS 29.863](#).
- (b) Electrical cables, terminals, and equipment, in designated fire zones, and that are used in emergency procedures, must be at least fire resistant.
- (c) Insulation on electrical wire and cable installed in the rotorcraft must be self-extinguishing when tested in accordance with [EASA CS-25, Appendix F, Part I\(a\)\(3\)](#)

- - SAFETY EQUIPMENT

NLD-MCS-OS 29.1411 General

- (a) *Accessibility*. Required safety equipment to be used by the crew in an emergency, such as automatic life raft releases, must be readily accessible.
- (b) *Stowage provisions*. Stowage provisions for required emergency equipment must be furnished and must –
 - (1) Be arranged so that the equipment is directly accessible and its location is obvious; and
 - (2) Protect the safety equipment from inadvertent damage.
- (c) *Emergency exit descent device*. The stowage provisions for the emergency exit descent device required by [NLD-MCS-OS 29.809\(f\)](#) must be at the exits for which they are intended.
- (d) *Life rafts*. Life rafts must be stowed near exits through which the rafts can be launched during an unplanned ditching. Rafts automatically or remotely released outside the rotorcraft must be attached to the rotorcraft by the static line prescribed in [NLD-MCS-OS 29.1415](#).
- (e) *Long-range signalling device*. The stowage provisions for the long-range signalling device required by [NLD-MCS-OS 29.1415](#) must be near an exit available during an unplanned ditching.
- (f) *Life preservers*. Each life preserver must be within easy reach of each occupant while seated.

NLD-MCS-OS 29.1413 Safety belts: passenger warning device

- (a) If there are means to indicate to the passengers when safety belts should be fastened, they must be installed to be operated from either pilot seat.
- (b) Each safety belt must be equipped with a metal to metal latching device.

NLD-MCS-OS 29.1415 Ditching equipment

- (a) Emergency flotation and signalling equipment required by any applicable operating rule must meet the requirements of this paragraph.
- (b) Each life raft and each life preserver must be approved. In addition –
 - (1) Provide not less than two rafts, of an approximately equal rated capacity and buoyancy, to accommodate the occupants of the rotorcraft; and
 - (2) Each raft must have a trailing line, and must have a static line designed to hold the raft near the rotorcraft but to release it if the rotorcraft becomes totally submerged.
- (c) Approved survival equipment must be attached to each life raft.
- (d) There must be an approved survival type emergency locator transmitter for use in one life raft.

- - MISCELLANEOUS EQUIPMENT

NLD-MCS-OS 29.1439 Protective breathing equipment

- (a) Deleted.
- (b) For protective breathing equipment required by any applicable operating rule –
 - (1) That equipment must be designed to protect the crew from smoke, carbon dioxide, and other harmful gases while on flight deck duty;
 - (2) That equipment must include –
 - (i) Masks covering the eyes, nose, and mouth; or
 - (ii) Masks covering the nose and mouth, plus accessory equipment to protect the eyes; and
 - (3) That equipment must supply protective oxygen of 10 minutes duration per crew member at a pressure altitude of 8000 ft with a respiratory minute volume of 30 litres per minute BTPD.

- SUBPART G – OPERATING LIMITATIONS AND INFORMATION

- - MARKINGS AND PLACARDS

NLD-MCS-OS 29.1541 General

- (a) The rotorcraft must contain –
 - (1) The markings and placards specified in [NLD-MCS-OS 29.1557](#) and [NLD-MCS-OS 29.1561](#); and
 - (2) Any additional information, instrument markings, and placards required for the safe operation of the rotorcraft if it has unusual design, operating or handling characteristics.
- (b) Each marking and placard prescribed in sub-paragraph (a) of this paragraph –
 - (1) Must be displayed in a conspicuous place; and
 - (2) May not be easily erased, disfigured, or obscured.

NLD-MCS-OS 29.1557 Miscellaneous markings and placards

- (a) *Baggage and cargo compartments, and ballast location.* Each baggage and cargo compartment, and each ballast location must have a placard stating any limitations on contents, including weight, that are necessary under the loading requirements. (See [AMC-OS 29.1557\(a\)](#))
- (b) *Deleted.*
- (c) *Deleted.*
- (d) *Emergency exit placards.* Each placard and operating control for each emergency exit must differ in colour from the surrounding fuselage surface as prescribed in [NLD-MCS-OS 29.811\(f\)](#). A placard must be near each emergency exit control and must clearly indicate the location of that exit and its method of operation.

NLD-MCS-OS 29.1561 Safety equipment

- (a) Each safety equipment control to be operated by the crew in emergency, such as controls for automatic life raft releases, must be plainly marked as to its method of operation.
- (b) Each location, such as a locker or compartment, that carries any fire extinguishing, signalling, or other lifesaving equipment, must be so marked.
- (c) Stowage provisions for required emergency equipment must be conspicuously marked to identify the contents and facilitate removal of the equipment.
- (d) Each life raft must have obviously marked operating instructions.
- (e) Approved survival equipment must be marked for identification and method of operation.

Section 3 – Appendices to NLD-MCS-OS 29

Appendix A - Criteria for Demonstration of Emergency Evacuation Procedures under NLD-MCS-OS 29.803

- (a) The demonstration must be conducted either during the dark of the night or during daylight with the dark of night simulated. If the demonstration is conducted indoors during daylight hours, it must be conducted inside a darkened hangar having doors and windows covered. In addition, the doors and windows of the rotorcraft must be covered if the hangar illumination exceeds that of a moonless night. Illumination on the floor or ground may be used, but it must be kept low and shielded against shining into the rotorcraft's windows or doors.
- (b) The rotorcraft must be in a normal attitude with landing gear extended.
- (c) Safety equipment such as mats or inverted life rafts may be placed on the floor or ground to protect participants. No other equipment that is not part of the rotorcraft's emergency evacuation equipment may be used to aid the participants in reaching the ground.
- (d) Except as provided in paragraph (a) of this Appendix, only the rotorcraft's emergency lighting system may provide illumination.
- (e) All emergency equipment required for the planned operation of the rotorcraft must be installed.
- (f) Each external door and exit and each internal door or curtain must be in the take-off configuration.
- (g) Each crewmember must be seated in the normally assigned seat for take-off and must remain in that seat until receiving the signal for commencement of the demonstration. For compliance with this paragraph, each crewmember must be –
 - (1) A member of a regularly scheduled line crew; or
 - (2) A person having knowledge of the operation of exits and emergency equipment.
- (h) A representative passenger load of persons in normal health must be used. Crewmembers, mechanics, and training personnel who maintain or operate the rotorcraft in the normal course of their duties may not be used as passengers.
- (i) No passenger may be assigned a specific seat except as the MAA-NLD may require. Except as required by paragraph (g) of this Appendix, no employee of the applicant may be seated next to an emergency exit, except as allowed by the MAA-NLD.
- (j) Seat belts and shoulder harnesses (as required) must be fastened.
- (k) Before the start of the demonstration, approximately one-half of the total average amount of carry-on baggage, blankets, pillows and other similar articles must be distributed at several locations in the aisles and emergency exit access ways to create minor obstructions.
- (l) No prior indication may be given to any crewmember or passenger of the particular exits to be used in the demonstration.
- (m) The applicant may not practice, rehearse, or describe the demonstration for the participants nor may any participant have taken part in this type of demonstration within the preceding 6 months.

- (n) A pre-take-off passenger briefing may be given. The passengers may also be advised to follow directions of crewmembers, but not be instructed on the procedures to be followed in the demonstration.
- (o) If safety equipment, as allowed by paragraph (c) of this Appendix, is provided, either all passenger and cockpit windows must be blacked out or all emergency exits must have safety equipment to prevent disclosure of the available emergency exits.
- (p) Not more than 50% of the emergency exits in the sides of the fuselage of a rotorcraft that meet all of the requirements applicable to the required emergency exits for that rotorcraft may be used for demonstration. Exits that are not to be used for the demonstration must have the exit handle deactivated or must be indicated by red lights, red tape, or other acceptable means placed outside the exits to indicate fire or other reasons why they are unusable. The exits to be used must be representative of all the emergency exits on the rotorcraft and must be designated by the applicant, subject to approval by the MAA-NLD. [...]
- (q) All evacuees must leave the rotorcraft by a means provided as part of the rotorcraft's equipment.
- (r) Approved procedures must be fully utilised during the demonstration.
- (s) The evacuation time period is completed when the last occupant has evacuated the rotorcraft and is on the ground.

Section 4 – Acceptable Means of Compliance (AMC)

AMC-OS 29.561 Emergency landing conditions – General

AMC-OS 29.561(b)(3):

The items of mass referred in this sub-paragraph are only items of mass which are part of the certified rotorcraft configuration including any installed equipment.

AMC-OS 29.561(b)(4):

If a pallet loading system is used to carry pallets together with occupants in the same compartment, applicable pallet weight limitations compatible with the specified load factors shall be included in the loading instructions for the pallet loading system.

AMC-OS 29.562 Emergency landing dynamic conditions

AMC-OS 29.562:

The performance measures of NLD-MCS-OS 29.562(c) only address forward- and aft-facing seats. Side-facing seats were not considered when those airworthiness standards were issued. The existing regulations do not provide adequate or appropriate safety standards for occupants of side-facing seats because they do not consider the differences in the dynamic forces that apply to a side-facing occupant. To achieve an equivalent level of safety, special conditions should be added to the type-certification basis of aeroplanes with side-facing seat installations. The MAA-NLD accepts the technical criteria of FAA Policy Statement PS-ANM-25-03 as appropriate special conditions in addition to the requirements of NLD-MCS-OS 29.562 and 29.785.

AMC-OS 29.625 Fitting factors and visual inspection of attachments

AMC-OS 29.625(d):

In the context of NLD-MCS-OS 29.625(d), cargo tie-down points in the cabin are to be considered as 'attachments to the structure concerning an item in the cabin that can be optionally installed'.

AMC-OS 29.625(d)(2):

Attachments of items that may be optionally installed are usually considered subject to wear and tear.

AMC-OS 29.783 Doors

AMC-OS 29.783(c):

This requirement does not preclude the possibility to open a door during flight by deliberate action from the crew if required for mission purposes.

AMC-OS 29.785 Seats, berths, safety belts and harnesses

AMC-OS 29.785:

See AMC-OS 29.562.

AMC-OS 29.785(a) and (b):

Seats and adjacent parts should be evaluated for head and limb strike hazards. Potentially injurious objects should be removed or padded when feasible. Suitable warnings and instructions should be provided when potentially injurious objects cannot be removed or padded. In case there are no head and limb strike envelopes available for representative dynamic landing conditions the strike envelopes provided in the Army Crash Survival Design Guide (ref. USAAVSCOM TR 89-D-22D) may be used as guidance. See Figure 1 and Figure 2 for reference.

AMC-OS 29.785(f), (g) and (k):

Occupant weights should be agreed that match typical occupant weights expected in service, including military gear. Par example, the following typical occupant weights were used in the structural design of the CH-47 helicopters:

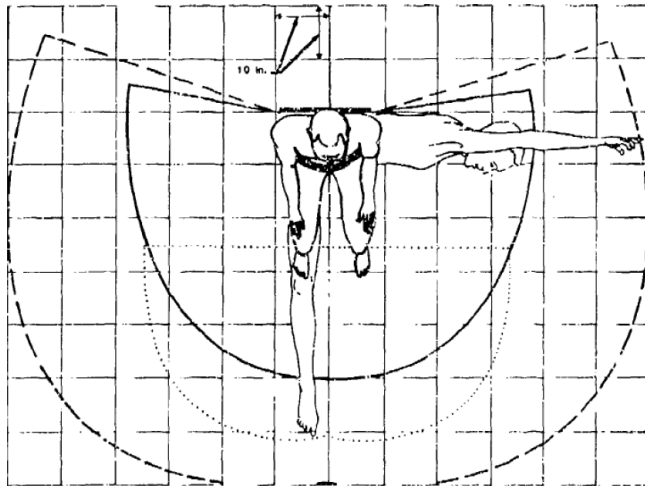
- (1) Pilot, co-pilot: combined weight of man and equipment: 250 lbs
- (2) Troops, occupants: combined weight of man and equipment: 250 lbs
- (3) Litter occupant: combined weight of man, litter and equipment: 250 lbs

AMC-OS 29.785(n):

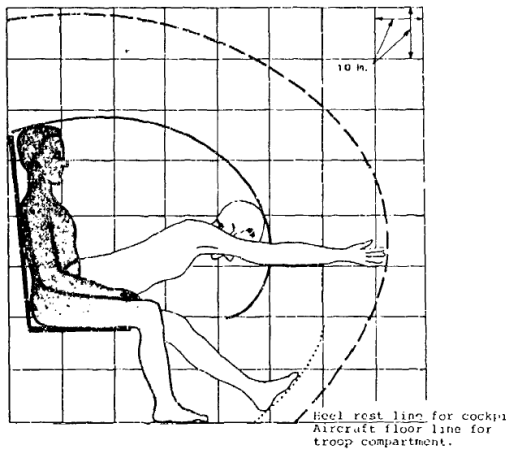
The Flight Manual should include head strike envelope geometry data. This allows the crew to comply with the operational requirements in NLD-SMAR-3 to not position cargo or equipment within the head strike envelope of seated occupants such that the occupant may (or is likely to) suffer serious injury in an emergency landing, taking into account the installed type of seat and restraint system.

NB: The head strike envelopes that are to be considered by the operator when seating passengers next to cargo or equipment should not be presented in the AFM as hard certification limits that strictly determine whether the seats may be used or not based on airworthiness regulations only. If under operational circumstances the cargo cannot be positioned outside the head strike envelopes, the operator must follow the risk assessment and acceptance procedures required under NLD-SMAR-300. The MTCHO is responsible for providing the operator with the correct aircraft related data to perform this assessment. The head strike envelopes are part of that data.

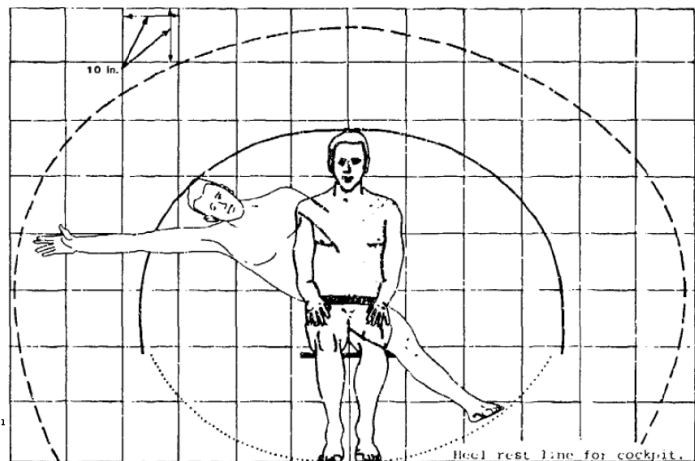
If strike envelope geometry of the actual seat is not available, the figures from the Army Crash Survival Design Guide (ref. USAAVSCOM TR 89-D-22D) may be used, as shown in Figure 1 and Figure 2 below.



Top View



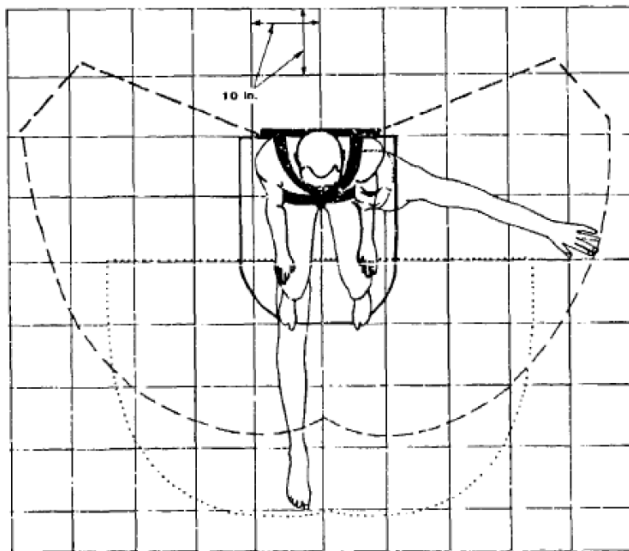
Side view



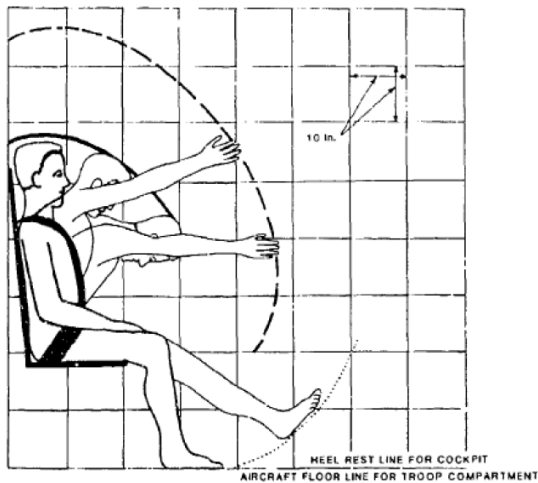
Front view

(Source: USAAVSCOM TR 89-D-22D: Aircraft crash survival design guide Volume IV, Chapter 11.2)

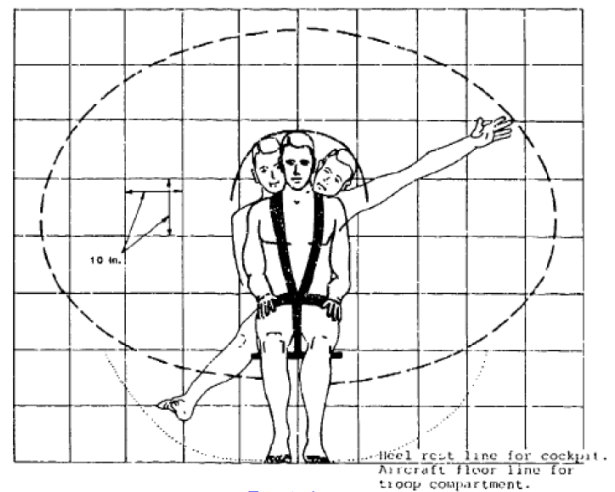
Figure 1: Lap-belt-only extremity strike envelope (continuous line indicates head strike envelope)



Top View



Side view



Front view

(Source: USAAVSCOM TR 89-D-22D: Aircraft crash survival design guide Volume IV, Chapter 11.2)

Figure 2: Full-restraint extremity strike envelope (continuous line indicates head strike envelope)

AMC-OS 29.803 Emergency evacuation

AMC-OS 29.803(d):

The evacuation capacity of an exit is defined as the number of evacuees that can safely escape the rotorcraft through that exit within 90 seconds. The escape sequence starts at the signal for commencement of the evacuation with the exit(s) initially closed and the evacuees sitting on their seats and ends at the moment when the last evacuee reaches the ground.

If different cabin configurations, with different maximum allowed numbers of passengers each, are to be certified, the allowed number of occupants for each configuration according to NLD-MCS-OS 29.803 can be presented in the form of a table in the Flight Manual. An example of such a table is shown below. In such table both the evacuation capacity as well as any other limitations on the allowable number of occupants (e.g. limitations listed in the MTCDS) must be taken into account. The table should be added to the Flight Manual, along with any relevant procedures in relation to the emergency exits.

Allowable number of occupants per cabin compartment and configuration for aircraft type X				
Cabin configuration / section****	Most limiting exit(s)	Configuration	Summed evacuation capacities of exits	Allowable no. of occupants
Open Cabin	LH FWD exit + Ramp exit	No weapon	12+50	48**
		Weapon 1 in LH FWD exit Weapon 2 in Ramp exit	5*+40	45*
Divided cabin / FWD section	LH FWD exit	No weapon	12	12
		Weapon 1 in LH FWD exit	5*	5*
Divided cabin / Aft section	Ramp exit	No weapon	50	20***
		Weapon 2 in Ramp exit	40	20***

* A crew member must de-install Weapon 1 in the FWD exits prior to evacuation.

** This amount is limited by the maximum seating capacity according the MTCDS of the aircraft type.

*** When the cabin is divided, the aft part of the cabin offers only one exit. Therefore the maximum capacity is limited to 20 (cfm NLD-MCS-OS 25/29.807).

**** A cabin is defined as 'divided' when the access between the forward section and the rear section does not comply with the minimum requirements for an evacuation route in accordance with NLD-SMAR-3.40.b. Otherwise it is defined as 'open'.

AMC-OS 29.803(d)(1):

The evacuation capacity must be shown for occupants wearing typical clothing as determined by the intended use. For tactical rotorcraft this should include as a minimum normal weather clothing and a fragmentation protective vest. On tactical rotorcraft it should be possible to remove obstructing items of equipment (if any, see AMC-OS 29.803(d)(2)) and to open the emergency exits while wearing gloves.

AMC-OS 29.803(d)(2):

In exceptional cases, and only when deemed necessary due to the nature of the operation, an obstruction due to the installation of operationally required equipment may be accepted that is not 'simple and obvious' to remove. In such cases it may be necessary to instruct occupants before flight on how to remove an obstruction that blocks the passage through an exit. In such case relevant data and warnings must be included in the Flight Manual.

When such procedure is not practical, or does not provide in a reliable means to remove the obstruction, as an alternative measure crew members who are trained in the removal of the obstruction may be allocated to the affected emergency exit pair. For redundancy, a minimum of two crew members must be allocated to each exit pair that is obstructed by the installation of operationally required equipment, also when only one of the exits of that exit pair is obstructed.

AMC-OS 29.803(d)(6) and (7):

For the purpose of NLD-MCS-OS 29.803(d)(6) and (7), the passenger cabin area must be considered to be divided into separate compartments if the passageway between the compartments does not comply with the minimum requirements for passageways in accordance with NLD-MCS-OS 29.813(a). The maximum number of occupants must be established for each individual separate compartment.

For rotorcraft that may be used for the combined transport of passengers and cargo, the positioning of the cargo may result in the cabin being divided into separate compartments according to operational regulations in NLD-SMAR-3. If such positioning is to be allowed, the effect on the allowed number of passengers per compartment must be stated in the Flight Manual. See the example in AMC-OS 29.803(d) above.

AMC-OS 29.809 Emergency exit arrangement

AMC-OS 29.809(c):

In case the opening of emergency exits cannot be achieved in a simple and obvious manner by itself, suitable placards must be placed with instructions on how to open the emergency exits in accordance with NLD-MCS-OS 29.803(d)(3).

The design of the emergency exit opening mechanism must be such that the operation of the emergency exit opening mechanism is not hampered when wearing any commonly used type of gloves.

AMC-OS 29.809(e):

Acceptable means may be a jettison capability of the emergency exit door/hatch. The provisioning of alternative exits in addition to the required exits may be acceptable too.

AMC-OS 29.811 Emergency exit marking

AMC-OS 29.811(e)(2):

The background of an arrow may be interpreted as a border around the arrow with a minimum width of 12.7 mm (0.5 inch) in all directions.

AMC-OS 29.811(f):

For doors with a lack of space for application of the peripheral markings on the surroundings of the door, the peripheral markings may be applied on these doors themselves.

For doors that can be used as an emergency exit by themselves, and that are equipped with an additional escape hatch in the door as a redundant escape provision, no peripheral marking nor the wording 'Emergency Exit' need to be applied to mark that escape hatch separately. For the hatch itself only the opening instructions need to be applied and must comply with the requirements for textual markings of NLD-MCS-OS 29.811(f)(2).

AMC-OS 29.811(f)(1):

Perform the following test to verify if the emergency exits can be easily distinguished from a distance of 10m in dusk lighting conditions:

- Apply the paint scheme to be certified to the rotorcraft. At least the basic rotorcraft colour and the peripheral marking (the coloured band) around the emergency exits to be evaluated shall be applied.
- Position the rotorcraft (outside or inside a building) in such a way that every exit to be assessed can be viewed from a distance of 10m from and approximately perpendicular to the applicable exit, without any items that can block the view to the rotorcraft from that distance.
- Turn off all lights that are not required for the evaluation and might influence the evaluation. Reflections from (artificial or natural) light sources shall be minimized as much as possible for the best result of the evaluation.
- The evaluation shall be performed with an ambient light intensity of a maximum of 85 Lux.
- The evaluation shall be performed by at least 12 persons, who shall individually rate how easy or difficult it is to distinguish the peripheral marking around each emergency exit to be evaluated.

NOTE: Each evaluator must rate every emergency exit individually i.e. the evaluators are not allowed to discuss what ratings they will give.

- From a distance of 10m, approximately perpendicular to the emergency exit under test, the applicable peripheral marking around the emergency exit shall be rated in accordance with the rating scale provided in the table below.

Rating	Evaluation
1	I cannot or just barely see the coloured band outlining the emergency exit.
2	
3	
4	
5	I can see the coloured band outlining the emergency exit, however, it takes effort to follow the band with my eyes.
6	
7	
8	
9	
10	I can very clearly see the entire coloured band outlining the emergency exit.

Minimum data to be recorded:

- Place and date the evaluation took place.
- Location of the rotorcraft (If outside, record approximate position e.g. spot 2 of the 298SQ platform. If inside, record building number and if applicable hangar bay number).

- Aircraft registration number.
- The type and serial number of the Lux meter used, including last calibration date (if applicable).
- Names of the evaluators.
- Ratings per evaluator per emergency exit.

NOTE: The evaluation/rating sheet shall be signed by the applicable evaluator.

- The Lux level at the time of the assessment. If this differs per assessment (evaluator and/or exit), then for each assessment the Lux level must be recorded.
- Any condition that might have influenced the assessment and therefore the rating given.

Results:

The average rating per exit shall be determined by adding the rating of each evaluator for that specific emergency exit and then divide the outcome by the number of evaluators. This average rating is the final rating for that emergency exit.

The final rating for each emergency exit under test must be at least 6.3.

Using a combination of analysis and testing:

A combination of analysis and testing may be used to show compliance with the requirement if a previous test on a similar design is available that shows compliance with the requirement, at the acceptance of the MAA-NLD, and analysis shows that the contrast between the colours used in the actual design under study is higher than the contrast between the colours in the similar design.

AMC-OS 29.811(f)(2):

Perform the following test to verify if the emergency exit opening instructions can be easily read from a distance of 1m in dusk lighting conditions:

- Apply the paint scheme to be certified to the rotorcraft. At least the basic rotorcraft colour and the emergency exits opening instructions to be evaluated shall be applied.
- Position the rotorcraft (outside or inside a building) in such a way that every exit to be assessed can be viewed from a distance of 1m from and approximately perpendicular to the applicable exit, without any items that can block the view to the rotorcraft from that distance.
- Turn off all lights that are not required for the evaluation and might influence the evaluation. Reflections from (artificial or natural) light sources shall be minimized as much as possible for the best result of the evaluation.
- The evaluation shall be performed with an ambient light intensity of a maximum of 85 Lux.
- The evaluation shall be performed by at least 12 persons, who shall individually rate how easy or difficult it is to read the opening instruction of each emergency exit to be evaluated.

NOTE: Each evaluator must rate every emergency exit individually i.e. the evaluators are not allowed to discuss what ratings they will give.

- From a distance of 1m, approximately perpendicular to the emergency exit under test, the applicable emergency opening instructions shall be rated in accordance with the rating scale provided in the table below.

Rating	Evaluation
1	I cannot or just barely see the emergency opening instructions. I can see the emergency opening instructions, however, it takes effort. I can very clearly read emergency opening instructions.
2	
3	
4	
5	
6	
7	
8	
9	
10	

Minimum data to be recorded:

- Place and date the evaluation took place.
- Location of the rotorcraft (If outside, record approximate position e.g. spot 2 of the 298SQ platform. If inside, record building number and if applicable hangar bay number).
- Aircraft registration number.
- The type and serial number of the Lux meter used, including last calibration date (if applicable).
- Names of the evaluators.
- Ratings per evaluator per emergency exit.

NOTE: The evaluation/rating sheet shall be signed by the applicable evaluator.

- The Lux level at the time of the assessment. If this differs per assessment (evaluator and/or exit), then for each assessment the Lux level must be recorded.
- Any condition that might have influenced the assessment and therefore the rating given.

Results:

The average rating per exit shall be determined by adding the rating of each evaluator for that specific emergency exit and then divide the outcome by the number of evaluators. This average rating is the final rating for that emergency exit.

The final rating for each emergency exit under test must be at least 6.3.

Using a combination of analysis and testing:

A combination of analysis and testing may be used to show compliance with the requirement if a previous test on a similar design is available that shows compliance with the requirement, at the acceptance of the MAA-NLD, and analysis shows that the contrast between the colours used in the actual design under study is higher than the contrast between the colours in the similar design.

AMC-OS 29.811(h):

The following should be substantiated for excess emergency exits, marked as emergency exits:

- The presence and configuration of the excess exits will not lead to confusion during an emergency.

- The use of the excess exits will not result in significantly increased evacuation times, due to reduced use of more efficient exits in an emergency.
- Occupants will not get directed to excess exits which are not simple and obvious to open without training.

Excess exits which can only be used for safe evacuation under supervision of trained crew members should not be marked as exit. However, those exits may be described in the Flight Manual as emergency exits with proper warnings.

It may happen that an exit that may be marked as an (excess) emergency exit in one configuration, may not be marked as such in another configuration due to too strict application of NLD-MCS-OS 25.811(h)(2). To prevent the unnecessary burden to cover the exit markings between flights, as well as the associated risk that the markings are not uncovered when they are required, the likeliness of any use of such exit should be considered and weighed against the hazards. In many cases it may suffice to warn the passengers not to use such an exit and direct their attention to the other exits during the passenger briefing before the start of the flight.

AMC-OS 29.812 Emergency lighting

AMC-OS 29.812(b):

To comply with the requirements of NLD-MCS-OS 29.812(b), internal light sources may be used. External light sources are not required. It is acceptable that the illumination on the ground is reduced to less than the stated requirement at the moment that a person actually exits through the emergency exit.

AMC-OS 29.851 Fire extinguishers

AMC-OS 29.851(a)(1):

Hand fire extinguishers must be approved according to MLE 21.305 or NLD-MAR 21.A.305. and must comply with industry standards. The following industry standards are accepted:

- (1) U.S. - UL Standard 711, Rating and Fire Testing of Fire Extinguishers, and U.S. - UL construction and performance requirements for specific agent extinguishers. Extinguishers must be marked with the name of the listing agency and rating according to U.S. - UL 711, and must have the UL listing mark (with UL copyright logo) with the four required elements: UL in circle mark; word "listed;" product or company name; and issue/serial number or control number.
- (2) European Standard EN 3, Portable fire extinguishers. Extinguishers must be marked according to EN 3-7 clause 16.2 and have the CE-mark and the number(s) and reference(s) relating to the approval of the extinguisher.

Equivalent standards may be proposed by the applicant for acceptance.

AMC-OS 29.851(a)(2):

Specific fire hazards of any equipment or systems installed in the cabin or in accessible cargo compartments should be considered. Examples of (role) equipment in the cabin or accessible cargo compartments that may introduce specific fire hazards are:

- Auxiliary fuel tank systems, like the Extended Range Fuel System for the CH-47.
- (Multiple) Electrical medical equipment, with or without batteries, as used in Medevac configurations.

Anytime when equipment with specific fire hazards is installed in the cabin or in accessible cargo compartments, the immediate access to an appropriate fire extinguisher by the cabin crew should be assured. Access should not rely upon the help of any other occupants. If additional fire extinguishers

are required or present fire extinguishers need to be relocated when hazardous equipment is installed, this should be stated in the installation instructions of the hazardous equipment and/or the flight manual.

AMC-OS 29.851(a)(2)(i)(A):

For the purpose of this subparagraph two fire extinguishers rated at 34B conform EN 3 may be considered equivalent to a total rating of 70B conform EN 3.

AMC-OS 29.851(a)(2)(ii):

The fire extinguisher installed in the cockpit may also be considered suitable for extinguishing a fire in the cabin, if unobstructed and rapid retrieval for use in the cabin is shown by test.

AMC-OS 29.851(a)(2)(iii):

Fire extinguishers approved conform UL711 should have a C-rating. Fire extinguishers approved conform EN 3 should include markings that they are suitable for use on live electrical equipment.

AMC-OS 29.853 Compartment interiors

AMC-OS 29.853(a)(4):

Isolated parts/materials which are considered small may be exempt due to their small size because they would not contribute significantly to the propagation of a fire. Parts eligible to be considered small should at least comply to each of the following:

- a maximum exposed length less than 15 cm, and;
- an exposed surface less than 100 cm², and;
- a volume less than 100 cm³, and;
- a mass less than 100 grams.

Consideration must be given when more than one small part is located in the same proximity with the same or other small parts (one part may ignite the other part) as the combined fuel load may contribute to propagation of a flame, in this case the above small parts exemption would not apply. Small parts exemption does not apply to electrical wire and cable.

AMC-OS 29.855 Cargo and baggage compartments

AMC-OS 29.855(b)(1):

Consideration should be given to the movement of cargo as part of normal loading and unloading procedures, but also to movement of cargo due to flight and ground loads, including emergency landing conditions.

Consideration should be given to hazards resulting from water based fire extinguishing agents in relation to exposed electrical parts.

AMC-OS 29.865 External loads

AMC-OS 29.865(f):

Some parts may be used for non-human external cargo operations as well as for human external cargo operations, like the cargo hook and its attachment to the structure. In such case the fatigue evaluation shall consider the accumulated effects of the non-human cargo operations and human cargo operations together.

AMC-OS 29.1557 Miscellaneous markings and placards

AMC-OS 29.1557(a):

If baggage, cargo compartment and ballast location limitations are complex and involve, for example, additional limitations on loading intensity and distribution, it is acceptable to provide a placard making reference to the appropriate document.

Final clauses

This regulation is known as NLD-MCS-OS 29 and will be published on the intranet and internet site of the Ministry of Defence.

The Hague, 1 August 2025

A handwritten signature in blue ink, consisting of a stylized 'A' with a horizontal line through it and a vertical line extending upwards.

For the Minister of Defence,
The Director Military Aviation Authority – The Netherlands,