



Technical Circular

No.: 010/2021

Date: 16th February 2021

Subject: Pilot Transfer Arrangements.

1. The IMO Convention for Safety of Life at Sea (SOLAS Chapter V, Regulation 23) sets out the principal requirements for the rigging of pilot ladders. There is further detailed technical specification for pilot ladder in IMO Resolution A.1045 (27).
2. Though above Regulation (SOLAS Regulation V/23) is applicable since 1 July 2012, deficiencies with regard to boarding arrangements and unsafe rigging of pilot ladders continue to be detected during port state control inspections, resulting in delays and financial penalties for the ship operator.
3. The International Maritime Pilots' Association (IMPA), has also voiced their concern stating that many vessel operators do not comply with safety regulations for pilot ladders. A result of survey undertaken by IMPA shows that:
 - a) 12.1% of the vessels inspected did not comply with the SOLAS regulations for pilot ladders.
 - b) The worst- performing regions were Europe, North America and the Middle East, where non-compliance levels exceeded 18%.
 - c) More than 21% of passenger- ships, 19% of reefers and 15% of chemical tankers failed to meet the regulatory requirements.
4. It was also found that vessels generally fail to comply with the rules when their ladders are old and overused, or when seafarers fail to install them correctly.
5. In view of above, ship Owners / managers and Masters are advised to ensure that pilot ladders onboard are complying with the requirements of SOLAS Chapter V, Regulation 23 and IMO Resolution A.1045 (27). Following are to be noted for compliance;
 - a) A pilot ladder placed on a vessel with keel laid after 1 July 2012 or equipment in its entirety or for individual components of the system delivered after 1 July 2012, is certified by the manufacturer as complying with the requirements of SOLAS Chapter V, Regulation 23 and IMO Resolution A.1045 (27) as amended.
 - b) A record is maintained on board providing the date the pilot ladder is placed into service and any repairs carried out.
 - c) The pilot ladder is regularly inspected and record of inspections is maintained to ensure that the pilot ladder is safe to use.

- d) Shipside doors used for pilot transfer must open inwards in accordance with SOLAS Regulation V/23, paragraph 5.
- e) The use of mechanical pilot hoists is prohibited on all ships in accordance with the requirements of SOLAS Regulation V/23, paragraph 6.
- f) The side ropes of the pilot ladder should be made of manila or other material of equivalent strength, durability, elongation characteristics and grip and should consist of two uncovered ropes not less than 18 mm in diameter on each side and should be continuous, with no joints and have a breaking strength of at least 24 KN per side rope.
- g) Permanent marking is provided at regular intervals (e.g. 1m) throughout the length of the ladder in order to facilitate the rigging of the ladder to the required height.
- h) The retrieval line should be fastened at or above the last spreader step and should lead forward.
- i) The steps of the ladders should be made of hardwood, in one piece and non-slippery.
- j) The steps should not be less than 115 mm wide, 25 mm in depth and should be not less than 400 mm between the side ropes.
- k) The steps should be equally spaced not less than 310 mm or more than 350 mm apart and they should be secured in such a manner that each will remain horizontal.
- l) No pilot ladder should have more than two replacement steps which are secured in position by a method different from that used in the original construction of the ladder.
- m) Safe, convenient and unobstructed passage is provided for any person embarking on, or disembarking from, the ship between the head of the pilot ladder, or of any accommodation ladder, and the ship's deck. Where such passage is by means of:
 - i. A gateway in the rails or bulwark, adequate handholds shall be provided;
 - ii. A bulwark ladder, two handhold stanchions rigidly secured to the ship's structure at or near their bases and at higher points shall be fitted. The bulwark ladder shall be securely attached to the ship to prevent overturning.
- n) The securing strong points, shackles and securing ropes are in good shape.
- o) Where Accommodation ladders is used in conjunction with pilot ladders (ships with freeboard of more than 9 metres).

- i. The length of the accommodation ladder should be sufficient to ensure that its angle of slope does not exceed 45 deg and the accommodation ladder should be at least 600 mm in width.
 - ii. The lower platform of the accommodation ladder should be in a horizontal position and secured to the ship's side when in use. The lower platform should be a minimum of 5 m above sea level.
 - iii. The pilot ladder should be rigged immediately adjacent to the lower platform of the accommodation ladder and the upper end should extend at least 2 m above the lower platform. The horizontal distance between the pilot ladder and the lower platform should be between 0.1 and 0.2 m.
 - p) Embarkation/disembarkation area is illuminated for transfer arrangement over side and on the deck.
 - q) The rigging of the pilot transfer arrangements and embarkation of a pilot is supervised by a responsible officer and associated safety equipment such as life jackets, harness, life lines and life buoys is in place to assure the safety of personnel.
6. Attached checklist may be used by the Vessel's Master / managers to verify that pilot ladders onboard are complying with the requirements of SOLAS Chapter V, Regulation 23 and IMO Resolution A.1045 (27). The checklist may form part of the ships SMS and be used as an inspection checklist by responsible ship's officer and records be kept for future reference.
7. Ship owners / managers and Masters are advised to be guided by above and ensure compliance.

Enclosure:

1. IMO Resolution A.1045 (27)
2. IMO Resolution A.1108 (29)
3. Check List for Pilot Transfer Arrangements

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ASSEMBLY
27th session
Agenda item 9

A 27/Res.1045
20 December 2011
Original: ENGLISH

Resolution A.1045(27)

**Adopted on 30 November 2011
(Agenda item 9)**

PILOT TRANSFER ARRANGEMENTS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization regarding the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

NOTING the provisions of regulation V/23 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its eighty-seventh session,

1. ADOPTS the "Recommendation on Pilot Transfer Arrangements", as set out in the Annex to the present resolution;
2. INVITES Governments to draw the attention of all concerned to this recommendation;
3. FURTHER INVITES Governments to ensure that mechanical pilot hoists are not used;
4. REQUESTS Governments to ensure that pilot ladders and their arrangements, use and maintenance conform to standards not inferior to those set out in the annex to the present resolution;
5. REVOKES resolution A.889(21).

Annex

RECOMMENDATION ON PILOT TRANSFER ARRANGEMENTS**1 GENERAL**

Ship designers are encouraged to consider all aspects of pilot transfer arrangements at an early stage in design. Equipment designers and manufacturers are similarly encouraged, particularly with respect to the provisions of paragraphs 2.1.2, 3.1 and 3.3.

2 PILOT LADDERS

A pilot ladder should be certified by the manufacturer as complying with this section or with the requirements of an international standard acceptable to the Organization.¹

2.1 Position and construction

2.1.1 The securing strong points, shackles and securing ropes should be at least as strong as the side ropes specified in section 2.2 below.

2.1.2 The steps of the pilot ladders should comply with the following requirements:

- .1 if made of hardwood, they should be made in one piece, free of knots;
- .2 if made of material other than hardwood, they should be of equivalent strength, stiffness and durability to the satisfaction of the Administration;
- .3 the four lowest steps may be of rubber of sufficient strength and stiffness or other material to the satisfaction of the Administration;
- .4 they should have an efficient non-slip surface;
- .5 they should be not less than 400 mm between the side ropes, 115 mm wide and 25 mm in depth, excluding any non-slip device or grooving;
- .6 they should be equally spaced not less than 310 mm or more than 350 mm apart; and
- .7 they should be secured in such a manner that each will remain horizontal.

2.1.3 No pilot ladder should have more than two replacement steps which are secured in position by a method different from that used in the original construction of the ladder, and any steps so secured should be replaced as soon as reasonably practicable by steps secured in position by the method used in the original construction of the pilot ladder. When any replacement step is secured to the side ropes of the pilot ladder by means of grooves in the sides of the step, such grooves should be in the longer sides of the step.

¹ Refer to the recommendations by the International Organization for Standardization, in particular publication ISO 799:2004, *Ships and marine technology – Pilot ladders*.

2.1.4 Pilot ladders with more than five steps should have spreader steps not less than 1.8 m long provided at such intervals as will prevent the pilot ladder from twisting. The lowest spreader step should be the fifth step from the bottom of the ladder and the interval between any spreader step and the next should not exceed nine steps.

2.1.5 When a retrieval line is considered necessary to ensure the safe rigging of a pilot ladder, the line should be fastened at or above the last spreader step and should lead forward. The retrieval line should not hinder the pilot nor obstruct the safe approach of the pilot boat.

2.1.6 A permanent marking should be provided at regular intervals (e.g. 1 m) throughout the length of the ladder consistent with ladder design, use and maintenance in order to facilitate the rigging of the ladder to the required height.

2.2 Ropes

2.2.1 The side ropes of the pilot ladder should consist of two uncovered ropes not less than 18 mm in diameter on each side and should be continuous, with no joints and have a breaking strength of at least 24 Kilo Newtons per side rope. The two side ropes should each consist of one continuous length of rope, the midpoint half-length being located on a thimble large enough to accommodate at least two passes of side rope.²

2.2.2 Side ropes should be made of manila or other material of equivalent strength, durability, elongation characteristics and grip which has been protected against actinic degradation and is satisfactory to the Administration.

2.2.3 Each pair of side ropes should be secured together both above and below each step with a mechanical clamping device properly designed for this purpose, or seizing method with step fixtures (chocks or widgets), which holds each step level when the ladder is hanging freely. The preferred method is seizing.²

3 ACCOMMODATION LADDERS USED IN CONJUNCTION WITH PILOT LADDERS

3.1 Arrangements which may be more suitable for special types of ships may be accepted, provided that they are equally safe.

3.2 The length of the accommodation ladder should be sufficient to ensure that its angle of slope does not exceed 45°. In ships with large draft ranges, several pilot ladder hanging positions may be provided, resulting in lesser angles of slope. The accommodation ladder should be at least 600 mm in width.

3.3 The lower platform of the accommodation ladder should be in a horizontal position and secured to the ship's side when in use. The lower platform should be a minimum of 5 m above sea level.

3.4 Intermediate platforms, if fitted, should be self-levelling. Treads and steps of the accommodation ladder should be so designed that an adequate and safe foothold is given at the operative angles.

² Refer to the recommendations by the International Organization for Standardization, in particular publication ISO 799:2004, *Ships and marine technology — Pilot ladders*, part 4.3a and part 3, paragraph 3.2.1.

3.5 The ladder and platform should be equipped on both sides with stanchions and rigid handrails, but if handropes are used they should be tight and properly secured. The vertical space between the handrail or handrope and the stringers of the ladder should be securely fenced.

3.6 The pilot ladder should be rigged immediately adjacent to the lower platform of the accommodation ladder and the upper end should extend at least 2 m above the lower platform. The horizontal distance between the pilot ladder and the lower platform should be between 0.1 and 0.2 m.

3.7 If a trapdoor is fitted in the lower platform to allow access from and to the pilot ladder, the aperture should not be less than 750 mm x 750 mm. The trapdoor should open upwards and be secured either flat on the embarkation platform or against the rails at the aft end or outboard side of the platform and should not form part of the handholds. In this case the after part of the lower platform should also be fenced as specified in paragraph 3.5 above, and the pilot ladder should extend above the lower platform to the height of the handrail and remain in alignment with and against the ship's side.

3.8 Accommodation ladders, together with any suspension arrangements or attachments fitted and intended for use in accordance with this recommendation, should be to the satisfaction of the Administration³.

4 MECHANICAL PILOT HOISTS

The use of mechanical pilot hoists is prohibited by SOLAS regulation V/23.

5 ACCESS TO DECK

Means should be provided to ensure safe, convenient and unobstructed passage for any person embarking on, or disembarking from, the ship between the head of the pilot ladder, or of any accommodation ladder, and the ship's deck; such access should be gained directly by a platform securely guarded by handrails. Where such passage is by means of:

- .1 a gateway in the rails or bulwark, adequate handholds should be provided at the point of embarking on or disembarking from the ship on each side which should be not less than 0.7 m or more than 0.8 m apart. Each handhold should be rigidly secured to the ship's structure at or near its base and also at a higher point, not less than 32 mm in diameter and extend not less than 1.2 m above the top of the bulwarks. Stanchions or handrails should not be attached to the bulwark ladder;
- .2 a bulwark ladder should be securely attached to the ship to prevent overturning. Two handhold stanchions should be fitted at the point of embarking on or disembarking from the ship on each side which should be not less than 0.7 m or more than 0.8 m apart. Each stanchion should be rigidly secured to the ship's structure at or near its base and also at a higher point, should be not less than 32 mm in diameter and should extend not less than 1.2 m above the top of the bulwarks. Stanchions or handrails should not be attached to the bulwark ladder.

³ Refer to SOLAS regulation II-1/3-9 concerning accommodation ladders.

6 SAFE APPROACH OF THE PILOT BOAT

Where rubbing bands or other constructional features might prevent the safe approach of a pilot boat, these should be cut back to provide at least 6 metres of unobstructed ship's side. Specialized offshore ships less than 90 m or other similar ships less than 90 m for which a 6 m gap in the rubbing bands would not be practicable, as determined by the Administration, do not have to comply with this requirement. In this case, other appropriate measures should be taken to ensure that persons are able to embark and disembark safely.

7 INSTALLATION OF PILOT LADDER WINCH REELS

7.1 Point of access

7.1.1 When a pilot ladder winch reel is provided it should be situated at a position which will ensure persons embarking on, or disembarking from, the ship between the pilot ladder and the point of access to the ship, have safe, convenient and unobstructed access to or egress from the ship.

7.1.2 The point of access to or egress from the ship may be by a ship's side opening, an accommodation ladder when a combination arrangement is provided, or a single section of pilot ladder.

7.1.3 The access position and adjacent area should be clear of obstructions, including the pilot ladder winch reel, for distances as follows:

- .1 a distance of 915 mm in width measured longitudinally;
- .2 a distance of 915 mm in depth, measured from the ship's side plating inwards; and
- .3 a distance of 2,200 mm in height, measured vertically from the access deck.

7.2 Physical positioning of pilot ladder winch reels

7.2.1 Pilot ladder winch reels are generally fitted on the ship's upper (main) deck or at a ship's side opening which may include side doors, gangway locations or bunkering points. Winch reels fitted on the upper deck may result in very long pilot ladders.

7.2.2 Pilot ladder winch reels which are fitted on a ship's upper deck for the purpose of providing a pilot ladder which services a ship side opening below the upper deck or, alternatively, an accommodation ladder when a combination arrangement is provided should:

- .1 be situated at a location on the upper deck from which the pilot ladder is able to be suspended vertically, in a straight line, to a point adjacent to the ship side opening access point or the lower platform of the accommodation ladder;
- .2 be situated at a location which provides a safe, convenient and unobstructed passage for any person embarking on, or disembarking from, the ship between the pilot ladder and the place of access on the ship;

- .3 be situated so that safe and convenient access is provided between the pilot ladder and the ship's side opening by means of a platform which should extend outboard from the ship's side for a minimum distance of 750 mm, with a longitudinal length of a minimum of 750 mm. The platform should be securely guarded by handrails;
- .4 safely secure the pilot ladder and manropes to the ship's side at a point on the ship's side at a distance of 1,500 mm above the platform access point to the ship side opening or the lower platform of the accommodation ladder; and
- .5 if a combination arrangement is provided, have the accommodation ladder secured to the ship's side at or close to the lower platform so as to ensure that the accommodation ladder rests firmly against the ship's side.

7.2.3 Pilot ladder winch reels fitted inside a ship's side opening should:

- .1 be situated at a position which provides a safe, convenient and unobstructed passage for any person embarking on, or disembarking from, the ship between the pilot ladder and the place of access on the ship;
- .2 be situated at a position which provides an unobstructed clear area with a minimum length of 915 mm and minimum width of 915 mm and minimum vertical height of 2,200 mm; and
- .3 if situated at a position which necessitates a section of the pilot ladder to be partially secured in a horizontal position on the deck so as to provide a clear access as described above, then allowance should be made so that this section of the pilot ladder may be covered with a rigid platform for a minimum distance of 915 mm measured horizontally from the ship's side inwards.

7.3 Handrails and handgrips

Handrails and handgrips should be provided in accordance with section 5 to assist the pilot to safely transfer between the pilot ladder and the ship, except as noted in paragraph 7.2.2.3 for arrangements with platforms extending outboard. The horizontal distance between the handrails and/or the handgrips should be not less than 0.7 m or more than 0.8 m apart.

7.4 Securing of the pilot ladder

Where the pilot ladder is stowed on a pilot ladder winch reel which is located either within the ship's side opening or on the upper deck:

- .1 the pilot ladder winch reel should not be relied upon to support the pilot ladder when the pilot ladder is in use;
- .2 the pilot ladder should be secured to a strong point, independent of the pilot ladder winch reel; and
- .3 the pilot ladder should be secured at deck level inside the ship side opening or, when located on the ship's upper deck, at a distance of not less than 915 mm measured horizontally from the ship's side inwards.

7.5 Mechanical securing of pilot ladder winch reel

7.5.1 All pilot ladder winch reels should have means of preventing the winch reel from being accidentally operated as a result of mechanical failure or human error.

7.5.2 Pilot ladder winch reels may be manually operated or, alternatively, powered by either electrical, hydraulic or pneumatic means.

7.5.3 Manually operated pilot ladder winch reels should be provided with a brake or other suitable arrangements to control the lowering of the pilot ladder and to lock the winch reel in position once the pilot ladder is lowered into position.

7.5.4 Electrical, hydraulic or pneumatically driven pilot ladder winch reels should be fitted with safety devices which are capable of cutting off the power supply to the winch reel and thus locking the winch reel in position.

7.5.5 Powered winch reels should have clearly marked control levers or handles which may be locked in a neutral position.

7.5.6 A mechanical device or locking pin should also be utilized to lock powered winch reels.

ASSEMBLY
29th session
Agenda item 10

A 29/Res.1108
14 December 2015
Original: ENGLISH

Resolution A.1108(29)

**Adopted on 2 December 2015
(Agenda item 10)**

**AMENDMENTS TO THE RECOMMENDATION ON
PILOT TRANSFER ARRANGEMENTS (RESOLUTION A.1045(27))**

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization regarding the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO the provisions of regulation V/23 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended,

RECALLING FURTHER resolution A.1045(27) by which it adopted the *Recommendation on pilot transfer arrangements*,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its ninety-fifth session,

- 1 ADOPTS the amendments to the *Recommendation on pilot transfer arrangements* (resolution A.1045(27)), set out in the annex to the present resolution;
- 2 INVITES Governments to draw the attention of all concerned to these amendments to the Recommendation;
- 3 REQUESTS Governments to ensure that pilot ladders and their arrangements, use and maintenance conform to standards not inferior to those set out in the annex to resolution A.1045(27), as amended by the present resolution.

Annex

**AMENDMENTS TO THE RECOMMENDATION ON
PILOT TRANSFER ARRANGEMENTS (RESOLUTION A.1045(27))**

5 ACCESS TO DECK

The existing paragraphs 5.1 and 5.2 are amended to read as follows:

- "1 a gateway in the rails or bulwark, adequate handholds should be provided at the point of embarking on or disembarking from the ship on each side which should be not less than 0.7 m or more than 0.8 m apart. Each handhold should be rigidly secured to the ship's structure at or near its base and also at a higher point, should be not less than 32 mm in diameter and should extend not less than 1.2 m above the deck to which it is fitted; and

- .2 a bulwark ladder, two separate handhold stanchions should be fitted at the point of embarking on or disembarking from the ship on each side which should be not less than 0.7 m or more than 0.8 m apart. The bulwark ladder should be securely attached to the ship to prevent overturning. Each stanchion should be rigidly secured to the ship's structure at or near its base and also at a higher point, should be not less than 32 mm in diameter and should extend not less than 1.2 m above the top of the bulwarks. Stanchions or handrails should not be attached to the bulwark ladder."

VERIFICATION OF PILOT TRANSFER ARRANGEMENTS

Name of ship:	I. R. No.:
IMO Number:	Report No.:
Place:	Date:

No.	QUESTION	Yes	No	N/A
Q.1	Is the pilot ladder certified by the manufacturer as complying with the requirements of SOLAS Chapter V, Regulation 23 and IMO Resolution A.1045 (27)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
Q.2A	Is there a record kept on board with the date the pilot ladder is placed into service and any repairs carried out?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
Q.3	Is there a regular inspection carried out and recorded to ensure that the pilot ladder is safe to use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
Q.4	Is there a permanent marking provided at regular intervals throughout the length of the ladder in order to facilitate the rigging of the ladder to the required height?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
Q.5	Are there means provided to Access to the ship's deck to ensure safe, convenient and unobstructed passage for any person embarking on?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
Q.6	Is there a mechanical pilot hoists used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
Q.7	Are the shipside doors used for pilot transfer opening inwards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
Q.8	Is there a lifebuoy equipped with a self-igniting light and a heaving line in pilot landing platform?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
Q.9	Are there suitable bulwark ladders and stanchions provided?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
Q.10	Are the side ropes of the pilot ladder made of manila or other material of equivalent strength, durability, elongation characteristics and grip and consists of two uncovered ropes not less than 18 mm in diameter on each side and continuous, with no joints?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:				
Q.11	Are the steps of the ladders made of hardwood, in one piece and non-slippery?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
Q.12	Are the steps equally spaced not less than 310 mm or more than 350 mm apart and are secured in such a manner that each will remain horizontal?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
Q.13	Are pilot ladder steps parallel and the last four steps made of rubber of sufficient strength?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
Q.14	Is the retrieval line fastened at or above the last spreader step and is leading forward?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
Q.15	Are the securing strong points, shackles and securing ropes in good shape?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
Q.16	Are the Embarkation/disembarkation area illuminated for transfer arrangement over side and on the deck?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				

Note:

- For a pilot ladder placed on a vessel with keel laid after 1 July 2012 or equipment in its entirety or for individual components of the system delivered after 1 July 2012, a certificate by the manufacturer stating compliance with the requirements of SOLAS Chapter V, Regulation 23 and IMO Resolution A.1045 (27) as amended is required.
- Shipside doors used for pilot transfer must open inwards in accordance with SOLAS Regulation V/23, paragraph 5.
- The use of mechanical pilot hoists is prohibited on all ships in accordance with the requirements of SOLAS Regulation V/23, paragraph 6.
- The steps of the ladders should be made of hardwood, in one piece and non-slippery.
- The steps should not be less than 115 mm wide, 25 mm in depth and should be not less than 400 mm between the side ropes.
- The steps should be equally spaced not less than 310 mm or more than 350 mm apart and they should be secured in such a manner that each will remain horizontal.

- No pilot ladder should have more than two replacement steps which are secured in position by a method different from that used in the original construction of the ladder.
- The side ropes of the pilot ladder should be made of manila or other material of equivalent strength, durability, elongation characteristics and grip and should consist of two uncovered ropes not less than 18 mm in diameter on each side and should be continuous, with no joints and have a breaking strength of at least 24 KN per side rope.
- The retrieval line should be fastened at or above the last spreader step and should lead forward.