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ESPN-R Hoist PCDS Guide V 1.0

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Preamble:

Helicopter Hoist Operations are considered as a full crew mission concept where responsibilities and leadership change within the crew throughout the completion of the mission.

This document, which is focused on Helicopter Hoist Operation PCDS Personal Carrying Device System, aims to highlight on the composition of the equipment, usage, combination and potential incompatibilities. ***It provides an overview of experience best practices and requirements for PCDS usage in helicopter hoist operations and helps clarifying certification aspects.***

This guide does not contradict the AIR OPS regulation (EU) 965/2012, AMC´s or EU regulations it is furthermore a recommended guideline to create, not adding requirements, rather helping the operators to comply with existing European regulations.

This guide is not legally binding; it was developed by a group of experienced subject matter experts, hoist operators, equipment manufacturers, etc. and therefore it should be regarded as best practice.

The European Plan for Aviation Safety (EPAS), includes since 2019 a Safety Promotion Task (SPT) covering Helicopter Hoist Safety Promotion. This Helicopter Hoist Operation PCDS Guide delivered by the ESPN-R Hoist Safety Promotion Working Group, complements the hoist operator training guide and the hoist pilot training guide and focuses on the suitable combinations of PCDS for different kinds of operations, for the safety of persons on board and of hoisted persons. This guides specifically discusses Personnel Carrying Device System (PCDS) and their mutual interaction.

PCDS used for hoist operations are covered, whether they are under SPA.HHO or SPO.SPEC.HEC. Human external cargo operations with the cargo sling are outside of the scope of this guide

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1. Introduction

The ESPN-R Hoist Safety Promotion working group would like to support the growing Helicopter Hoist Operations market (HEMS, offshore wind energy, etc.) and address potentially operational safety risks and an increasing number of occurrences, by creating an equipment guide in order to increase safety in hoist operations of all types.

Equipment Manufacturer, Helicopter OEM´s (*Original Equipment Manufacturers),* operators and Training Organizations have been associated with this initiative to define clearly PCDS recommendations.

This ESPN-R PCDS guide is compatible with the ESPN-R hoist operator training guide and pilot training guide.

2. Abbreviations

AMC	Acceptable Means of Compliance
CoG	Center of Gravity
EN	European Norm
H/C	Helicopter
HEC	Human External Cargo
HHO	Helicopter Hoist Operation
HHOP	Helicopter Hoist Operation Passenger
HO	Hoist Operator
ICAR	International Cooperation for Alpine Rescue
PCDS	Personnel Carrying Device System
prEN	pre European Norm
PPE	Personnel Protective Equipment
RFM	Rotorcraft Flight Manual
SAR	Search And Rescue
TCM	Technical Crew Member
T4S	together 4 safety
UIAA	Union Internationale des Associations d'Alpinisme

3. Intention / Scope of the document

This document provides an overview regarding PCDS equipment choice, set-up, and management, to ensure proper and safe operation in helicopter hoist operations by providing a guideline for operators on the configuration and use of PCDS.
The guide will further develop PCDS and their components, Hoist safety equipment, hoist support equipment, equipment supporting PCDS as per the table below. Further PPE is not part of the scope of this document but their compatibility with PCDS components need to be ensured and its compatibility with PCDS.

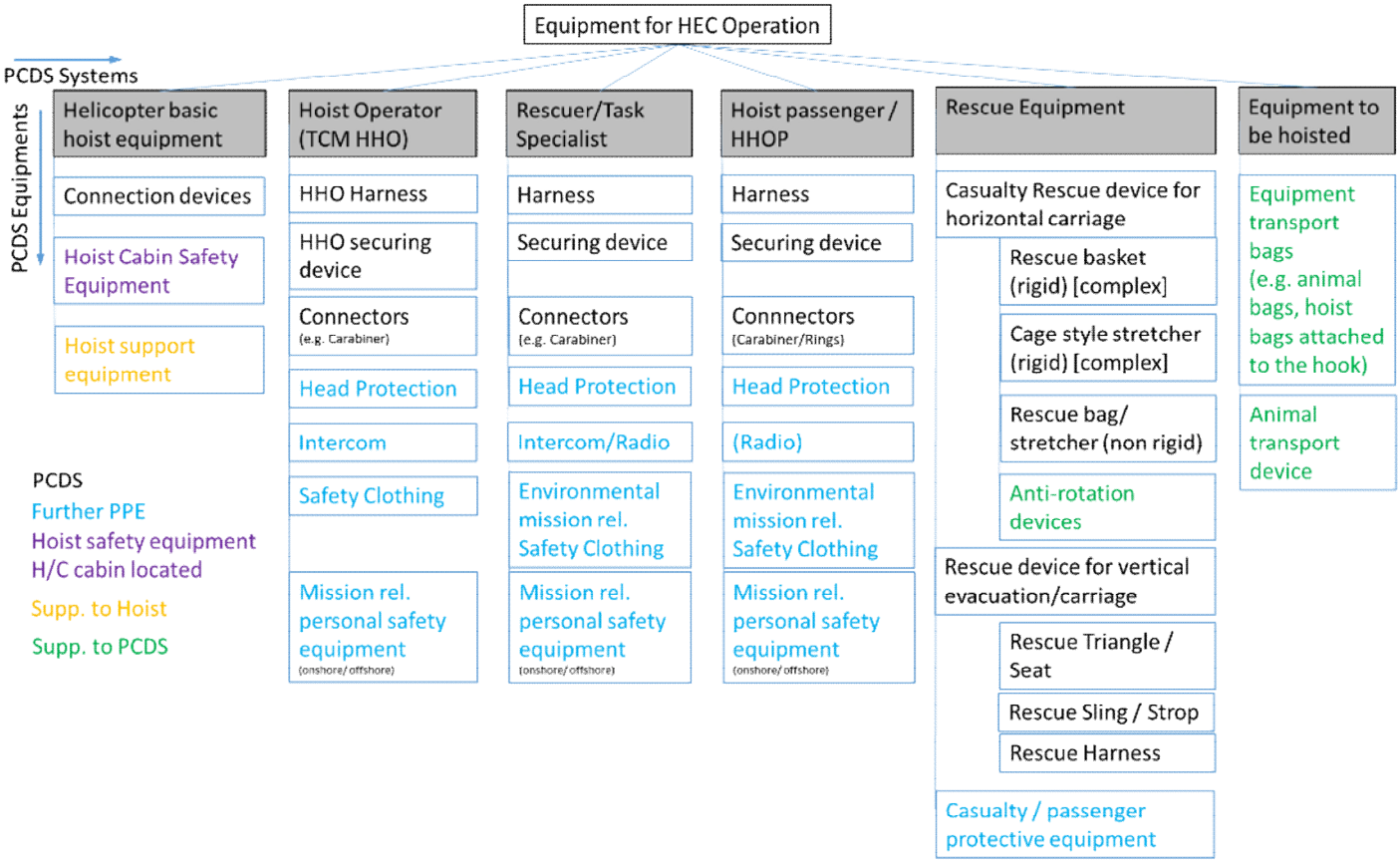


Table 1: Involved PCDS components in Hoist operations (with naming of further hoisting involved equipment)

4. Background and References

Easy Access Rules for Air Operations (Regulation (EU) No 965/2012)

CS 27 small rotorcraft Certification Specifications (CSs) | EASA (europa.eu)

CS 29 large rotorcraft Certification Specifications (CSs) | EASA (europa.eu)

Further regulatory detailed references are provided in Annex D.

5. Definitions and PCDS categories

5.1. PCDS definition and PCDS categories

PCDS: means a system including one or more PCDS devices that is either attached to a hoist or cargo hook or mounted to the rotorcraft airframe attachment interfaces during human external cargo (HEC) or helicopter hoist operations (HHO). The PCDS devices have the structural capability and features needed to transport occupants external to the helicopter.

PCDS has to read here as category III PPE. Equipment (acc. to (EU) 2016/425 or European Council Directive 89/686/EEC * (*if validity marked before 21/04/2019)). This is all Equipment, which is involved in the direct load chain of securing/preventing from fall from height.

In general, PCDS are designed and manufactured to be worn or held by a person for protection against fall from height.

In PCDS are also included connection systems for the equipment described above and designed to:

- connect to other equipment
- connect to the helicopter
- be temporarily fixed and not requiring fastening works before use
- to restrain no more than a single person inside the cabin – simple PCDS
- to restrain no more than two persons outside the cabin (this includes transferring to the outside or vice versa) – simple PCDS
- to restrain more than two persons outside the cabin – complex PCDS

In the helicopter applications seen, the PCDS have the structural capability and features needed to transport occupants external and internal to the aircraft i.e., being a life safety harness preventing the rescuer or the “to be rescued person” or any person from danger of getting disconnected from the aircraft, hence falling.

Based on AMC No.3 to CS 27.865 and AMC No.2 to CS 29.865, two types of PCDS have to be distinguished: simple PCDS and complex PCDS.

Simple PCDS:
A PCDS is considered to be simple if:
(a) it meets an EN standard under Regulation (EU) 2016/425 or Directive 89/686/EEC * (*if validity marked before 21/04/2019), as applicable, or subsequent revision;
(b) it is designed to restrain no more than a single person (e.g., hoist or cargo hook operator, photographer, etc.) inside the cabin, or to restrain no more than two persons outside the cabin;
(c) it is not a rigid structure such as a cage, a platform or a basket.
PCDSs that cannot be considered to be simple are considered to be complex.
NOTE: EASA or the relevant Authority should be contacted to confirm the classification in the event that:

- a PCDS includes new or novel features;
- a PCDS has not been proven by appreciable and satisfactory service experience;

OR

- there is any doubt in the classification.

NOTE: ESPN-R hoist working group recommends to not limit it to the cabin, but also when operating the helicopter hoist with doors open and potentially standing on the helicopter landing skid or step.

NOTE: EN / UIAA Norms are applicable when an equipment is made available on the market. Equipment with applicable norms at time of introduction in operation can be used until end of its service life limit.

For equipment manufactured before EN norms were published, UIAA norms are applicable and can be used.
(In cases where UIAA is providing more stringent requirements then the EN Norm, both Norms should normally be provided/displayed by the manufacturer for the equipment (e.g., UIAA-109 and EN17520).

Complex PCDS:

All other systems that do not qualify as “simple PCDS”, e.g., a cage, which can carry one or more individuals.
Also a system connecting three (3) persons or more to the hook is defined as complex PCDS

NOTE: Governmental authorities/agencies (e.g., police, SAR, military) may deviate from the EU regulations for PCDS equipment in order to fulfill their own sovereign tasks, but generally should follow the specifications.

5.2. Other definitions

For the purpose of this document, the following definitions apply:

Definition of PPE as per regulation (EU) No 2016/425
(1) ‘personal protective equipment’ (PPE) means: (a) equipment designed and manufactured to be worn or held by a person for protection against one or more risks to that person's health or safety; (b) interchangeable components for equipment referred to in point (a) which are essential for its protective function; (c) connection systems for equipment referred to in point (a) that are not held or worn by a person, that are designed to connect that equipment to an external device or to a reliable anchorage point, that are not designed to be permanently fixed and that do not require fastening works before use;
PPE are divided into several categories:
Category III PPE protects against the highest risk with serious consequences such as death or irreversible damage to health like falling from height, electric shocks, high/cold temperature environments, drowning, substances hazardous to health and so on. (This Category III is including the §5.1 defined and named PCDS).
Cat II PPE are equipment, which are neither classified as Cat I or Cat III, and protect against risks other than those in Cat I or Cat III (protects against risks which are not minimal but also not lethal or causing irreversible damage). This is equipment like swimming aids, high visibility clothes or bicycle helmets.
Cat I PPE are equipment of mostly simple design, which protects exclusively against minimal risks like: superficial mechanical injury, contact with cleaning material of weak action or prolonged contact with water, contact with hot surfaces not exceeding than 50°C, damage to eyes due to exposure to sunlight, atmospheric conditions of not extreme nature. This is equipment like gardener hand gloves, rainwear, ski goggles, sunglasses.

Hoist cabin safety equipment: This is securing equipment installed direct to the helicopter, to be used together with PCDS in the load chain between the helicopter fixed attachment points and the PCDS. This equipment is not belonging to a “person” but belonging to the helicopter environment as interfaces to PCDS. The purpose of this equipment is to restrain persons and equipment inside the helicopter or while transfer to the outside or vice versa.

Hoist support equipment: The anti-static line is not a securing equipment, but necessary to provide controlled electrical discharge within hoist operation and therefore seen as hoist support equipment for safe hoist operation.
In addition, a hoist weight bag belongs as supportive equipment to these elements.

Support to PCDS: This is additional equipment, which supports the PCDS to fulfil its intended operation, but is not in the load chain of PCDS. It is used together with specific PCDS (e.g., anti-rotation line, anti-rotation ruder).

Task Specialist: Task specialist (per Part-SPO) means a person assigned by the operator or a third party, or acting as an undertaking, who: (a) performs tasks on the ground directly associated with a specialised task; or (b) performs specialised tasks on board or from the aircraft.
NOTE: Medical personal with appropriate training for hoist operations are seen as belonging to the task specialist for special operational tasks.

Rescuer: Means a rescuer carried in a helicopter during a rescue/HEMS flight and responsible for the medical team safety on the ground, enabling the extraction and medicalization of the casualty. The rescuer is deployed from the helicopter as the first response when the conditions to access to the casualty are difficult (confined area, sea etc.)

HEC (Human External Cargo): Transport of individuals external to the rotorcraft with PCDS.

HHO (Helicopter Hoist Operation): The mission where the hoist is applied on the helicopter for deploying/extracting persons to/from the ground/surface while the helicopter is in flight.

TCM HHO (Technical Crew Member): 'technical crew member' means a crew member in commercial air transport HEMS, HEMS HEC, HHO or NVIS operations, other than a flight or cabin crew member, assigned by the operator to duties in the aircraft or on the ground for the purpose of assisting the pilot during HEMS, HEMS HEC, HHO or NVIS operations, which may require the operation of specialised on-board equipment; For the purpose of this document the TCM HHO is the technical crew member in charge of operating the hoist.

Qualified person: One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, national requirements/regulation, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

Compatibility: The ability of different components of the system to properly work together without affecting safety performances of the components, the system, other systems, and the helicopter.

Training: The action of undertaking a path that is a contribution and stimulus to the growth of a person or a group, and that pursues the development of skills and attitudes that are not only cognitive but also of practical and behavioral relevance.

Equipment maintenance and management: Any activity - such as tests, measurements, replacements, adjustments, and repairs - intended to retain or restore a functional unit in or to a specified state in which the unit can perform its required functions.
The routine recurring work required to keep equipment in such condition that it may be continuously used, at its original or designed capacity and efficiency for its intended purpose.

Harness: Body support primarily for fall prevention or arrest purposes. It may comprise straps, fittings, buckles or other elements, suitably arranged and assembled to support the body of a person and to prevent a fall or to restrain the wearer during a fall and after the arrest of a fall.

Securing Device: Device, subsystem, or system with a fixed length or with a length adjustment device, used to connect directly or indirectly a body holding device to the helicopter as a means of support for fall prevention or protection.

Connector: Openable device used to connect components, which enables the user to assemble a system in order to link himself/herself directly or indirectly to the helicopter as a means of support for fall prevention or protection.

Rescue Equipment: Equipment designed and manufactured to which a person is connected for protection against one or more risks to that person's health or safety, but are operated by another person and that are not designed to be permanently fixed and require use of tools.

Rescued Person: Person in need of being saved from a dangerous or difficult situation, who is not injured or not requiring immediate treatment for critical injuries.

Patient: A person in need of or receiving medical treatment.

6. Hoist operations with PCDS and associated equipment

6.1 PCDS /Helicopter compatibility

6.1.1 PCDS /Helicopter compatibility

Compatibility and relevance of PCDSs and operation equipment should ensure proper interactions between helicopter, PPEs, rescue equipment and other equipment, and should be carefully checked for the PCDS to properly work together.

6.1.2 Evaluation and implementation process (Assembly and testing)

PCDS should be assembled & integrated correctly and logically, and their proper applications should be continuously re-evaluated according to the operation.

The integration on the helicopter of the PCDS's and operation equipment (e.g., helmet, radio, lifejacket) should be evaluated accurately and tested in order to understand the interoperability of this equipment.
This evaluation has to be performed by the helicopter operator and recorded before releasing to operational service. The evaluation, or assessment, has to be recorded in the safety management system and reflected in the operation manual, but under the form of (standard operating) procedures to apply.

Operating organizations * should evaluate the connections used to attach PCDS to each hoist hook in use in order to ensure compatibility of the PCDS with the airframe; specifically, to rule out the possibility of dynamic roll-out issues or jamming situations between the PCDS attaching hardware and the hoist hook.

Note : For complex PCDS and simple PCDS certified under CS27 or CS29, the compatibility of the PCDS with the hoist hook is part of the airworthiness approval. For simple PCDS with no airworthiness approval, the compatibility check is on the operator. The compatibility of different PCDS's with each other is also on the operator.

A procedure is suggested below to support helicopter hoist operators to achieve a compatibility statement for the PCDS's:

1. Risk assessment for every item, combination of equipment, and system (e.g., very important length evaluation of lanyards adopted per helicopter type) with respect to matching the respective helicopter configuration.
2. Ground evaluation / assessment on the helicopter (or a simulator may also be suitable) if used material is appropriate to fulfill the requirements of the operation and safety aspects
3. Operational assessment of the respective operation scenario
4. Post flight debrief with a review of the previously conducted risk assessment.
5. Training of all users.
6. Continuous re-assessment of operational experience with implementation of measures whenever needed.

NOTE: Any modification is seen as requiring an impact analysis; A re-cycling of the process is recommended before full implementation of the modification.

Foreseen or potential equipment misuse should be taken into account as well, then assessed, and thereafter mitigated.

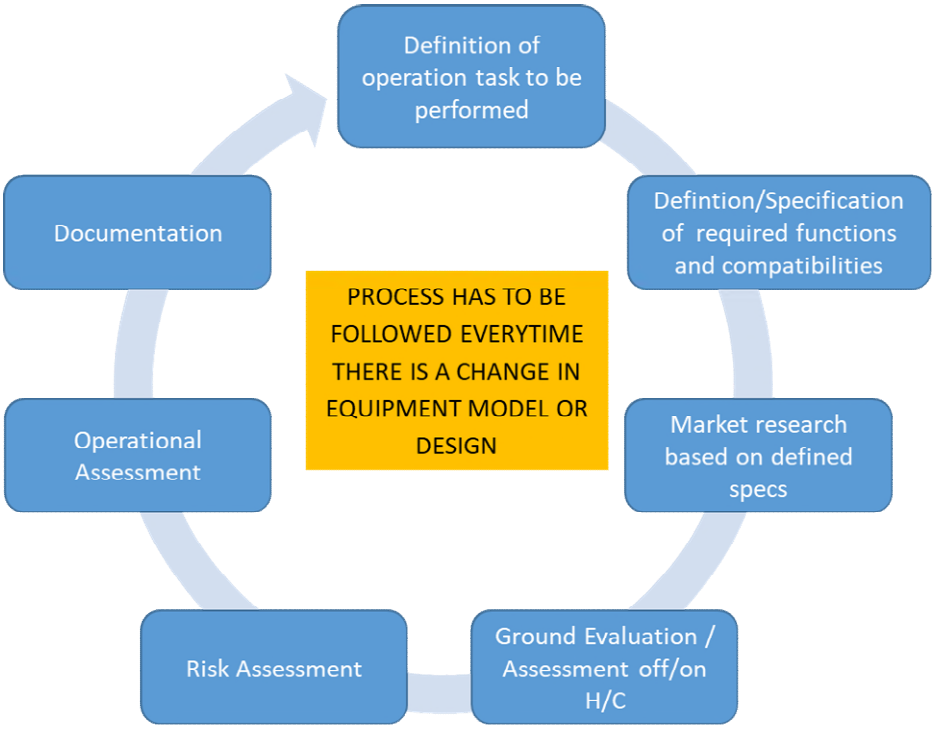


Table 2: flow chart for PCDS equipment selection, evaluation and implementation

NOTE: Evaluation if the used material is appropriate to fulfill the requirements of the operation and safety aspects by: involving the task specialist, applicable norms, lanyard length, bridal lengths, compatibility of all components together, required user comfort, dynamic rollout, foreseeable misuse, etc.

6.2 Interoperability with partner organizations

For interoperability with other involved organizations in the operation:
A compatibility check is highly recommended to be accomplished as well for personnel, e.g., task specialists outside the organization of the helicopter operator when they are cooperating with this latter organization (e.g., rescuers, medical staff)

e.g., Ingress and egress in the cabin should be verified by means of an assessment.

6.3 Summary of interface issues

6.3.1 Compatibility Check

Compatibility checks with other HHO flight equipment and helicopter type have to be carried out with the cooperation of a senior HHO TCM (see ESPN-R HOIST OPERATOR TRAINING GUIDE, latest revision) or competent design organization, and is highly recommended to be accomplished with cooperating personnel outside the organization of the helicopter operator as well.

6.3.2 Contents of the compatibility check

A major topic of all this equipment and operations evaluation and assessment (and core of this document) is:
To always ensure a closed loop of safety chain within the selection & combination of the equipment and its operation, in order to avoid unsecured & hazardous conditions.

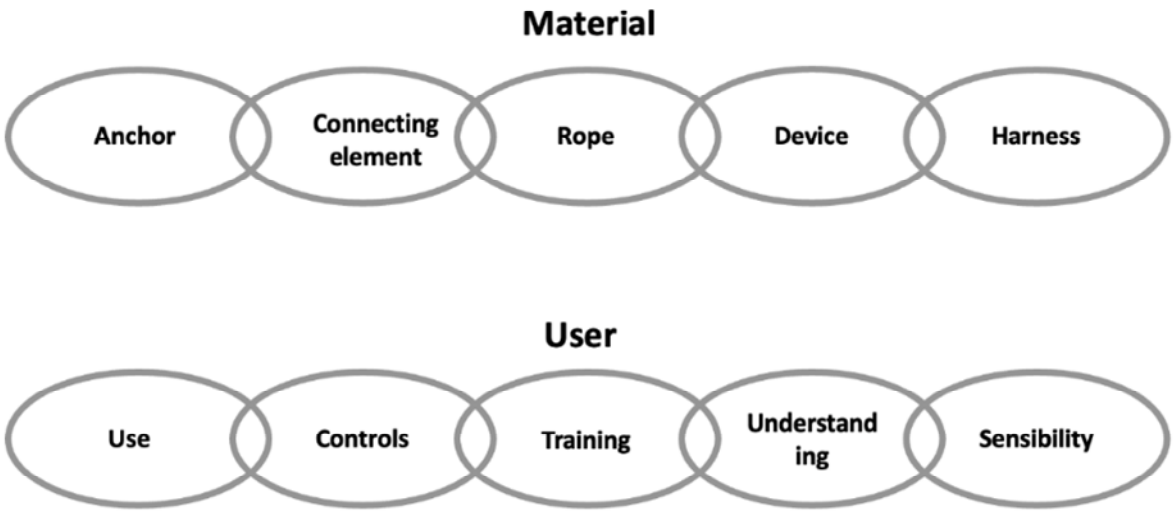


Table 3: General safety chain for material and operation

6.3.3 Examples of the safety chain for material

- The rescuer harness should be provided with specific pouches to support the radio transceiver. If those are not available, the rescuer may have to wear a compatible (high visibility) jacket/gear with pouches.
- It is recommended that the HHO TC lanyard is provided with a (minimum) dual action carabiner on the helicopter airframe, and with a triple action carabiner at the HHO TC (body) side.
- Check for risk of entanglement or any interference between PCDS's or between PCDS and further PPE.

- For offshore operations the combination of the life jackets with the HHO TC and the harness should not degrade the safety performance of either equipment.

- When the rescuer is attached to the hoist hook and other equipment (e.g., stretcher, rescue sling, rescue triangle, medical bag, etc..) the correct relative positioning of rescuer and equipment should be ensured by devices properly chosen in the PCDS system.

7. Training

All personal involved in HEC operations have to be trained in the use of PCDS, PPE and other operation equipment. Training should include personnel from the operator and involved organizations in the operation.

Always train with the equipment which will be used in operation, to ensure proper use, muscle memory, confidence, and to avoid potential issues related to differences between training habits and operation.

It is recommended to prioritize training in the use of restraint and positioning systems, when such equipment is used. All persons involved should be trained in the use of restraint and positioning systems. If fall arrest systems are used, knowledge of their capability and performance have to provided.

The training should cover at least (non-exhaustive list):

- Pre-flight checks (usage)
- System Operation (e.g., work at height, partner check, partner check after manipulation of PCDS, cross-checking for safe connection, etc.)
- Associated risks of the individual devices
- Communication (standardized – incl. radio calls, hand signals) between involved persons
- Post-flight checks (usage)

ESPN-R “Hoist Safety Promotion Working Group” recommended this activity to be provided by a trainer with high competence and experience of PCDS.

The same concept should be applied to rescue and other operation equipment.

8. Maintaining and management of the PCDS for continued usage

User safety depends on continuous efficiency, integrity and strength of PCDS and other operation equipment, which it is necessary to monitor according to national and international regulations, through proper maintenance and management.

In order to carry out proper maintenance and management, the following have to be respected (not exhaustive list):

- Service Life Limitations (SLL)
- Record and traceability to ensure a good follow up
- Pre and post use checks
- Periodical inspections (e.g., every 12 months)
- Overhaul, service, revision procedures where applicable
- Examination following an extraordinary event
- Cleaning procedures, including disinfection where applicable
- Storage procedures
- Maintenance procedures
- Repair procedures

All this operation shall be done according to the manufacturer statements and documentation and/or by any requirements of applicable regulations.

Management of the simple PCDS maintenance has to be done by the competent (refer to EN 365) and trained personnel of the operator or by a qualified organization (e.g., OEM, operation task responsible organization).

Management of the complex PCDS maintenance has to be done by the CAMO and Part 145.

Roles & responsibilities to operate and maintain operation equipment, have to be established (and agreed with all stakeholder concerned in the operation execution) prior to commencing operation.

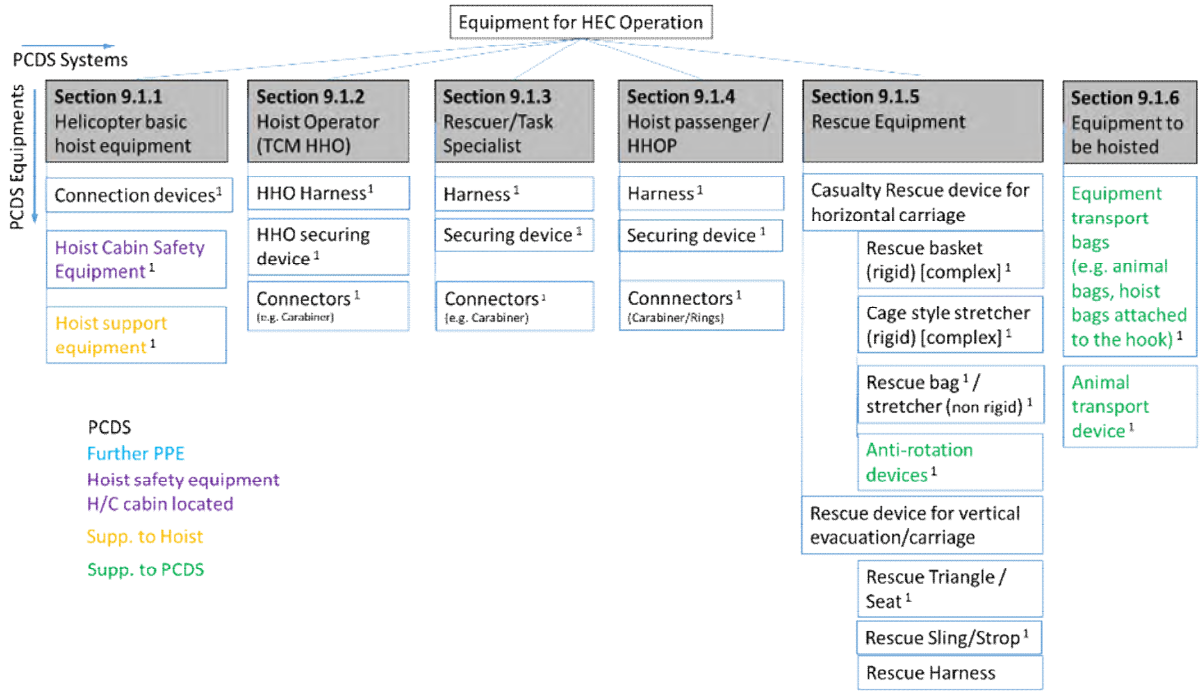
Example: for all in operation execution concerned and involved stakeholders with PCDS Equipment: Visible Inspection marking with common agreed color coding attached flag of equipment (standardized – recurrent activity) of yearly certifying body inspection of equipment for simple PCDS.

9. Required functions for PCDS Equipment and PCDS Systems

Examples of different characteristics for representative equipment items from different categories are collected in Annex A. These are depicted with the intent of providing some recommendations for their best practice application.

Each used equipment should be described in its minimum required functions according to its proper and safe use and intended purpose in helicopter hoist operations. The table below shows which equipment is presented in which section of this document. It also shows which equipment are directly working together and its specific needs within a dedicated PCDS and the category types of the different PCDS.

An empty template equipment sheet is provided in Annex B for operator customization.



NOTE 1: sample cards for best practice application and usage see:

- Hoist cabin safety equipment: Annex A section 10.1.3
- Connection devices / Connectors: Annex A section 10.1.2
- Hoist support equipment: Annex A section 10.2.1
- Harnesses: Annex A section 10.1.4
- Securing devices: Annex A section 10.1.1
- Rescue basket: Annex A section 10.1.10
- Cage style stretcher: Annex A section 10.1.9
- Rescue bag / stretcher: Annex A section 10.1.5
- Anti-rotation devices: Annex A section 10.2.2
- Rescue triangle / seat: Annex A section 10.1.6
- Rescue sling / strop: Annex A section 10.1.7
- Equipment to be hoisted: Annex A section 10.2.3

NOTE 2: The compatibility assessment of/with further PPE is developed in Annex C

9.1.1. H/C basic hoist equipment

H/C basic hoist equipment	**Connection devices, (permanent installed in helicopter)**	• The helicopter has structural provisions (or anchor points) where the Hoist cabin safety equipment, the Hoist operator or other persons can be attached to the helicopter structure. • They will be suitable (structural strength, shape) for attaching PCDS connectors or securing devices • Hoist operator connection devices should be physically separated from the connection positions for other persons • When needed, one hand grip operation should be available. • Anchor/hard points are recommended to be installed in the structure of ceiling or roof area of the helicopter cabin to ensure a drop factor below 1.
	Hoist Cabin Safety Equipment	Person related safety equipment: • Standards: EN 362, EN 12275 (for connectors) and EN 354 (optionally energy absorber EN 355 may be added), EN 358, EN 17520 (for securing device), EN 795 B/C, EN 566 • Provide appropriate interfaces for connecting the PCDS equipment's and systems to secure the hoisted persons and equipment to the helicopter or to the hoist, or both • It is extending/installed to the helicopter direct installed fixed provisions for enabling proper and safe hoist operations. • A lanyard should have two end connections in order to be connected to the harness on one side and to the anchor device on the other side. • The connection is usually made with a connecting element. Length adjustment is optional. • If a lanyard is used in a fall arrest system, the lanyard should include a fall arrester. • The use of anchor/hard points in the structure or roof area of the helicopter cabin is recommended to ensure a drop factor below 1. Hoist related safety equipment Manual cable cutter: • If needed by certification requirements, a manually operated pair of cable cutting shears or equivalent system has to be available located inside the cabin in accordance with the RFM. • It may operate as back-up system in case the pyrotechnic cable cutter of the hoist fails to operate for any reason when a cable has to be cut.
	Hoist support equipment	Anti-static line: • a flexible discharge cable intended for use in helicopter hoist operations. • Line is connected to the hoist hook and touch the ground, ship or water and will ground the helicopter before the passenger or cargo touches the surface. • Cable has a built-in weak-link in the upper loop which breaks in case of an entanglement. • The Anti-Static Line is made of corrosion resistant (steel) wire with or without a terminal at the lower end. • The upper end will be connected to the hoist hook

		Hook weight: • It functions as a simple hoist hook ballast to prevent unwanted swing and assist the operator with easier control in situations such as high winds, confined/cluttered areas or other environmental conditions. • The system may also be provided with a high visibility reflective band and may support for light sticks for night hoist operation. • The interface geometry should be designed to avoid dynamic roll-out from hoist hook. • The hoist manufacturer may recommend using a loaded bag on the hook at all times to help remedy cable milking and cable looseness.

9.1.2. Hoist operator

Hoist operator (TCM HHO)	**HHO Harness**	▪ Standards: EN 361 (full body harness) – recommended by ESPN-R - or EN 813 (sitting harness) or EN 12277 all types or EN 358 (restraint and positioning harness) ▪ Recommended a sternal or dorsal attachment point to attach the fall protection system, a ventral attachment point may be used if the equipment for the operation requires ▪ Any accessories attachments/rings (non-load bearing) should be at sufficient distance to the fall protection/prevention attachment points (load bearing points) to prevent confusion/wrong-usage ▪ Restraint harnesses/Belt (EN 358 or 813 or 12277 type C) may be used if the operator does not expose himself to risk of falling/moving outside the helicopter cabin ▪ Recommendation for having the attachment points in contrasting and clear detectable colors. ▪ Recommendation for click lock buckles ▪ The harness should be designed to be comfortable for prolonged use ▪ Type and number of paddings should be adapted to environmental condition foreseen for possible operations (e.g., amount of textile surface in the back) ▪ components should be less prone as possible to entanglement with other components, with other devices, or with the helicopter ▪ Compatibility check with other HHO flight equipment and helicopter type has to be ensured with the cooperation of a qualified HHO (subject matter expert) or competent design organization
	HHO securing device	▪ Standards: EN 354 (optionally energy absorber EN 355 may be added), EN 358, EN 17520 ▪ Length adjustable ▪ Unintended length change via cyclic load should not occur ▪ Quick release (minimum double action) is highly recommended (mainly foreseen for operations above water) ▪ Risks assessment needs to be performed by the flight crew/HHO TCM to assess prevention of unintended manipulation by a 3rd person ▪ Recommendation loose ends of the lanyard should be storable to prevent entanglement

		▪ When operation with open door the length of the lanyard should still ensure reentering the helicopter in case of fall
	Connectors	• Standards: EN 362, EN 12275 • Minimum a dual action carabiner on the helicopter airframe side, and with a triple action carabiner at the HHO TCM (body) side ->risk assessment to be performed

9.1.3. Rescuer/ Task Specialist

Rescuer / Task Specialist	**Harness**	▪ Standards: EN 361 or EN 813 or EN 12277 type A or C or C&D ▪ Selection depending on complete operation profile of the rescue personal (e.g., drop-on & pick-up vs. mountain rescue climbing) Ergonomic fit to be respected, also in conjunction with intended operation profile of rescuer. ▪ Risk assessment regarding body positioning/inclination while hoisting (respect of tilting over event) (If the operation profile allows, a high bearing point is recommended) ▪ Any accessories attachments/rings (non-load bearing) should at sufficient distance to the fall protection/prevention attachment points (load bearing points) to prevent confusion/wrong-usage ▪ Recommendation for having the attachment points in contrasting and clear detectable colors. ▪ Compatibility check with other equipment has to be ensured with the cooperation of an experienced rescue /HHO organization (subject matter expert) or competent design organization ▪ Risk assessment on entanglement prone components for hoisting and H/C environment	
	Securing device	▪ Standards : EN 354, EN 358, EN 17520, UIAA 109, ▪ Selection depending on complete operation profile of the rescue personnel ▪ A Safety lanyard (a securing device connected with its fixed end to the harness) may have a maximum length not longer than necessary for the operation purpose ▪ Easy length adjustment with one hand, if needed for operation ▪ Disconnection interfaces (at the far end of the securing device) shall be operable by the rescuer himself	
	Connectors	**Securing Line connectors**	▪ Standards: EN 362 or EN 12275 ▪ Gate locking device (min double action) has to be easily openable with just one hand. Automatic gate locking device has to be present
		Hook connectors	▪ Standards : EN 362 or EN 12275 or UIAA 130 - prEN 17961 ▪ Rings/Carabiners/Shackles means of connection to the hook. (If the operation profile allows it, a not openable device is recommended) ▪ Risk assessment regarding dynamic roll out has to performed ▪ For carabiners, a steel / stainless steel carabiner is best practice in usage as

			interface to the hook (Recommended by ESPN-R and by ICAR) ▪ For carabiner, a min dual action (triple action recommended by ESPN-R) gate locking device (No screw-able locking device for carabiners, due to risk of re-opening by vibrations!) ▪ Quick release device between the hook and the harness may be applicable, if applicable for the operation (entanglement prevention) *NOTE:* A visual indication of locked or unlocked position would be recommended for any new design. ▪ Recommendation Hook connection device should be a metallic device (no fabric direct to hook) (NOTE: Fabric shall never be attached to previous uncheck and unknown conditions of metallic surfaces at the side of the person on the hoist. Therefore, metal to metal connection in the hook is recommended, to prevent any damaging of the fabric by a maybe scratched hook surface in operation. Metal device as interface in the hook prevents this possible event.)

9.1.4. Hoist Passenger / HHOP, Commercial Air Transport (CAT) (any person not allocated to crew/rescuer and is not a patient)

Hoist Passenger / HHOP, Commercial Air Transport (CAT) (any person not allocated to crew/rescuer and not patient)	**Harness**	▪ Standards: EN 361 or EN 813 or EN 12277 type A or B or C or C&D, EN1497 (recommendation is not to use EN 1498 rescue slings or rescue triangles, as this equipment is defined for rescue operations only and not for “preplanned“ transportation tasks) ▪ Selection depending on complete operational profile (e.g., wind farm technician, harbor pilot, ...) ▪ Risk assessment regarding body positioning/inclination while hoisting (respect of tilting over event) (If the operation profile allows, a high bearing point is recommended) ▪ Any accessories attachments/rings (non-load bearing) should be at sufficient distance to the fall protection/prevention attachment points (load bearing points) to prevent confusion/wrong-usage ▪ Recommendation for having the attachment points in contrasting and clear detectable colors. ▪ Compatibility check with other equipment has to be ensured with the cooperation of a subject matter expert from either an Operator holding a SPA.HHO approval or a competent design organization ▪ Risk assessment on entanglement prone components for hoisting and H/C environment
	Securing device	▪ Standards : EN 354, EN 17520 or EN 358 ▪ Selection depending on complete operation profile ▪ Recommended Fixed length lanyard to be used. For usage of adjustable length lanyard (EN 17520, EN 358) a training is applicable for the person who operates the adjustment.

		▪ Harness mounted securing device (if applicable); the max length has not to be longer than necessary for securing in the cabin	
	Connectors	**Securing Line connectors**	▪ Non removable connector for the passenger
		Hoist/HEC System Hook connectors	▪ Standards: EN 362 or 12275 or UIAA 130 - prEN 17961 ▪ Rings/Carabiners/Shackles means of connection to the hook. (If the operation profile allows it, a not openable device is recommended) ▪ Lifting strap with fixed length (carabiner, textile (e.g., EN 354/EN566) and ring/shackle) for elongation to harness hoisting point, if the harness connection point itself is too short for proper attachment to the hook, if applicable. ▪ Risk assessment regarding dynamic roll out has to performed ▪ If carabiners are used, steel / stainless steel carabiners are best practice in usage as interface to the hook (Recommended by ESPN-R) ▪ For carabiner, a min dual action (triple action -- Recommended by ESPN-R) gate locking device (No screw-able locking device for carabiners, due to risk of re-opening by vibrations) ▪ Recommendation Hook connection device should be a metallic device (no fabric direct to hook) (NOTE: Fabric shall never be attached to previous uncheck and unknown conditions of metallic surfaces at the side of the person on the hoist. Therefore, metal to metal connection in the hook is recommended, to prevent any damaging of the fabric by a maybe scratched hook surface in operation. Metal device as interface in the hook prevents this possible event.)

9.1.5. Rescue Equipment

Most rescue equipment logically/naturally belongs under the PPE (Personal Protective Equipment) definition. EC regulation 2016/425 and the associated European Norms are the certification basis for such equipment.

In most cases rescue equipment will carry the CE mark (EN norms with CE marks). One example is a hoist harness manufactured, tested and type certified i.a.w. EN 813.

In some cases, rescue equipment is EN compliant and therefore acceptable for compliance with EASA regulations but cannot carry the CE mark. One example is a rescue sling manufactured and tested i.a.w. EN 1498 (EN norm without CE marks).

NOTE: If a PCDS is not EU type examination certified, an approval can be achieved by a derogation request with the national authority if properly documented in the respective SOP of the requesting operational entity, e.g., for tactical / military / police / SAR operations.

In case of doubt for whether an equipment item is to be categorized simple or complex PCDS, EASA may as well be contacted for clarification of technical questions.

It is generally recommended for rescue equipment to clearly identify the person age size, weights range of fitting to respect children for equipment proper use.

NOTE: For carriage of babies and infants for hoisting in laying position, operator should use a specific suited rescue bag (for babies and infants). There is no EN standard for such rescue bag, but its components need to be certified to the relevant parts of EN norms for the intended use. For example, but not limited to EN1498, EN1497, EN12277, etc may apply.

NOTE: medical device regulation 2017/745 is not applicable in sense of/for PCDS equipment and functionality.

Rescue Equipment	**Casualty Rescue device for horizontal carriage**	**Rescue Basket**	▪ Categorized as Complex PCDS ▪ Made from corrosion resistant materials. ▪ The device must provide sufficient enclosing metal or other materials to permit a seated occupant to be unrestrained yet fully secure from unintentionally leaving the device. ▪ Recommended with an integrated floatation system allow for rescue of patients out the water even under harsh offshore conditions. ▪ Basket should have sufficient buoyancy to support its own weight plus sufficient additional buoyancy to keep a survivor's head above the water while seated. ▪ An anti-rotation device should be used for helicopter hoist operations (tag line, rudder or sail) whenever possible.
		Cage Style stretcher	▪ Categorized as Complex PCDS ▪ It is recommended to choose a metal / cage style which is purpose designed for helicopter hoist rescue (hoist straps/ attachment and patient retention). ▪ The stretcher should be connected to the hoist hook by a sling/hoisting bridal that ensures the 95th percentile male is hoisted with a slight head-up. The empty stretcher should therefore be suspended by a sling/bridal that holds an empty stretcher at a moderate head-up angle. ▪ If used in the offshore environment, cage type stretchers should be made from corrosion resistant materials. ▪ All stretchers should be outfitted with a patient restraint system that secures the patient and secures the patients arms so that occupant activation of restraint buckles is impossible. ▪ Safety advice, adjustable attachment straps – if adjusted improperly - can

				increase the danger of uncontrolled stretcher spins or put the patient at an unsafe angle for hoisting. Even slightly asymmetrically adjusted straps can have a huge effect in helicopter downwash. ▪ Adjustable straps, therefore, are not recommended without a clear visual system for ensuring a symmetrical adjustment and shall be constructed so that unsafe angles are impossible to achieve. ▪ An anti-rotation device should be used for helicopter hoist operations (tag line, ruder or sail) whenever possible
		Rescue Bag / stretcher (non-rigid)	**PCDS Type definitions**	➢ Equipment to be certified/qualified, such as for air rescue bags and claiming it as <u>simple PCDS</u> and going PPE certification way: is already accepted by EASA and operationally validated by a wide range of helicopter operators. (EC Type Examination Certificate in accordance with EU Regulation 2016/425 PPE, issued by a Notified Certification Body and EC Conformity Certificate, issued by the Manufacturer.)
			▪ Textile transportation device with horizontal person positioning ▪ Straps to position it stably ▪ Person inside is fixed to the rescue bag to prevent falling out. ▪ Proper locking devices for person fixation have to be included ▪ It should be provided with means of sufficient stiffness for horizontal stable form keeping.	

		Anti-rotation devices (Support to PCDS)	**AR Line / High Line**	▪ Mandatory fuse (weak link) near rescue bag/basket with defined force umbilical (force depending on operation need)
				  ▪ Highline (line deployed from the helicopter) approx. 1500N breakaway force
				  ▪ Anti-rotation Line (line deployed from the ground) approx. 400 N breakaway force
				▪ Quick release mechanism
				▪ Assessment and training to be performed for the operation to be intended
				▪ Active separation element, which is operable under

				tension, near rescue bag/basket for rescuer usage ▪ Separation element located at the end towards the hook ▪ Low stretch / static rope recommended ▪ Line length should be long enough regarding the hoist operation needed in order to create a correct force triangle for stabilization ▪ Color or knot codification for indication of length (last meters) ▪ No physical connection to the line operator/deck equipment (this is applicable for both ends of the line) ▪ Recommendation by ESPN-R: CAUTION label to be attached on the line-bag, “Do not attach the bag/end of the rope to the ground, objects or operator”. ▪ it may be practical when the bag and the end of the line is weighted, to prevent runaway.
			Aero-dynamic rudder or other means of rotation prevention	▪ Local rescue bag/basket detachable spin stopping device ▪ Manual rudders have to be operated by personnel trained or experienced in its usage for rotation stoppage and prevention while in rotor downwash zone
			Automatic stabilization system	▪ To be continued, as ESPN-R has not evaluated this technology yet
	Rescue device for vertical evacuation/ carriage	**Rescue Triangle / Seat**	▪ In acc to EN 1498 class B ▪ Usage only for rescue purpose ▪ More safe and better comfort than rescue sling (less body strength of person is needed) ▪ Proper sizing for the respective person to be transported ▪ Higher attachment and bearing point as the Person Body CoG ▪ Recommendation for fitting adjustment possibility or fitting for person size to be transported	

			▪ Not recommended for regular passenger transport ▪ Person weight limitation to be labeled on, for persons which can be carried with
		Rescue Sling / Strop	▪ In acc to EN 1498 class A ▪ The use of the rescue strop may be used as a last resort, if no other rescue equipment can be used ▪ it is recommended to use rescue slings with additional crotch strap options ▪ unattended casualty transport in single lift is not recommended, guided/escorted during the lift by rescuer, if practical ▪ Single slings not to be used for hoisting unconscious persons, as an imminent risk of slippage thru the sling exists. The double sling (in water rescues), or single slings with additional crotch strap may be used.
		Rescue Harness	▪ In acc to EN 1497 ▪ For fast evacuation of persons in case of emergencies ▪ Harness needs be operated, handled and adjusted by the rescuer for harness usage for the rescued person in case of emergency evacuation operation. ▪ Keeping and supporting the persons complete body in appropriate position during rescuing ▪ Attachment point, to be above/high enough of the person's body center of gravity.

9.1.6. Equipment to be hoisted

Equipment to be hoisted	**Equipment transport bags/devices**	▪ Personal / medical and rescue bags / devices to be evaluated on a case-by-case basis. ▪ The attachment points for the hoist hook shall be made out of metal ▪ For larger bags / devices markings on the bag/device should show where to lift it and the maximum allowable weight. ▪ Any aerodynamic effect of this specific equipment should be evaluated and procedure be adapted (whenever possible use cylindrical bags because they are affected less by downwash and wind) ▪ All equipment to be secured at foreseen anchor points.
	Animal Transport Devices	▪ For dog transport for operations (task purpose trained dogs) a dedicated gear shall be used ▪ For dog transportation a mouth piece/muzzle is highly recommended ▪ Dog always to be connected to the dog handler during hoist operation ▪ Markings on the animal retaining device should show where to lift it.

10. Annex A Specific PCDS Part (best practice samples)

Disclaimer: The shown devices are only for indication how to use the form sheet. It provides examples of existing products of the dedicated categories, but is not limited to these. ESPN-R does not give any recommendation to the equipment mentioned in this document- it provides best practice samples of the related product category.

Several samples within one filled form sheet are shown here, to support the sample character. For operational usage only the used equipment shall be listed, described and shown for its functions and usage.

10.1. Simple PCDS - sample cards

10.1.1. Sample cards for Lanyards

For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Recue Equipment / Cargo equipment
PCDS Equipment usage:	Lanyard / hoist operator securing device
PCDS Type	Simple
Equipment Name:	Length adjustable securing device.
applied EN Norm or certification baseline	EN 354 / EN 358 / EN 17520
Mandatory required functions for equipment:	• Length adjustable • Unintended length change via cyclic load or unintended operation should not occur • Connectors Standards: EN 362, EN 12275 • Dual action carabiner on the helicopter airframe, and with a triple action carabiner at the HHO TCM (body) side
Further available functions	Quick release (minimum double action) is highly recommended NOTE: recommended if emergency egress is required when the lanyard is under tension/tightened.
For usage in specific environment	Offshore/ onshore/ mountains
Picture of equipment	

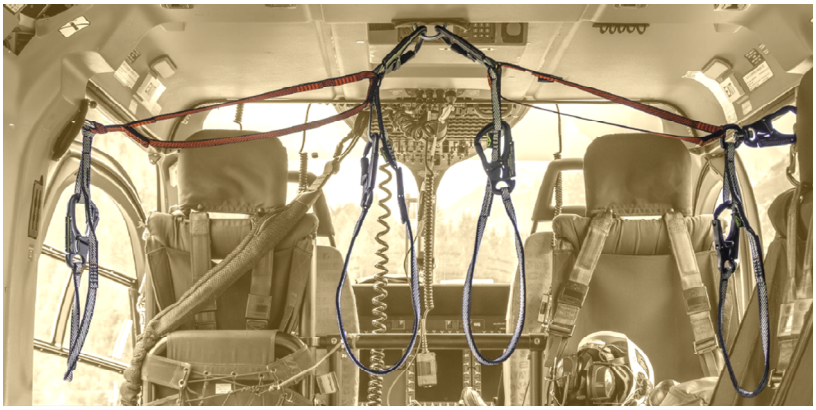
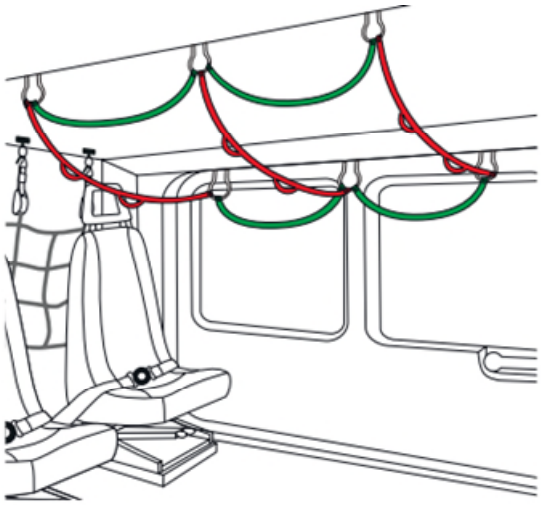
For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Recue Equipment / Cargo equipment
PCDS Equipment usage:	Lanyard / Rescuer & HEC securing device
PCDS Type	Simple:
Equipment Name:	Length adjustable securing device.
applied EN Norm or certification baseline	EN 354 / EN 358 / EN 17520 / UIAA 109
Mandatory required functions for equipment:	• Length adjustable • Unintended length change via cyclic load or unintended operation should not occur • Connectors Standards: EN 362, EN 12275 • Dual action carabineer on the helicopter airframe, and with a triple action carabineer at the Rescuer/HEC body side
Further available functions	The length of the Rescuer/HEC adjustable securing device, during flight in the cabin with open door operations, should be limited/set to the minimum length for this dedicated position.
For usage in specific environment	Offshore/ onshore/ mountains
Picture of equipment	

10.1.2. Sample cards for Connectors

Equipment Name:	Connector, commonly referred to as carabiner or quick-link
For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Rescue Equipment / Cargo equipment
PCDS Equipment usage:	Securing device
PCDS Type	Simple
applied EN Norm or certification baseline	EN 362 and/or EN 12275
Mandatory required functions for equipment:	• Always automatic gate locking device. • For frequent connection in areas that do not pose risk of accidental opening, a dual action carabiner may be used. • In populated areas a triple action carabiner is recommended. • To connect the harness to lanyard is always recommended a triple action gate. • Check the shape and class according to use and device foreseen to connect. • Carry out an evaluation to check suitability of the material used in relation of vibration. Quick links may be used only to create a semi-permanent connection between 2 devices. Proper closing torque should be used. Evaluation on the effect of vibration should be carried out for semi-permanent connection to the helicopter NOTE: ESPN-R recommends steel connectors at the helicopter hoist hook and stainless steel connectors in offshore operations.
Further available functions	Color codification Accessories to make the carabiner works properly
For usage in specific environment	Offshore: Corrosion resistant treatment or materials are highly recommended. Onshore: for all carabiner it's strongly suggested to secure them with appropriate means to a device directly or indirectly connected to the helicopter, to avoid possible drop on people. Mountains: connector used for mountaineering rescue, should be suitable for mountaineering.
Picture of equipment	

Equipment Name:	Interface devices (Master Attachment Point)
For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Rescue Equipment / Cargo equipment
PCDS Equipment usage:	Securing device
PCDS Type	Simple
applied EN Norm or certification baseline	EN 354, EN 362 and EN 12275, UIAA 130 - prEN 17961
Mandatory required functions for equipment:	• for carabiner, see sample card §10.1.2. • The length of the system has to be carefully assessed due to extra length of the rigging system. • Any potential interference with the helicopter hoist hook has to be assessed. NOTE: the connection of more than two persons, will require a complex PCDS. NOTE: more than one person secures inside the helicopter cabin, will require a complex PCDS, see CS27/CS29.
Further available functions	Rigging devices with functions other than suspending, the manufacturers recommendations, such as training, operation, maintenance, etc. have to be respected.
For usage in specific environment	Offshore: Corrosion resistant treatment or materials are recommended.
Picture of equipment	

10.1.3. Sample cards for Hoist cabin safety equipment devices

For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Recue Equipment / Cargo equipment
PCDS Equipment usage:	H/C Cabin safety equipment, anchor system
PCDS Type	Simple
Equipment Name:	Cabin safety system / attachment line
applied EN Norm or certification baseline	EN 795 B/C / EN 354 / EN 358 / EN 17520 / EN 566 and EN 362 / EN 12275
Mandatory required functions for equipment:	• Designed for anchor points in H/C type • Safety line/loop for connection of rescuer/TCM/HHOP/rescued person`s safety lanyard with connector • Securing line for HHOP/rescue equipment (length adjustable, if needed)
Further available functions	• Integrated fall absorber functions • Securing points for transfer of equipment • Removable without tools from helicopter-based Anchor points
For usage in specific environment	Offshore/ onshore/ mountains
Picture of equipment	 

10.1.4. Sample cards for Harness

For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Rescue Equipment / Cargo equipment
PCDS Equipment usage:	HHO Harness
PCDS Type	Simple
Equipment Name:	Helicopter Hoist Operator Harness
applied EN Norm or certification baseline	EN 813, EN 358, EN 361
Mandatory required functions for equipment:	• Secures the TCM HHO to the anchor point of the helicopter. • Should allow maximum mobility inside the helicopter cabin, • dorsal/sternal attachment point, • not to be prone to entanglement / interference with the helicopter structure or other equipment.
Further available functions	• Full body harness • Quick release for use in emergency, if not installed in the lanyard, i.e., ditching
For usage in specific environment	Offshore/ onshore/ mountains
Picture of equipment	   

For usage in PCDS System:	H/C fixed / Hoist operator / **Rescuer & HEC passenger** / Rescue Equipment
PCDS Equipment usage:	Rescuer Harness
PCDS Type	Simple
Equipment Name:	Rescuer Harness
applied EN Norm or certification baseline	EN 813, EN 361, EN12277 Type A or C or C&D
Mandatory required functions for equipment:	• Hold the rescuer in place, • safely connected to the hoist hook NOTE: Risk assessment to be performed regarding body positioning/inclination while hoisting (respect of tilting over event) (If the operation profile allows, a high bearing point is recommended)
Further available functions	Quick release devices may be used, when required by the operation, e.g., offshore rescue.
For usage in specific environment	Offshore/ onshore/ mountains
Picture of equipment	    

10.1.5. Sample cards for Rescue bags

For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Rescue Equipment / Cargo equipment
PCDS Equipment usage:	Rescue Bag
PCDS Type	Simple
Equipment Name:	Hoistable Rescue Bag
applied EN Norm or certification baseline	EC Type Examination Certificate in accordance with EU Regulation 2016/425 PPE, issued by a Notified Certification Body and EC Conformity Certificate, issued by the Manufacturer.
Mandatory required functions for equipment:	• Horizontal/lying patient transport on the hoist of a helicopter together with a vacuum mattress or stretcher (spine board). • The outer shell is intended to provide protection for the patient against environmental influences. • The hoistable rescue bag represents the securing of the patient to the HEC system and the securing of the patient in the helicopter cabin. • Sufficient handles for loading and handling.
Further available functions	Protection of the patient from environmental influences (cold, rain, etc.). Protection of the patient from downwash, dust, small flying objects, etc. Rotation during flight procedures should be avoided by using devices such as anti-rotation sails or/and tag-/high-lines.
For usage in specific environment	Mountains / onshore / offshore (not water rescue)
Picture of equipment	  

For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Rescue Equipment / Cargo equipment
PCDS Equipment usage:	Rescue rollable stretcher (non-rigid)
PCDS Type	Simple:
Equipment Name:	Hoistable Rescue stretcher
applied EN Norm or certification baseline	EC Type Examination Certificate in accordance with EU Regulation 2016/425 PPE, issued by a Notified Certification Body and EC Conformity Certificate, issued by the Manufacturer.
Mandatory required functions for equipment:	• Horizontal/lying patient transport on the hoist of a helicopter together with a vacuum mattress or stretcher (spine board) or even as a standalone system. • The integrated harness system of the stretcher secures the patient to the HEC system. • Sufficient handles for loading and handling.
Further available functions	Protection of the patient from environmental influences (cold, rain, etc.). as well downwash, dust, small flying objects, etc. and may be combined with any patient bag. Rotation during flight procedures should be avoided by using devices such as anti-rotation sails or/and tag-/high-lines.
For usage in specific environment	Mountains / onshore / offshore
Picture of equipment	 

10.1.6. Sample cards for Rescue triangle/seat

For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Rescue Equipment / Cargo equipment
PCDS Equipment usage:	Rescue Device
PCDS Type	Simple
Equipment Name:	Rescue Triangle
applied EN Norm or certification baseline	EN1498 B
Mandatory required functions for equipment:	• Has to hold one Person for lifting up • Has to hold the patient in a comfortable sitting position • Has to be size adaptable • Has to be positioned fast • Has to be intuitive (loop colors, etc.) • Folding the device should be possible
Further available functions	• Shoulder straps • Securing line for the patient on the Triangle • Should have a handgrip on the backside to bring the patient easily into the cabin • Optional: also usable as a rescue sling (dual use)
For usage in specific environment	Offshore/ onshore/ mountains
Picture of equipment	

10.1.7. Sample cards for Rescue Sling / Strop

For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Rescue Equipment / Cargo equipment
PCDS Equipment usage:	Rescue Sling
PCDS Type	Simple
Equipment Name:	Rescue Sling / Strop
applied EN Norm or certification baseline	EN 1498, class A or B (Class A as last resort only)
Mandatory required functions for equipment:	• Hold the casualty safely in place while hoisting to helicopter • Crotch strap to prevent slip out • Single slings not to be used for hoisting unconscious persons, as an imminent risk of slippage thru the sling exists! • Connecting point to hoist hook should utilize stainless steel A-rings to minimize risk of dynamic roll out
Further available functions	• Open or closed sling • Self-Securing System allows a conscious casualty to hold on and thereby securing themselves
For usage in specific environment	Offshore/ onshore/ mountains
Picture of equipment	  

10.1.8. Sample cards for special device (add on device)

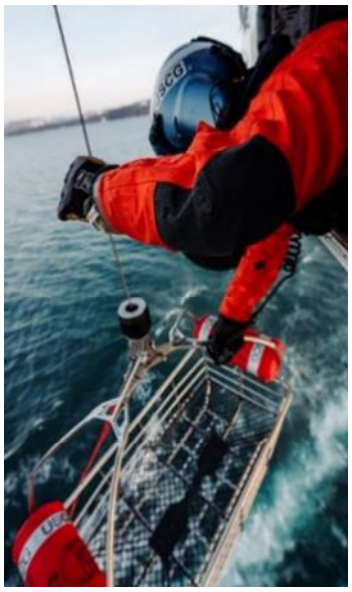
For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Rescue Equipment / Cargo equipment
PCDS Equipment usage:	Quick release for rescuer
PCDS Type	Simple, if integrated in an EN certified device:
Equipment Name:	Quick release box/system
applied EN Norm or certification baseline	No EN certification as a standalone product. Any quick release to be considered as integrated part of the (EN type certified) hoist harness or lanyard
Mandatory required functions for equipment:	• Minimum Dual action release system • Operate (able to release) under tension • Single hand operation by means of very distinctive actions • Simple to reset/reconnect NOTE: A visual indication of locked or unlocked position would be recommended for any new design.
Further available functions	Secondary ring to facilitate connection to secondary hoist
For usage in specific environment	Offshore/ onshore/ mountains
Picture of equipment	    

10.1.9. Sample cards for Cage Style stretcher:

For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Rescue Equipment / Cargo equipment
PCDS Equipment usage:	Cage Style Stretcher – used to hoist non-ambulatory patients in the supine position.
PCDS Type	Complex
Equipment Name:	Stretcher/ Litter
applied EN Norm or certification baseline	Complex PCDS needs to be certified in accordance with CS27 or CS29 by a PART 21 certified company, if it's supposed to be used by an EASA regulated operator.
Mandatory required functions for equipment:	• It is recommended that the cage style stretcher is designed for helicopter hoist rescue (hoist straps/ attachment and patient retention). • The stretcher connected to the hoist hook by the sling/hoisting bridal that ensures the 95th percentile male is hoisted with a slight head-up angle. • the sling/bridal holds an empty stretcher with a moderate head-up angle. • Fur usage in offshore environment, the cage type stretcher to be made from corrosion resistant materials. • Due to the forces applied to this device – including shock loading – the cage style stretcher (and their slings/attachment bridals) should be of sufficient strength. • Stretcher to be outfitted with a patient restraint system that secures the patient and secures the patients arms so that occupant activation of restraint buckles is impossible. • Safety advice, adjustable attachment straps should support a proper adjustment and fixation of the patient in position inside the stretcher, in order to prevent danger of uncontrolled spin due to unsafe angle for hoisting. • Even slightly asymmetrically adjusted straps can have a huge effect in helicopter downwash. • Adjustable straps, therefore, are not recommended without a clear visual system for ensuring a symmetrical adjustment and shall be constructed so that unsafe angles are impossible to achieve. • Carabiners or maillons used to connect slings to stretchers should be configured with the open side of the hardware inboard, facing the patient when attached to the stretcher and properly secured.
Further available functions	Cage style stretcher with an integrated floatation system allow for rescue of patients out the water in case of a spine injury for example, even under harsh offshore conditions. They also provide for the safe transfer of patients between vessels and from the vessel to the aircraft. Litters that are not designed to float with the patients head out of the water should not be used for offshore rescue. An anti-rotation device should be used for helicopter hoist operations (tag line, ruder or sail) whenever possible.
For usage in specific environment	Mountains / onshore / offshore

Picture of equipment	 

10.1.10. Sample cards for Rescue baskets

For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Rescue Equipment / Cargo equipment
PCDS Equipment usage:	Rescue out of water and onshore
PCDS Type	Complex
Equipment Name:	Rescue Basket
applied EN Norm or certification baseline	Complex PCDS needs to be certified in accordance with CS27 or CS29 by a PART 21 certified company, if it's supposed to be used by an EASA regulated operator.
Mandatory required functions for equipment:	• Basket to be made from corrosion resistant materials. • The device must provide sufficient enclosing metal or other materials to permit a seated occupant to be unrestrained yet fully secure from unintentionally leaving the device.
Further available functions	• Baskets with an integrated floatation system allow for rescue of patients out the water even under harsh offshore conditions. • Basket should have sufficient buoyancy to support its own weight plus sufficient additional buoyancy to keep a survivor's head above the water while seated. • An anti-rotation device should be used for helicopter hoist operations (tag line, ruder or sail) whenever possible.
For usage in specific environment	Mountains / onshore / offshore / disaster relief
Picture of equipment	 

10.2. Sample cards for Miscellaneous support equipment

10.2.1. Sample cards for Anti-static line

For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Rescue Equipment / Cargo equipment
PCDS Equipment usage:	Anti-static line
PCDS Type	n/a
Equipment Name:	Static Discharge Wire
applied EN Norm or certification baseline	n/a
Mandatory required functions for equipment:	Provide electrical connection between hoist cable and ground, before the rescuer touches down, to prevent electric shock
Further available functions	Stainless steel karabiner for easy connection Built-in weak link and optional swivel
For usage in specific environment	Offshore/ onshore/ mountains
Picture of equipment	 

10.2.2. Sample cards for Anti-rotation device

For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Rescue Equipment / Cargo equipment
PCDS Equipment usage:	Anti-rotation device
PCDS Type	n/a
Equipment Name:	
applied EN Norm or certification baseline	n/a
Mandatory required functions for equipment:	• Reducing/ prevention rotation of horizontal rescue device • Operated by the rescuer attending the horizontal rescue device
Further available functions	
For usage in specific environment	Offshore/ onshore/ mountains
Picture of equipment	 

For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Rescue Equipment / Cargo equipment
PCDS Equipment usage:	High line / Anti rotation line
PCDS Type	n/a
Equipment Name:	Anti-rotation line, High line/ Tag line/ guide line/ trail line
applied EN Norm or certification baseline	n/a
Mandatory required functions for equipment:	• Umbilical at defined rip off force • Device for separation under tension/ quick release • Sufficient line length • None dynamic line • Proper connectable to rescue device required point
Further available functions	High visibility options, i.e., built in reflective stripes Static discharge, i.e., internal electrically conducting core
For usage in specific environment	Offshore/ onshore/ mountains
Picture of equipment	  

10.2.3. Sample cards for Equipment to be hoisted

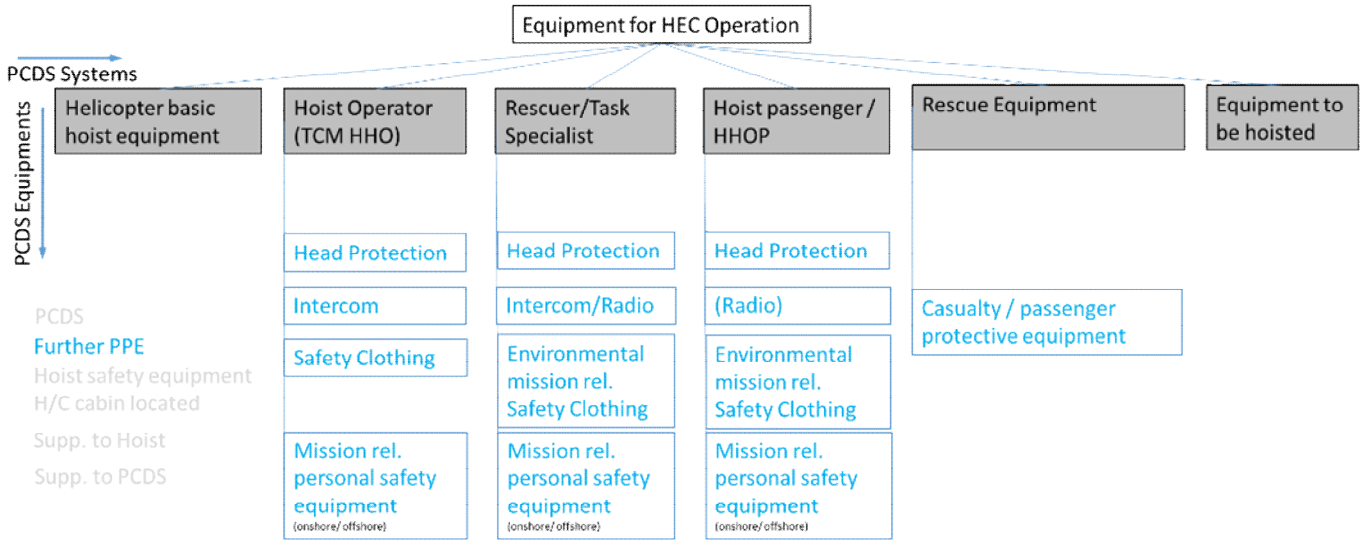
For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Rescue Equipment / Cargo equipment
PCDS Equipment usage:	Miscellaneous cargo equipment / Equipment Transport bag/device, Weight bag
PCDS Type	n/a
Equipment Name:	Equipment Bag
applied EN Norm or certification baseline	N/A
Mandatory required functions for equipment:	Clear identification of the attachment / lifting point, working load limit
Further available functions	
For usage in specific environment	Offshore/ onshore/ mountains
Picture of equipment	

11. Annex B: Template Form for PCDS equipment item characteristics and function recording

For usage in PCDS System:	H/C fixed / Hoist operator / Rescuer & HEC / Rescue Equipment / Cargo equipment
PCDS Equipment usage:	
PCDS Type	Simple or Complex
Equipment Name:	
applied EN Norm or certification baseline	
Mandatory required functions for equipment:	
Further available functions	
For usage in specific environment	Offshore / onshore / mountains
Picture of equipment	

Table 4: PCDS equipment item characteristics form for function and requirement recording

12. Annex C: Compatibility of further PPE



General consideration: Do a compatibility check between the further PPE and PCDS equipment and -systems.

Further PPEs shall work fully within their intended, foreseen and needed functionality, also in presence of the PCDS Equipment and -Systems (this statement is also valid vice versa!)!

Especially the PPE Cat III safety related functions must not be blocked, interfered, hindered or hampered in its function or handling/operation by other present equipment/parts (including PCDS).

In case of interference with PCDS, the further PPE should be checked for other options to be used, which will not interfere. If this is not possible, also the PCDS equipment/system should be evaluated for possible other options for enabling the impacted/interfered functions.

For further PPE equipment following considerations should be made:

Hoist Operator (TCM HHO)	**Head Protection**	▪ consideration for proper head protection/helmet with intercom connection, ear protection and eye protection ▪ Flight helmet recommended ▪ for Ops which incorporate a prolonged exposure of the TCM HHO to the weather, use of a face shield is recommended.
	Intercom	▪ direct connection into the H/C intercom system with clear audio connection ▪ proper microphone with protection from external noise

	Safety Clothing	▪ Clothing of the TCM HHO to be adjusted to the environmental requirements. ▪ Excessive heat and hypothermia can have a huge impact on the physical performance of the crew. ▪ The necessity of flame retardant clothing has to be assessed by the operator. ▪ Hidden dangerous are the windchill effeteness of the airspeed caused by rotor wash. ▪ Do compatibility check between the clothing and the PPE and PCDS. ▪ <u>Gloves</u>: o a special - glove to handle the cable and to protect the hand. o Give the ability to handle the cable all the time. o Gloves with create high friction should be avoided to prevent the “milking effect” on the hoist cable. *Samples picture of hoist gloves for different environmental conditions and need:*    ▪ <u>Shoes</u>: o Protective shoes regarding the environment, without jamming parts to avoid damaging or catching the hoist cable. o Ankle high shoes are recommended give the best covering for the feet
	Mission related personal safety equipment (onshore/offshore)	▪ Cutting devices, Lighting, and survival Equipment, depends on the environmental operation profile.

<u>NOTE:</u> Also, further PPE equipment needs training for safe handling in every situation.

Rescuer / Task Specialist	**Head Protection**	▪ The certification of the helmet has to meet the environmental operation profile. ▪ Eye and ear protection for usage in H/C environment ▪ Correct impedance for connection to H/C ▪ Correct connector for intercom system
	Intercom/radio	▪ Connector Capable for plugging into H/C intercom ▪ Easy connector changes from intercom into personal radio device ▪ PTT radio transmission ▪ For example: water compatibility of comm. systems in offshore operations.
	Environmental mission related safety clothing	▪ Clothing of the task specialists are to be adjusted to the environmental requirements. ▪ Excessive heat and hypothermia can have a huge impact on the physical performance of the crew. ▪ Hidden dangerous are the windchill effeteness of the airspeed caused by rotor wash. ▪ Do compatibility check between the clothing and the PPE and PCDS. ▪ Gloves: o needed types of gloves to protect for mechanical influences and offer dexterity to operate the hoist hook and other PCDS fast and safe. o An important point is also a high visibility color of the gloves, for hand signals to the TCM HHO ▪ Shoes: o Protective shoes regarding the environment, without jamming parts to avoid damaging or catching the hoist cable. o Suited for the environmental conditions when operated off-H/C o Ankle high shoes are recommended give the best covering for the feet
	Mission related personal safety equipment (onshore/offshore)	▪ Cutting devices; Lighting, and survival Equipment, depends on the environmental operation profile.

NOTE: Also, further PPE equipment needs training for safe handling in every situation.

Hoist Passenger / HHOP	**Head Protection**	▪ Recommendation for helmet which meets environmental requirements ▪ Eye and ear protection for usage in H/C environment
	(Radio)	▪ depends on mission or ops requirements
	Safety Clothing	▪ Clothing of the HHOP to be adjusted to the environmental requirements. ▪ Shoes: o Protective shoes regarding the environment, without jamming parts to avoid damaging or catching the hoist cable.
	Mission related personal safety equipment (onshore/offshore)	▪ Cutting devices; Lighting, and survival Equipment, depends on the environmental operation profile.

NOTE: Also, further PPE equipment needs training for safe handling in every situation.

Rescue Equipment	**Casualty / Passenger protective equipment**	▪ the Casualty / Passenger protective equipment must match with the other rescue equipment applied for rescue of the person. ▪ Recommendation for usage of head-, eye-, ear- protection, which can be applied by the rescuer/ task specialist, to prevent impact to downwash and downwash generated/swirled environmental debris, if it fits with the injury and the rescue operation. ▪ Compatibility to be checked with the rescue equipment, which will be used in combination. ▪ Can be applied to the person (if it fits with the injury) or possibly also be integrated into the rescue equipment.

13. Annex D Relevant extracts of Regulations (April 2024)

13.1. Air Operations regulations

Easy Access Rules for Air Operations (Regulation (EU) No 965/2012)

(95a) 'personnel-carrying device system (PCDS)' means a system including one or more devices that is either attached to a hoist or cargo hook or mounted to the rotorcraft airframe during human external cargo (HEC) or helicopter hoist operations (HHO). The devices have the structural capability and features needed to transport occupants external to the helicopter e.g., a life safety harness with or without a quick release and strop with a connector ring, a rigid basket or a cage;
(95b) 'simple personnel carrying device system (simple 'PCDS')' means a PCDS that complies with the following conditions:
(a) meets a harmonised standard under Regulation (EU) 2016/425 of the European Parliament and of the Council1 or Directive 2006/42/EC of the European Parliament and of the Council2;
(b) is designed to restrain no more than a single person (for instance, hoist or cargo hook operator, task specialist or photographer) inside the cabin, or to restrain no more than two persons outside the cabin;
(c) is not a rigid structure such as a cage, a platform or a basket;

GM17 Annex I Definitions

ED Decision 2019/019/R
SIMPLE AND COMPLEX PERSONNEL-CARRYING DEVICE SYSTEM (PCDS)
(a) The following may qualify as a simple PCDS:
(1) A safety harness or rescue triangle for no more than two persons.
(2) A fixed-rope system for no more than two persons, to be attached under a single cargo hook or Y-rope to be attached to a dual hook.
(b) The following may not qualify as a simple PCDS:
(1) Any system that connects three persons or more to the helicopter.
(2) A PCDS with new or novel features.
(3) A PCDS that has not yet been proven by an appreciable and satisfactory service experience.
(c) The connecting elements to the hoist or cargo hook are part of the PCDS.
(d) The following standards may be used for a simple PCDS:

Table 1: Information on existing available standards applicable to a simple PCDS **Regulation (EU) 2016/4251 or Directive 89/686/EEC if validly marketed before 21 April 2019**	**Personal protective equipment**
Directive 2006/42/EC2	Machinery
EN 354	Personal protective equipment for work positioning and prevention of falls from a height — lanyards
EN 355	Personal protective equipment against falls from a height — energy absorbers
EN 358	Personal protective equipment for work positioning and prevention of falls from a height — belts for work positioning and restraint and work positioning lanyards
EN 361	Personal protective equipment against falls from a height — full body harnesses
EN 362	Personal protective equipment against falls from a height — connectors

Regulation (EU) 2016/4251 or Directive 89/686/EEC if validly marketed before 21 April 2019	Personal protective equipment
EN 363	Personal fall protection equipment — personal fall-protection systems
EN 364	Personal protective equipment against falls from a height — test methods
EN 365	Marking/packaging/instructions to use
EN 813	Personal fall-protection equipment — sit harnesses
EN 1497	Personal protective equipment against falls from a height — rescue harnesses
EN 1498	Personal protective equipment against falls from a height — rescue loops
EN 1891	Personal protective equipment for the prevention of falls from a height — low stretch kernmantle ropes
EN 12275	Mountaineering equipment — connectors — safety requirements and test methods
EN 12277	Mountaineering equipment — harnesses — safety requirements and test methods

SPA.HHO.110 Equipment requirements for HHO

Regulation (EU) 2019/1384

(a) The installation of all helicopter hoist equipment other than a simple PCDS, including any radio equipment to comply with point SPA.HHO.115, and any subsequent modifications, shall have an airworthiness approval appropriate to the intended function. Ancillary equipment shall be designed and tested to the appropriate standard as required by the competent authority.

(b) Maintenance instructions for HHO equipment and systems shall be established by the operator in liaison with the manufacturer and included in the operator's helicopter maintenance programme as provided for by Regulation (EU) No 1321/2014.

NCO.IDE.H.100 Instruments and equipment – general

Regulation (EU) 2019/1384

(a) Instruments and equipment required by this Subpart shall be approved in accordance with the applicable airworthiness requirements if they are:

(1) used by the flight crew to control the flight path;

(2) used to comply with NCO.IDE.H.190;

(3) used to comply with NCO.IDE.H.195; or

(4) installed in the helicopter. ***Easy Access Rules for Air Operations*** *ANNEX VII (Part-NCO) SUBPART D: INSTRUMENTS, DATA AND EQUIPMENT*
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(b) The following items, when required under this Subpart, do not need an equipment approval:

(1) independent portable lights;

(2) an accurate time piece;

(3) first-aid kit;

(4) survival and signalling equipment;

(5) sea anchor and equipment for mooring;

(6) child restraint device;

(7) a simple PCDS used by a task specialist as a restraint device.

NCO.SPEC.HEC.105 Specific HEC equipment

Regulation (EU) 2019/1384

(a) The helicopter shall be equipped with:
(1) hoist operations equipment or cargo hook;
(2) one cargo safety mirror or alternative means to see the hook; and
(3) one load meter, unless there is another method of determining the weight of the load.
(b) The installation of all hoist and cargo hook equipment other than a simple PCDS, and any subsequent modifications shall have an airworthiness approval appropriate to the intended function.

SPO.IDE.H.100 Instruments and equipment – general

Regulation (EU) 2019/1384

(a) Instruments and equipment required by this Subpart shall be approved in accordance with the applicable airworthiness requirements if they are:
(1) used by the flight crew to control the flight path;
(2) used to comply with SPO.IDE.H.215;
(3) used to comply with SPO.IDE.H.220; or
(4) installed in the helicopter.
(b) The following items, when required by this Subpart, do not need an equipment approval:
(1) independent portable lights;
(2) an accurate time piece;
(3) first-aid kit;
(4) survival and signalling equipment;
(5) sea anchor and equipment for mooring;
(6) child restraint device;
(7) a simple PCDS used by a task specialist as a restraint device.

SPO.SPEC.HEC.105 Specific HEC equipment

Regulation (EU) 2019/1384

(a) The helicopter shall be equipped with:
(1) hoist operations equipment or cargo hook;
(2) one cargo safety mirror or alternative means to see the hook; and
(3) one load meter, unless there is another method of determining the weight of the load.
(b) The installation of all hoist and cargo hook equipment other than a simple PCDS, and any subsequent modifications shall have an airworthiness approval appropriate to the intended function.

13.2. Certification specifications

CS 27 small rotorcraft Certification Specifications (CSs) | EASA (europa.eu)

CS 29 large rotorcraft Certification Specifications (CSs) | EASA (europa.eu)

AMC 29.865 External Loads

This AMC provides further guidance and acceptable means of compliance to supplement FAA AC 29- 2C Change 7 AC 29.865B § 29.865 (Amendment 29-43) EXTERNAL LOADS to meet

EASA's 1 Council Directive 89/686/EEC of 21 December 1989 on the approximation of the laws of the Member States relating to personal protective equipment (OJ L 399, 30.12.1989, p. 18). 2 Regulation (EU) 2016/425 of the European Parliament and of the Council of 9 March 2016 on personal protective equipment and repealing Council Directive 89/686/EEC (OJ L 81, 31.3.2016, p. 51). CS-29 Amendment 11 Subpart D — Design and Construction Annex II to EDD 2023/001/R Page 154 of 399 interpretation of CS 29.865. As such, it should be used in conjunction with the FAA AC but should take precedence over it, where stipulated, in the showing of compliance.

AMC No 1 below addresses the specificities of complex personnel-carrying device systems for human external cargo applications.

AMC No 2 below contains a recognised approach to the approval of simple PCDSs if required by the applicable operating rule or if an applicant elects to include simple PCDSs within the scope of type certification.

[Amdt: 29/5] [Amdt: 29/6]

AMC 27.865 External Loads

ED Decision 2018/015/R

This AMC provides further guidance and acceptable means of compliance to supplement FAA AC 27- 1B Change 7 AC 27.865B § 27.865 EXTERNAL LOADS to meet EASA's interpretation of CS 27.865. As such, it should be used in conjunction with the FAA AC but should take precedence over it, where stipulated, in the showing of compliance.

AMC No 1 addresses certification for applications that require the use of Category A rotorcraft.

AMC No 2 addresses the specificities of complex personnel-carrying device systems for human external cargo applications. This AMC provides further guidance and acceptable means of compliance to supplement FAA AC 27-1B Change 7 AC 27.865B § 27.865 (Amendment 27-36) EXTERNAL LOADS to meet EASA's interpretation of CS 27.865.

AMC No 3 contains a recognised approach to the approval of simple personnel-carrying device systems if required by the applicable operating rule or if an applicant elects to include simple personnel-carrying device systems within the scope of type certification.

[Amdt No: 27/5] [Amdt No: 27/6]

NOTE: The certification memorandum CM-CS-005 has been replaced with AMC No.3 27.865 / respectively AMC No.2 29.865.

13.3. EU regulation on PPE

REGULATION (EU) 2016/ 425 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL - of 9 March 2016 - on personal protective equipment and repealing Council Directive 89/ 686/ EEC (europa.eu)

Definition

(10) ‘harmonised standard’ means a harmonised standard as defined in point (c) of point 1 of Article 2 of Regulation (EU) No 1025/2012;

> Extract of Article 2 of Regulation (EU) No 1025/2012:
>
> (1) ‘standard’ means a technical specification, adopted by a recognised standardisation body, for repeated or continuous application, with which compliance is not compulsory, and which is one of the following:
>
> (c) ‘harmonised standard’ means a European standard adopted on the basis of a request made by the Commission for the application of Union harmonisation legislation;

Article 4 Making available on the market

PPE shall only be made available on the market if, where properly maintained and used for its intended purpose, it complies with this Regulation and does not endanger the health or safety of persons, domestic animals or property.

Article 47

Transitional provisions

1. Without prejudice to paragraph 2, Member States shall not impede the making available on the market of products covered by Directive 89/686/EEC which are in conformity with that Directive and which were placed on the market before 21 April 2019.

2. EC type-examination certificates and approval decisions issued under Directive 89/686/EEC shall remain valid until 21 April 2023 unless they expire before that date.

ANNEX I RISK CATEGORIES OF PPE

This Annex lays down the categories of risk against which PPE is intended to protect users.

Category I Category I includes exclusively the following minimal risks:

(a) superficial mechanical injury; (b) contact with cleaning materials of weak action or prolonged contact with water; (c) contact with hot surfaces not exceeding 50 °C; (d) damage to the eyes due to exposure to sunlight (other than during observation of the sun); (e) atmospheric conditions that are not of an extreme nature.

Category II Category II includes risks other than those listed in Categories I and III;

Category III Category III includes exclusively the risks that may cause very serious consequences such as death or irreversible damage to health relating to the following:

(a) substances and mixtures which are hazardous to health; (b) atmospheres with oxygen deficiency; (c) harmful biological agents; (d) ionising radiation; (e) high-temperature environments the effects of which are comparable to those of an air temperature of at least

100 °C; (f) low-temperature environments the effects of which are comparable to those of an air temperature of – 50 °C or less;

(g) falling from a height;

(h) electric shock and live working; (i) drowning; (j) cuts by hand-held chainsaws; (k) high-pressure jets; (l) bullet wounds or knife stabs; (m) harmful noise.

ESPN-R Hoist Safety Promotion working group

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