PILOT TRANSFER ARRANGEMENTS
AND
THEIR OPERATIONS

March 2004

JAPANESE PILOTS' ASSOCIATION
http://www.pilot.or.jp
P R E F A C E

There are legally prescribed pilotage districts in Japan and about 700 pilots render pilotage services for about 170,000 ships every year. In the course of their duties, pilots must perform a dangerous procedure called transfer. There have been a large number of accidents resulting in bodily injuries, including comparatively minor injuries during transfer. In recent years, seven fatal accidents have occurred from 1993 to 2003, and therefore assuring safety pilot's transfer is one of the major problems to be tackled.

Regional pilots' associations and our own association have taken a variety of countermeasures to ensure the safety transfer. However, in spite of strengthening safety measures for self-protection, pilots are forced to depend upon the ship for the pilot transfer arrangements and their operations.

We believe that concern over the safety issue can be shared among pilots regardless of nationality. In view of this, the Japanese Pilots' Association, as a member of the International Maritime Pilots' Association, has filed various proposals to IMO to review the related regulations of the international convention as necessary.

"The International Convention on Safety of Life at Sea, 1974" Chapter V has become effective from July 2002, in this opportunity we revised the brochure for the parties concerned. We hope this will be of some help in getting your further understanding of the safety of pilot transfer.

SHOJI ARAGANE
President
Japanese Pilots' Association
### Terminology used in this brochure

[Related to Rules]

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMO</td>
<td>International Maritime Organization, a special organization of the United Nations</td>
</tr>
<tr>
<td>IMCO</td>
<td>Inter-Governmental Maritime Consultative Organization, the former name of IMO</td>
</tr>
<tr>
<td>New SOLAS</td>
<td>New rules of the International Convention for the Safety of Life at Sea, 1974. Regulation 23, Chapter V of SOLAS was revised at the IMO Maritime Safety Committee held on December 2000. The regulation became effective on 1 July 2002</td>
</tr>
<tr>
<td>Old SOLAS</td>
<td>Old regulations of SOLAS before the revision mentioned above</td>
</tr>
<tr>
<td>SOLAS</td>
<td>General abbreviation used for the above when there is no necessity for distinguishing between old and new SOLAS</td>
</tr>
<tr>
<td>A275</td>
<td>The resolution &quot;Recommendation on Performance Standards for Mechanical Pilot Hoists&quot; adopted at the 8th Assembly of IMCO on 20 November 1973</td>
</tr>
<tr>
<td>A426</td>
<td>The resolution &quot;Recommendation on Arrangements for Embarking and Disembarking Pilots in Very Large Ships&quot; adopted at the 11th Assembly of IMCO on 15 November 1979</td>
</tr>
<tr>
<td>A667</td>
<td>The resolution &quot;Recommendation on Pilot transfer Arrangements&quot; adopted at the 16th Assembly of IMO on 19 October 1989</td>
</tr>
<tr>
<td>ISO Standards</td>
<td>&quot;ISO 799&quot; of the International organization for Standardization established on 1 July 1980</td>
</tr>
<tr>
<td>JIS</td>
<td>&quot;JIS F2615-1982&quot; of Japanese Industrial Standards revised on 1 February 1982</td>
</tr>
<tr>
<td>JPA</td>
<td>Japanese Pilots' Association consisting of pilots licensed by the Government of Japan</td>
</tr>
<tr>
<td>IMPA</td>
<td>International Maritime Pilots' Association, an international pilots' organization consisting of pilots from 46 leading maritime nations</td>
</tr>
</tbody>
</table>
[Equipment related terminology]

SOLAS terminology has been used in principle to avoid confusion.

Accommodation ladder
A ladder used in conjunction with the pilot ladder if the distance from sea level to the point of access to, or egress from, the ship exceeds 9 m

Combination ladder
A transfer arrangement that combines a pilot ladder and an accommodation ladder

Gangway ladder
A ladder used for transferring persons between ship and land

Hoist
Refers to a mechanical pilot hoist

Step
Refers to a step on the ladder

Spreader
A transverse piece of wood that prevents twisting of the ladder.

Transfer
Refers to as "batten" in old SOLAS

Refers to as "embark and disembark" in old SOLAS

[ Notation of the provisions ]

SOLAS, Domestic law

IMO recommendation A889

IMPA and/or JPA recommendation
CONTENTS

1. Accidents during Pilot Transfer
   1. Number of accidents in the past ............................................. E1
   2. Examples of Accidents .......................................................... E1

2. Results of Inspections on Pilot Transfer Arrangements and their operations
   1. The Safety Campaign for Pilots’ Transfer ...................................... E4
   2. Improvements ......................................................................... E4
   3. Deficiencies by Nationality of Ship ............................................. E5
   4. Deficiencies by Ship Type ....................................................... E5

3. Regulations of Pilot Transfer Arrangements
   1. SOLAS Convention and Related Recommendations ......................... E6
      (1) Processes behind the revision to Chapter 5 of the SOLAS Convention E6
      (2) IMO Recommendations ..................................................... E6
   2. Related rules in Japan .................................................................. E10
      (1) Pilotage Law .................................................................... E10
      (2) Pilotage Agreement ............................................................ E10
      (3) Regulations for Equipment of Ships ...................................... E10
      (4) Regulations for the Enforcement of the Ship Safety Law ............. E11
      (5) Notice by Ministry of Transport (current Ministry of Land, Infrastructure and Transport) E11

4. SOLAS and Related rules
   1. Application .............................................................................. E12
   2. General .................................................................................. E13
      Regular inspections ................................................................. E13
      Means of communication, escort by a safe passage and training of crew members etc. E14
   3. Transfer arrangements .............................................................. E15
      Means to rig pilot ladder on both sides of the ship ......................... E15
      Position to rig pilot ladder and strength of securing strongpoints ........ E15
      Consideration at an early stage in ship design ............................ E16
Construction of pilot ladders and dimensions of each part  E18
Replacement steps  E19
Spreadsers  E20
Dimensions and materials of the side ropes  E21
Arrangements when the access height exceeds 9 metres  E22
Accommodation ladders used in conjunction with pilot ladders (abstract)  E22
Position of accommodation ladder  E25
4. Access to the ship's deck  E26
5. Shipside doors  E28
6. Mechanical pilot hoists  E29
Resolution on Mechanical Pilot Hoist  E29
Position of mechanical pilot hoist  E31
Emergency hand gear  E32
Rigging of hoist and means for ships equipped with belting  E33
Rigging of the pilot ladder  E33
Indication of the hoisting position on the ship's side  E33
Protective stowage and means in very cold weather  E34
7. Associated equipment  E34
8. Lighting  E36
9. Other Important Items  E37
   (1) How to rig the pilot ladder to the ship  E37
   (2) Retrieving lines to recover pilot ladders  E38
   (3) Transfer arrangements and passages in ships carrying
       on-deck timber cargoes  E39
   (4) Use of gangway ladders  E41
   (5) Measures against ships not conforming to SOLAS  E41

Appendix  Provisions of the relevant conventions and recommendations
SOLAS Chapter V Application  E44
New SOLAS  E45
A889  E49
Old SOLAS  E56
A275  E59
A426  E64
1. Number of accidents in the past

A total of 57 accidents including 6 deaths were recorded in the 27 years from 1976 to 2002, all of which were attributable to deficiencies in pilot transfer arrangements and equipment, or their improper use. A summary of injuries sustained is shown in the following table. It should be borne in mind that even an accident involving a short period of recuperation meant a narrow escape from death.

<table>
<thead>
<tr>
<th>Degree of injury</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>6</td>
</tr>
<tr>
<td>Prescribed rest</td>
<td>2</td>
</tr>
<tr>
<td>more than 1 year</td>
<td></td>
</tr>
<tr>
<td>more than 6 months</td>
<td>2</td>
</tr>
<tr>
<td>more than 1 month</td>
<td>15</td>
</tr>
<tr>
<td>less than 1 month</td>
<td>32</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
</tr>
</tbody>
</table>

2. Examples of Accidents

From the above cases, the most frequent and dangerous cases are outlined for your reference.

【Case 1 : Slipping on a pilot ladder】

Date: during nighttime in March 1990

Environmental conditions: weather: cloudy, wind force: 3, wave height: 0.3 m

Vessel: Container ship, flag Taiwan, 40,436 G/T

Outline of accident: A pilot was shaken off and fell to the pilot boat from the third step from the top when the pilot ladder suddenly slipped down about 1 m.

Degree of injury: right wrist broken, thigh and occipital part bruised, obliged to quit occupation due to after-effects, despite 7 months of prescribed rest

Comment: Pilot falling due to sudden movement of ladder is the most frequent accident in the transfer phase. These are attributable to simple mistakes as follows:

* tangled side rope remained un-extended inside bulwark due to insufficient disposition,
* ladder suddenly loses its grip on the bulwark and quickly moves outboard when the load of the pilot is applied to the first step.

This accident might have been prevented if a load test had been carried out on the ladder prepared by the crew.
【 Case 2 : Inappropriate arrangement of pilot ladder position 】
Date: during daytime in November 1999

Environmental conditions: weather: cloudy, wind: 6 m/sec.

Vessel: Container ship, flag Germany, 80,942 G/T

Outline of accident: A pilot's chest was trapped between the finer lines of the ship exposed above the water in ballast condition and the rigging net of the rolling pilot boat while waiting for an opportunity to jump to the combination ladder fitted to the after part of the ship.

Degree of injury: right no.11 rib broken, required one month for a complete cure

Comment: The SOLAS regulation provides that “the lower end of the accommodation ladder shall rest firmly against the ship's side”. It is very dangerous when the accommodation ladder is fitted to a non-parallel body part the pilot boat may come into contact. It should be borne in mind that a ship's draft will be adjusted to maintain parallel body before and after dry docking, even if the condition of the accommodation ladder satisfies the above requirements under normal operating conditions.

【 Case 3 : Deficiency of bulwark ladder 】
Date: during night time in November 1992

Environmental conditions: weather: fine, wind force: 2, wave height: 0.5 m

Vessel: Reefer ship, flag Myanmar, 6,419 G/T

Outline of accident: The bulwark handrail broke and was get out of place when the pilot leave the ship, he fell to the pilot boat from a height of about 4.5 m upon losing his balance.

Degree of injury: bruised all left flexors of fingers and chest, 26 days of prescribed rest.

Comment: Transfer of pilots between ladder and ship's deck, although instantaneous, is not only the most critical phase but also the most tense among the activities of pilots as they are obliged to hang on for their lives by a single arm in quite an unstable posture. It is especially important to confirm that handhold stanchions and bulwark ladder and its handrails are correctly secured to their respective rests and bits.

A insecure bulwark ladder and the absence of stanchion can lead to a bad accident.
【Case 4: Inappropriate setting of combination ladder】

Date: during daytime in April 1992

Environmental conditions: wind force: 3～4, swell: 3 m

Vessel: Ore/Oil carrier, flag Brazil, 69,851 G/T

Outline of accident: The pilot hit his head and left shoulder hard against the hull and fell into the sea while descending when the ladder twisted due to the effect of the washed lower ladder end.

Grade of injury: death from drowning

Comment: The height of the pilot ladder above the water should be adjusted according to the instructions of the pilot, depending on the specification of the pilot boat and weather and sea conditions. If the pilot ladder is set too lower it may twist or turn unexpectedly due to the effects of waves or currents, and raises the grave hazard of shaking off the hanging pilot. This phenomenon and the subsequent hazard have been well demonstrated in tests.

【Case 5: Accident with Mechanical Hoist】

Date: during daytime in February 1977

Environmental conditions: unknown

Vessel: flag Liberia, 75,259 G/T

Outline of accident: Just after the hoist started lowering, the pilot fell into the sea from a height of 16 m. Despite an investigation being conducted by the Japanese Maritime Safety Agency (current Japan Coast Guard), the cause was not identified.

Degree of injury: death from drowning

Comment: Superficially using a mechanical hoist may seem by far the most convenient means for the swift transfer of a pilot. However, it also involves some drawbacks in that lifting and descending movements of the pilot are totally dependent on the ship's hand and the ability of the pilot to protect himself is limited. It is especially adventurous for the pilot to use this device when engaging high freeboard vessels in rough seas. Although use of a mechanical hoist for high freeboard vessels was approved by SOLAS as revised in 1994, IMPA maintains its stance as stated in its own 1992 resolution that use of a mechanical hoist should be left to the judgment of each pilot.
Results of Inspections on Pilot Transfer Arrangements and their operations

1. The Safety Campaign for Pilots' Transfer

The safety of pilot transfer cannot be ensured without the general understanding and cooperation of the ship's crew, even if we impose strict measures. So, we have requested masters to improve any deficiency in pilot transfer arrangements and their use, whenever we find it.

“Pilot Transfer Safety Campaign” will be launched for one week from the first week of July every year to carry out enhanced inspections of pilot transfer arrangements. Any deficiency or misuse found during this period will also be advised to the master, requesting appropriate improvement. (Data shown below are the results of inspection in 2003.)

2. Improvements

The results of inspections, although quite short term, reveal that the ratio of deficiencies has been decreasing every year. In particular, many improvements to equipment and arrangements have been made, demonstrating cooperation and efforts by shipping companies and their crews. Nonetheless, it should be borne in mind that misuse would instantly nullify these achievements. So, we will continue to provide the necessary advice to keep the vessels concerned conscious about the safety of pilots' transfer.
3. Deficiencies by Nationality of Ship

The results of inspections indicate that occurrences of deficiencies are greater in vessels registered under flags of convenience, and seldom occur in ships under flags of advanced maritime countries in Europe, U.S., and Japan.

<table>
<thead>
<tr>
<th>Flags</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahamas</td>
<td>0 / 28</td>
<td>0 / 28</td>
<td>2 / 26</td>
</tr>
<tr>
<td>Belize</td>
<td>0 / 2</td>
<td>3 / 4</td>
<td>2 / 6</td>
</tr>
<tr>
<td>Cambodia</td>
<td>3 / 6</td>
<td>3 / 3</td>
<td>0 / 3</td>
</tr>
<tr>
<td>China</td>
<td>5 / 49</td>
<td>2 / 38</td>
<td>3 / 35</td>
</tr>
<tr>
<td>Cyprus</td>
<td>2 / 11</td>
<td>1 / 19</td>
<td>1 / 15</td>
</tr>
<tr>
<td>Denmark</td>
<td>0 / 18</td>
<td>0 / 11</td>
<td>2 / 11</td>
</tr>
<tr>
<td>D. P. R. Korea</td>
<td>0 / 2</td>
<td>1 / 2</td>
<td>1 / 1</td>
</tr>
<tr>
<td>Germany</td>
<td>1 / 17</td>
<td>0 / 11</td>
<td>0 / 8</td>
</tr>
<tr>
<td>Greece</td>
<td>0 / 6</td>
<td>1 / 23</td>
<td>1 / 9</td>
</tr>
<tr>
<td>Italy</td>
<td>0 / 2</td>
<td>0 / 0</td>
<td>0 / 8</td>
</tr>
<tr>
<td>Japan</td>
<td>0 / 35</td>
<td>1 / 29</td>
<td>0 / 19</td>
</tr>
<tr>
<td>Korea</td>
<td>0 / 9</td>
<td>1 / 2</td>
<td>0 / 11</td>
</tr>
<tr>
<td>Liberia</td>
<td>1 / 48</td>
<td>1 / 44</td>
<td>3 / 56</td>
</tr>
<tr>
<td>Malaysia</td>
<td>1 / 12</td>
<td>0 / 12</td>
<td>0 / 13</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>1 / 10</td>
<td>1 / 20</td>
<td>2 / 15</td>
</tr>
<tr>
<td>Norway</td>
<td>0 / 13</td>
<td>0 / 16</td>
<td>1 / 19</td>
</tr>
<tr>
<td>Panama</td>
<td>13 / 324</td>
<td>15 / 373</td>
<td>10 / 313</td>
</tr>
<tr>
<td>Philippines</td>
<td>0 / 22</td>
<td>0 / 18</td>
<td>0 / 11</td>
</tr>
<tr>
<td>Singapore</td>
<td>0 / 35</td>
<td>1 / 41</td>
<td>0 / 24</td>
</tr>
<tr>
<td>Sweden</td>
<td>0 / 1</td>
<td>0 / 0</td>
<td>0 / 8</td>
</tr>
<tr>
<td>U. K.</td>
<td>0 / 2</td>
<td>1 / 7</td>
<td>0 / 6</td>
</tr>
<tr>
<td>U. S. A.</td>
<td>0 / 13</td>
<td>1 / 20</td>
<td>1 / 7</td>
</tr>
<tr>
<td>Others</td>
<td>4 / 64</td>
<td>2 / 64</td>
<td>0 / 22</td>
</tr>
<tr>
<td>Total</td>
<td>31 / 729</td>
<td>35 / 785</td>
<td>29 / 643</td>
</tr>
</tbody>
</table>

4. Deficiencies by Ship Type

<table>
<thead>
<tr>
<th>Size</th>
<th>Less than 3,000 G/T</th>
<th>3,000 to 10,000 G/T</th>
<th>10,000 to 50,000 G/T</th>
<th>Over 50,000 G/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total offenses</td>
<td>3 12 10 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand Total</td>
<td>14 75 425 129</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Offense rate 21.4 16.0 2.4 3.9

The ratio of deficiencies in smaller ships of less than 3,000 G/T is far larger than that of ships larger than 10,000 G/T.
1. SOLAS Convention and Related Recommendations

(1) Processes behind the revision to Chapter 5 of the SOLAS Convention

* Pilot Transfer Arrangements and Equipment and their operations are laid down in SOLAS as mandatory requirements.

* Deliberations had been carried on since 1997 to reorganize and rearrange Regulation 17, but relevant requirements were reformed under Regulation 23, and taking the opportunity of adopting the entire Chapter 5 at the 73rd session of the Maritime Safety Committee in 2000, they came into effect as the new SOLAS on 1 July, 2002.

* Before the above SOLAS Convention came into effect, the Recommendation on Pilot Transfer Arrangements and Equipment, prescribing the detailed requirements of SOLAS was adopted as IMO Resolution A 889 at the 21st General Assembly of IMO.

<table>
<thead>
<tr>
<th></th>
<th>Came into effect on 1 January 1994</th>
<th>Came into effect on 1 July 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convention regulation (Mandatory requirements)</td>
<td>Regulation 17 Chapter 5</td>
<td>Regulation 23 Chapter 5</td>
</tr>
<tr>
<td>Recommendation</td>
<td>IMO Recommendation A 667 (16)</td>
<td>IMO Recommendation A 889 (21)</td>
</tr>
</tbody>
</table>

(2) IMO Recommendations

* IMPA prepared a poster illustrating the pilot transfer arrangements and their operational requirements in accordance with SOLAS, and recommendations by IMO and IMPA in a readily understandable format, and the poster was approved by IMO in 1995.

Refer to MSC/Circ.568/Rev.1 "REQUIRED BOARDING ARRANGEMENTS FOR PILOT"

* JPA arranged to print the poster affixed with Japanese translations and to distribute copies of the poster through regional pilots' associations and shipping companies for posting them on the navigation bridge of individual ships. You are requested to review them. And also Russian, Chinese and Korean version are ready to download on our web site.

* Pay attention to the following points when referring to the poster:
  - See "Cautions for Mechanical Pilot Hoist" printed on the back of the poster.
  - Man-ropes should be ready for immediate use even in the case of pilot transfers using a combination ladder, although this is not depicted in the poster.
- It is desirable to provide the bulwark ladder with handrails "Access to the ship", although this is not depicted in the poster.
- Dimensions of a pilot ladder and associated equipment in the poster are to be based upon the requirements of the new SOLAS and A889, but they may be based upon the requirements of the old SOLAS for existing arrangements.
MPA poster / adverse side
2. Related rules in Japan

(1) Pilotage Law

Safety means for pilot transfer

Article 19 The master of the ship shall take adequate measures to ensure safety for the transfer of the pilot.

(2) Pilotage Agreement (Based on Article 22-2 of the Pilotage Law)

Limitation of the agreement

Article 6 The pilot can refuse his services in the following cases:

(4) When the boarding facilities are not considered dependable.

Safe means of embarking and disembarking

Article 8-1 When a pilot embarks or disembarks, the master of the ship shall take every precaution for the safety of the pilot and pilot boat by keeping to the lee side, reducing the ship's speed properly or stopping the engine.

Article 8-2 The master of the ship shall ensure that the pilot ladder etc. conform to the requirements of Regulation 17, Chapter V of the International Convention for the Safety of Life at Sea, 1974. The master shall also ensure that the pilot ladder is secured at a proper height so that its lowest step may reach the pilot boat, but not become awash the sea surface by being too long.

Article 8-3 Where an accident such as a pilot falling takes place during embarkation or disembarkation of the pilot, the master shall try to what is for saving and treating the pilot, and shall accede to the request from the said pilot or his representative to make documents certifying the accident.

(3) Regulations for Equipment of Ships

Part 3 Equipment for Navigation etc.

Chapter 3 Equipment for Navigation

- Article 146-39 Requirements for Pilot Ladders

(Ships with a gross tonnage less than 1,000 tons not engaged on international voyages or ships not requiring pilotage services may be exempted from the requirements)

Part 7 Special Arrangements
Chapter 1  Pilot Hoists
  - Article 305  Arrangements
  - Article 306  Safety Factors
  - Article 307  Length of Main Falls
  - Article 309  Performance, Construction and Dimensions
  - Article 310  Lighting and Stowage
  - Article 311  Other Necessary Means

(4) Regulations for the Enforcement of the Ship Safety Law
  - Article 56-2  Allowable working loads for hoists
  - Article 60-2  Inspection of hoists
  - Article 64  Restrictions on the use of pilot ladders etc.

(5) Notice by Ministry of Transport (current Ministry of Land, Infrastructure and Transport)
  To complement those items of the SOLAS requirements not prescribed in the Pilotage Law, the Regulations for Ship's Equipment and the Regulations for the Enforcement of the Ship Safety Law, the following notices have been issued by the Ministry of Transport:
  - Notice from the Director-General of the Maritime Technology and Safety Bureau
    It summarizes detailed requirements for pilot transfer arrangements and is addressed to District Transport Bureaux etc. (the contents are omitted).
  - Notice from the Director of the Ship Officers Division, Seafarers Department, Maritime Technology and Safety Bureau
    This notifies the operational requirements for pilot transfer arrangement to those concerned (the text is omitted).
SOLAS and Related rules

In this Chapter, the provisions of SOLAS Chapter 5 "Safety of Navigation" Regulation 23 "Pilot transfer arrangements" are explained. The provisions of A889 and IMPA's recommendations will be added if necessary. And therefore the provisions of the old SOLAS will be explained in each occasion.

1. Application

CHAPTER V
Regulation 1 Application
1 Unless expressly provided otherwise, this chapter shall apply to all ships on all voyages, except:
   .1 warships, naval auxiliaries and other ships owned or operated by a Contracting Government and used only on government non-commercial service; and
   .2 ships solely navigating the Great Lakes of North America and their connecting and tributary waters as far east as the lower exit of the St. Lambert Lock at Montreal in the Province of Quebec, Canada.
   However, warships, naval auxiliaries or other ships owned or operated by a Contracting Government and used only on government non-commercial service are encouraged to act in a manner consistent, so far as reasonable and practicable, with this chapter.
   4 The Administration shall determine to what extent the provisions of regulations 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27 and 28 do not apply to the following categories of ships:
   .1 ships below 150 gross tonnage engaged on any voyage;
   .2 ships below 500 gross tonnage not engaged on international voyages; and
   .3 fishing vessels.

Regulation 23 1 Application
   1.2 Equipment and arrangements provided after 1 January 1994:
       - Shall conform to the requirements of the new SOLAS.
       - Shall observe the standards shown in A889 Recommendation.
1.3 Equipment and arrangements provided before 1 January 1994:
- Shall conform at least to the requirements of the old SOLAS.
- Shall observe both A275 Recommendation and A426 Recommendation.

1.4 Equipment and arrangements replaced after 1 January 1994:
- Shall conform to the requirements of the revised Convention rules as far as is reasonable and practicable.

* Recommendations mentioned below are shown at the end of the book.
- A275 Recommendation on Performance Standards for Mechanical Pilot Hoists
- A426 Recommendation on Arrangement for Embarking and Disembarking Pilots in Very Large Ships
- A889 Recommendation on Pilot Transfer Arrangements

* The new SOLAS provides that "due regard shall be paid to ..." in 1.2 and 1.3, above on the basis of the standard in each recommendation adopted by IMO. However, these recommendations are considered to complement the Convention's requirements in a concrete manner, and compliance is understood to be obligatory.

* In case of "1.3 Equipment and arrangements provided before 1 January 1994", the new SOLAS applies to the operational matters.

2. General

Regular inspections

2.1 All arrangements used for ... the appliances shall be kept clean, properly maintained and stowed and shall be regularly inspected to ensure that they are safe to use.

* It is important to inspect pilot transfer arrangements such as pilot ladders and ancillary equipment for wear and defects. Inspections shall be carried out, at least before and after using the pilot ladder. It is necessary to carry out repairs immediately, if abnormalities are found. Precautions should be taken for the following items specifically:
- Inspections of the pilot ladder itself and ancillary equipment for wear and tear.
- Immediate reconditioning/repairs of abnormalities discovered in the inspection and cleaning.
- Proper stowage of the pilot ladder to prevent it from fouling, wear and formation of ice.
- Others necessary for preventing danger.

* Inspections of pilot hoists, which are mechanical, are particularly important. It is necessary to thoroughly inspect them in accordance with the requirements of the maintenance manual prescribed in 4.1.2 of A889.

Means of communication, escort by a safe passage and training of crew members etc.

2.2 The rigging of the pilot transfer arrangements and the embarkation of a pilot shall be supervised by a responsible officer having means of communication with the navigation bridge who shall also arrange for the escort of the pilot by a safe route to and from the navigation bridge. Personnel engaged in rigging and operating any mechanical equipment shall be instructed in the safe procedures to be adopted and the equipment shall be tested prior to use.

* Ship's officers referred to here are navigating officers who have ample knowledge on the requirements of SOLAS.

* Means of communication between the officer and the navigation bridge is a portable transceiver. This is for communicating with the master or the duty officer on the navigation bridge to ensure safe pilot transfer through course and/or speed changes as appropriate, or to enable crew members to take immediate actions in possible cases of the pilot falling to the sea or his injury.

* Inadequate training of crew members who operate the arrangements might lead to a fatal accident of the pilot. In particular, it is necessary to provide crew members of the ship equipped with mechanical equipment - pilot hoists with adequate training in accordance with the manual prescribed in 4.7.1 of A889 for proper storage, assembly, rigging and operation of the hoist.
* The mechanical pilot hoist shall be tested before use for the safety.
* No requirements are provided in SOLAS, but safety precautions shall be exercised on the following points:
  - A portable transceiver shall be carried by the officer to communicate with the navigation bridge.
  - When a combination ladder is used, the officer shall stand at the lower platform of the accommodation ladder.
  - It is advisable that at least one crew member of the deck department should be accompanied to support the necessary operation.

3. Transfer arrangements

Means to rig pilot ladder on both sides of the ship

3.1 Arrangements shall be provided to enable the pilot to embark and disembark safely on either side of the ship.

3.2 The accommodation ladder or mechanical pilot hoists on the ship shall carry such equipment on each side, unless the equipment is capable of being transferred for use on either side.

* The pilot normally transfers himself from or to the pilot boat on the lee side of the ship in wind and waves. The pilot ladder shall, therefore, be ready to use either side of the ship. Concretely, the following items shall be ready for use on both sides of the ship:
  - Safe points of access (including handhold stanchions and bulwark ladders)
  - Ring plates for rigging the pilot ladder
  - Lighting arrangement

Position to rig pilot ladder and strength of securing strongpoints

3.3 Safe and convenient access to, and egress from, the ship shall be provided by either:

.1 a pilot ladder requiring a climb of not less than 1.5 m and not more than 9 m above the surface of the water so positioned and secured that:

.1.1 it is clear of any possible discharges from the ship;
.1.2 it is within the parallel body length of the ship and, as far as is practicable, within the mid-ship half length of the ship;
* To verify whether the 9-metre criterion is exceeded or not, the height from the water to the top of the bulwark should be measured when the pilot climbs over the bulwark, or the height from the water to the top of the deck when the pilot does not climb over the bulwark.

* When the height from the water to the point of access to the ship is less than 1.5 metres, the pilot should embark or disembark the ship directly without using the pilot ladder.

* Distance from discharges from the ship should be determined with an ample allowance taking into account the effects of wind and waves. If a sufficient distance cannot be achieved due to the structure of the ship with resultant splashes reaching the ladder, it should be stopped with a plug.

* Within the mid-ship half length of the ship is as shown in Figure below. In the old SOLAS, the requirement is described as "it is clear so far as is practicable of the finer lines of the ship"

Consideration at an early stage in ship design

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.
* The position of the ladder should be determined by paying sufficient attention during the early stage of construction of the ship.

* The contents of the provisions specifically shown are as follows:
  - Paragraph 2.1.2: Means to make sure step rests firmly against the ship’s side, also means for belting.
  - Paragraph 3.1: Securing position of the accommodation ladder, resting of the lower platform against the ship’s side and means for special types of ships.
  - Paragraph 3.3: Levelling of the lower platform of the accommodation ladder when in use.

  1.3 each step rests firmly against the ship’s side; where constructional features, such as rubbing bands, would prevent the implementation of this provision, special arrangements shall, to the satisfaction of the Administration, be made to ensure that persons are able to embark and disembark safely;

* It should be ensured that each step of the pilot ladder rests firmly against the ship’s side.

* Rubbing bands are the belting fitted to ships engaged on voyages involving frequent passages through dock gates such as in the Great Lakes of North America (also called "longitudinal fixed fender"). A rubbing band, therefore, precludes the pilot ladder from resting firmly against the ship’s side, and is also dangerous for the pilot boat when it comes alongside the ship.

* For ships with such a construction, special safety measures shall be taken by flattening the portion of the face of the rubbing band where the pilot ladder is to be rigged. Approval from the Administration is required for such a case.

* It is advisable that the measures stated above be considered during the ship’s design stage.

Example showing that each step of the pilot ladder does not rest firmly against the ship’s side firmly against the ship’s side
.1.4 The single length of pilot ladder is capable of reaching the water from the point of access to, or egress from, the ship and due allowance is made for all conditions of loading and trim of the ship, and for an adverse list of 15°; the securing strong point, shackles and securing ropes shall be at least as strong as the side ropes;

* Pilot ladders should not be used in conjunction.
* Increment \( \Delta L \) due to a reverse list of 15 degrees of the ship can be approximated as shown below referring to the following figure.
* Positioning the pilot ladder for the ships carrying on-deck timber cargoes should be refer to "Pilot transfer arrangements and passages for ships carrying on-deck cargoes".
* See "Securing the pilot ladder firmly against the ship's structure" for the height of the lower end of the pilot ladder from the water when the ladder is actually rigged.
* The strength of securing strong points, shackles and securing ropes must be equivalent to that of the side ropes.

---

Construction of pilot ladders and dimensions of each part

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 300 mm or more than 380 mm apart; and
.7 they should be secured in such a manner that each will remain horizontal.

【Materials of step】
* It is defined in ISO that hardwood is ash, oak, elm, beech or teak, and equivalent characteristics refer to equivalent relative density, strength, durability and buoyancy.
* Steps made from aluminium alloy materials readily buffeted by winds are dangerous and, therefore, are unacceptable. Note, however, “COMAR MARK ”, “using steps made from specifically invented synthetic resin is approved by the United States Coast Guard as having equivalent characteristics as hardwood and are highly evaluated by IMPA.
* The lowest four steps should be made of rubber of sufficient strength and stiffness, because they are vulnerable to failure upon being squeezed between the ship and a pilot boat.
* Although application of a non-slip coating on the upper side of each step is acceptable, use of ordinary paints results in slippery surfaces and detection of failures becomes difficult, hence, it is not acceptable.

【Dimensions of steps】
* The thickness of a step excluding the depth of the grooving or non-slip coating shall not be less than 25 millimetres.

【Levelling of steps】
* Each step shall be levelled in both the longitudinal and transverse directions of the ship.

Replacement steps
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.

* The steps of the pilot ladder have rope holes at their ends, through which side ropes pass. Because replacement steps are fitted to the side ropes by providing grooves in the step as shown in the figure, they tend to be misaligned and their strength is insufficient. For these reasons, the number of replacement steps is restricted to two and it is obligatory that replacement steps be replaced with steps of the original construction as soon as possible.

Spreaders

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.

* No spreader shall be placed at an intermediate position between the steps.
* The following requirements of ISO shall be referred to for the number of steps and relative positions of spreaders:

<table>
<thead>
<tr>
<th>Number of steps</th>
<th>Position(s) of spreader step(s)</th>
<th>Number of steps</th>
<th>Position(s) of spreader step(s)</th>
</tr>
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<tbody>
<tr>
<td>6</td>
<td>5</td>
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<td>7</td>
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<td>15</td>
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<td>5,14,23</td>
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<tr>
<td>17</td>
<td>5,14</td>
<td>30</td>
<td>5,14,23</td>
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</tbody>
</table>

Note: Spreader step positions are determined by the step number counted from the bottom of the ladder.

* Spreaders shall be either fitted on the rear side of a step or fabricated to be integrated with the steps (spreaders of this construction are called spreader steps, which are frequently used today) so that there is no interference with pilot transfers.

Dimensions and materials of the side 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 joins below the top step.

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

* Equivalent grip to that available with manila ropes means resistance to slippage when gripped, which is comparable to manila ropes.

* The circumference of the side rope shall not be less than 18 mm in diameter. Two lines each on both sides, a total of four side ropes, shall be provided.

* Application of covers to the side ropes is not accepted because they preclude visual
detection of defects and involve dangers such as dislocations and slippery hand grips.

* The side ropes for "COMAR MARK □" have a polypropylene core and Dacron at the periphery, the materials were specifically developed and are approved as equivalent to manila ropes.

Arrangements when the access height exceeds 9 metres

2 In all ships where the distance from sea level to the point of access to, or egress from, the ship exceeds 9 m, and when it is intended to embark and disembark pilots by means of the accommodation ladder, or by means of mechanical pilot hoists or other equally safe and convenient means in conjunction with a pilot ladder, □ □ □

* The criterion of 9 metres is said to have been determined considering the limit of tolerable height for a person falling onto the sea without sustaining fatal injuries due to impact. This reflects the results of old experiment to assess the impact upon a parachutist from an aircraft at the moment he lands on the water. However, IMO declared the safe height for a person jumping into the water in a freestanding position to be 5 metres. The results of a simulation by the Japan Association for Preventing Marine Accidents using a dummy show that a height of 5.5 metres is the tolerable limit. Different criteria have been proposed as shown above. In this connection, lower criteria than 9 metres have been employed by pilots in Canada and Mexico.

* In judging if the 9-metre criterion is exceeded, any listing of the ship is not to be taken into account.

Accommodation ladders used in conjunction with pilot ladders (abstract)

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 angle of slope does not exceed 55°.

3.3 The lower platform should be in a horizontal position.

3.4 Intermediate platforms should be self-levelling.

3.5 The ladder and platform should be equipped on both sides with stanchions and rigid handrails or handrope for safety.
3.6 The pilot ladder should be rigged adjacent to the lower platform and the upper end should extend at least 2 m above the lower platform.

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. 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.

3.8 Accommodation ladders should be to the satisfaction of the Administration.

【Height of the lower platform of the accommodation ladder】

* SOLAS does not specify any requirements for the distance between sea level and the lower platform of the accommodation ladder, but IMPA clearly prescribes that "the distance shall be adjusted within the range between 3 and 7 metres considering the size of the pilot boat and the height of swells" as stated in the IMPA Poster.

* In Japan, the distance of 7 metres is often used particularly in pilotage districts where pilots transfer to or from tugs or those where pilots transfer in open seas, otherwise the distance of 5 metres in many cases is used. In either event, it is necessary to observe the instructions of the regional pilots' association concerned.

* The accommodation ladder must be secured against the ship's side within the range from 5 to 7 metres.

* Sufficient consideration should be given during operation, as well as in design so that the pilot ladder does not foul the lower platform of the accommodation ladder or become detached.

* IMPA recommends that a 9-metre mark be indicated so that the pilot can readily find whether the distance from sea level to the point of access exceeds 9 metres or not.
The following points should be taken into account when indicating this mark:
- The 9-metre mark should be indicated on the ship's side below the point of access as depicted in the figure.
- When the bulwark is to be climbed over, measurement for the 9-metre criterion should be taken from the top of the bulwark.
- It is not required to take the listing of the ship into consideration.
- Any ship for which the distance from sea level to the point of access in her light load condition does not exceed 8 metres may dispense with the requirement for the 9 metre mark.

* As "the other equally safe and convenient means," the following arrangement is accepted.

Pilot Embarkation Ladder System (PELS): A trapdoor is provided at the lower platform of an accommodation ladder through which a pilot ladder is led therethrough.

【Securing of the pilot ladder】
* If the pilot ladder is lashed securely with the lower platform of the accommodation ladder to ensure their firm connection, it might result in the danger involving the
pilot ladder twisting or parting by being pulled by the lower platform of the accommodation ladder when the ship lists or when the height of the accommodation ladder is adjusted. In the case of a high-freeboard ship for which the distance from sea level to the point of access exceeds 9 metres, there is a probability of non-compliance with the requirements of SOLAS, because the lower platform of the accommodation ladder moves far from the ship's side due to a slight roll or list of the ship. To prevent such a danger, IMPA and JPA recommend that the pilot ladder and the accommodation ladder be connected by the following procedure:

- The pilot ladder should be secured to the ship's side by a suitable means at a point 1 to 1.5 metres above the lower platform of the accommodation ladder.
- Such a fixture is normally attained if an eye-plate welded to the side shell of the ship is used, but use of a sunken bitt embedded in the shell plating provides the best solution. If PELS is used, safe pilot transfer is ensured without involving these difficulties.

* In connection with the above, it is also recommended that the accommodation ladder itself be secured to the ship's side. The recommended procedure is to lash a sunken bitt embedded in the stringer forming the side of the accommodation ladder in contact with the side shell and another sunken bitt embedded in the side shell of the ship at a point approximately one metre above the lower platform. For determining the securing position, see "Height of the lower platform of the accommodation ladder."

Position of accommodation ladder

.2 The accommodation ladder shall be sited leading aft. When in use, the lower end of the accommodation ladder shall rest firmly against the ship's side within the parallel body length of the ship and, as far as is practicable, within the mid-ship half length and clear of all discharges;

* The reason for the requirement "The accommodation ladder shall be sited leading aft" is that pilot transfers, in many cases, are carried out while the ship is proceeding ahead, and if it is sited leading forward, then the pilot boat might get in below the accommodation ladder, which is dangerous.
4. Access to the ship's deck

Means shall 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 or other appliance, and the ship's deck. Where such passage is by means of:

1. a gateway in the rails or bulwark, adequate handholds shall be provided;
2. a bulwark ladder, two handhold stanchions rigidly secures 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.

5.2 a bulwark ladder, such 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.
* The access referred to here is access to the deck; i.e., access from the head of the pilot ladder, the accommodation ladder or the hoist to the deck, and it is natural to ensure that no obstacles are left in such access areas.

* The handrails referred to as a kind of handholds, are the "handrails at the point of access", and not "those of the bulwark ladder".

* If stanchion or handrails are fitted to the bulwark ladder, instability can result if the bulwark ladder is rigged inadequately. They should, therefore, be rigged firmly to the ship's structure.

* Means for access to, or egress from, the ship are prescribed in the requirements in the following two ways:

  (1) Where access to and from the ship is by means of a gateway provided in the bulwark or handrail
  - Two "adequate" handholds may be substituted by handrail pipes provided at both sides of the gangway or cutout of the ship. If the cutout is too wide to grip the handholds with two hands, it is necessary to provide handholds by the stanchions shown below.

  (2) Where access to and from the ship is by a bulwark ladder
  - Sufficient precautions are necessary because many serious accidents caused by inadequate rigging of the bulwark ladder have been experienced.
  - Stanchions shall be securely fixed to the hull structure even for access over the bulwark ladder.
  - Although it is not specified in the SOLAS Convention, handrails shall be fitted to the bulwark ladder.

* The methods in above figure are specified in JIS which conforms to ISO.
Access through the gateway in the bulwark or handrail

Access over bulwark ladder

* IMPA recommends that the following requirements be observed:
  - Access points shall be provided on each side of the ship. The reason for this requirement is derived from the need for pilot transfers to be carried out on the lee side.
  - The positions of the access points shall be marked with thick lines with permanent clear signs stating "NO OBSTRUCTIONS" These areas of the ship shall be kept free and clear at all times.
  - A safe passage shall be secured between the access points and the navigation bridge. The passage shall be cleaned of slippery ice, or oil.

5. Shipside doors

  5 Shipside doors
  
  Shipside doors used for pilot transfer shall not open outwards.

* If the shipside doors are allowed to open outwards, it is difficult to lock the doors at their open positions, and they might collide with the superstructure of the pilot boat, which is dangerous. For these reasons, the shipside doors are required to open inwards. The old SOLAS does not specify any requirements of the shipside doors.

* For large container ships and pure car carriers on which the point of access to, or egress from the ship exceeds 9 metres from sea level, IMPA states it is desirable to
provide side doors, and prescribes its standards as follows:
- Consideration shall be given so that operations for the pilot boat to come alongside the ship and pilot transfer do not involve danger.
- The ship side door shall not open outwards.
- The size of the side door shall be 2 or more metres high and 1.5 or more metres wide.
- The ladder used in conjunction with the side door shall meet the requirements of SOLAS.
- The safety of passage from the side door to the navigation bridge shall be ensured. (Pure car carriers, in particular, have complex passageways and a low ceiling height, and special attention shall be paid.)
* If the height above sea level of the lower edge of the shipside door for pilot transfer is insufficient, the deck of a pilot boat, which heaves up and down in waves, can rise above the lower edge of the shipside door precluding safe pilot transfer. The Japanese Pilots' Association makes the recommendations specified below, although SOLAS prescribes no requirements:
- Although the safe height of the lower edge of the shipside door varies depending upon the size of a pilot boat and wave heights, it is desirable to design the height to be 5 metres above the load line if we consider a case in which a tug is used in high waves. However, for container ships and pure car carriers equipped with shipside doors whose load lines are rarely reached and a sufficient height cannot be provided at the lower edge of the shipside door for structural reasons, a height of 3 metres above the load line might impose no practical problem, except in special cases.

6. Mechanical pilot hoists

The mechanical pilot hoist has been prescribed as the pilot transfer arrangement. However, it is necessary to observe "the Resolution on Mechanical Pilot Hoist, the XIth IMPA Congress 1992" as below by providing a combination ladder to ensure efficient ship operation.

<table>
<thead>
<tr>
<th>Resolution on Mechanical Pilot Hoist</th>
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<tr>
<td>at the XIth Congress 1992</td>
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<tr>
<td>of the International Maritime Pilots' Association</td>
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<tr>
<td>The Congress, considering the reasons described in the attached paper,</td>
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CONFIRMED that:
Whether or not a pilot uses a mechanical pilot hoist to transfer to/from a ship is ultimately at each pilot's discretion and REQUEST shipowners and shipbuilders that:

Every ship with a transfer height in excess of nine metres shall be equipped with a combination ladder. In addition a pilot hoist complete with pilot ladder alongside may also be provided.

| Exhibit 1. | In order to observe sub-paragraph (f)(v) of the revised text of Regulation 17, Chapter V, SOLAS 1974, it is necessary to rig a pilot ladder adjacent to a mechanical pilot hoist. Conversely, it is necessary to rig a pilot ladder and hoist far enough apart from each other so that the ends of the spreader of both arrangements do not touch each other. If the two arrangements are rigged closely, the hoist cannot be raised or lowered safely. Accordingly, the text is impossible to perform.

**[Reference] Revised text of Regulation 17, Chapter V, SOLAS**

(f) Mechanical pilot hoists

- (v) A pilot ladder shall be adjacent to the mechanical pilot hoist and be available for immediate use so that access to it is available from the hoist at any point of its travel. The pilot ladder shall be capable of reaching the sea level from its own point of access to the ship.

2. Hoists involve the following dangers depending on the conditions of use. A number of accidents and dangerous incidents have been reported in the past.

a) Pilot cannot know the condition of a hoist from outside if the ship's crew have neglected proper maintenance.

b) Pilot cannot know beforehand if the crew will be able to operate a hoist properly.

c) In the case of a high freeboard ship, the following dangers can be expected.

- It is not easy for a hoist-operator on the deck to measure the height of the lower end of a hoist and to control its height in relation to the tossing pilot boat. Consequently, the pilot might be jammed between the ship's side and the pilot boat.

- If a ship rolls, a pilot on a hoist is in danger of striking the ship's side because a hoist might swing like a long pendulum and the spreaders will not be effective in preventing twisting.

3. In case a pilot rejects use of a hoist under the reasons stated in 2., a ship which has no combination ladder would be compelled to stop navigating.
* The new SOLAS has prescribed as "6.5 A pilot ladder shall be rigged adjacent to the hoist and available for immediate use so that access to it is available from the hoist at any point of its travel. The pilot ladder shall be capable of reaching the sea level from its own point of access to the ship."

* However, when the hoist is used with a pilot ladder rigged adjacent to it, spreaders of both the hoist and the pilot ladder into touch with each other, causing dangers lifting and lowering of the hoist.

* Accordingly, IMPA recommends that the pilot ladder combined with the accommodation ladder should be rigged and used as a safer means of pilot transfer, in the poster approved by IMO titled "REQUIRED BOARDING ARRANGEMENTS FOR PILOT"

**Position of mechanical pilot hoist**

3.3.3 a mechanical pilot hoist so located that it is within the parallel body length of the ship and, as far as is practicable, within the mid-ship half length of the ship and clear of all discharges.

* The position for rigging the mechanical pilot hoist shall be the same as for other pilot transfer arrangements.

**6.1 The mechanical pilot hoist and its ancillary equipment shall be of a type approved by the Administration. The pilot hoist shall be designed to operate as a moving ladder to lift and lower one person on the side of the ship, or as a platform to lift and lower one or more persons on the side of the ship. It shall be of such design and construction as to ensure that the pilot can be embarked and disembarked in a safe manner, including a safe access from the hoist to the deck and vice versa. Such access shall be gained directly by a platform securely guarded by handrails.

* On the basis of the resolution of IMPA mentioned above, the mechanical pilot hoist should be provided as an option, and when used, the requirements of A889 shall be complied with in accordance with "1 Application 1.2" of the new SOLAS.

* Types of mechanical pilot hoist to be approved by the Ministry of Land, Infrastructure and Transport of Japan are prescribed by the Regulations for
Equipment of Ships and the Regulations for the Enforcement of the Ship Safety Law.

* There are two types of mechanical pilot hoists as follows:
  - A moving ladder to lift and lower one person on the side of the ship
  - A platform to lift and lower one or more persons on the side of the ship

The former has conventionally been used, while the latter has recently been developed and is used on a limited number of ships, which is called a Pilot Embarkation Platform System (PEPS).

* A platform with handrail shall be provided between the top of the hoist and the deck for the safe transfer.

![PEPS Diagram]

**Emergency hand gear**

6.2 Efficient hand gear shall be provided to lower or recover the person or persons carried, and kept ready for use in the event of power failure.

* The mechanical pilot hoist becomes inoperable upon a power failure. Efficient hand gear shall, therefore, be provided so that the pilot can be lifted to the deck or lowered to the pilot boat even in the event of power failure. In the case of high-freeboard ships, however, it takes time to lift/lower the hoist, and hence, it is necessary to rig the pilot ladder in conjunction therewith as prescribed in the later part of 6.5.
Rigging of hoist and means for ships equipped with belting

6.3 The hoist shall be securely attached to the structure of the ship. Attachment shall not be solely by means of the ship's side rails. Proper and strong attachment points shall be provided for hoists of the portable type on each side of the ship.

6.4 If belting is fitted in the way of the hoist position, such belting shall be cut back sufficiently to allow the hoist to operate against the ship's side.

* If belting is fitted to the shipside, smooth motions of the hoist is hampered, and in the worst case, parting might result. Belting shall therefore be cut back sufficiently to allow the hoist to operate against the ship's side.

Rigging of the pilot ladder

6.5 A pilot ladder shall be rigged adjacent to the hoist and available for immediate use so that access to it is available from the hoist at any point of its travel. The pilot ladder shall be capable of reaching the sea level from its own point of access to the ship.

* In the event that the hoist stops as mentioned in 6.2, the pilot shall be allowed to transfer rapidly to the pilot ladder from any position of the hoist. For this reason, the pilot ladder must be rigged in advance at a position within the transferable distance from the hoist.

* The pilot ladder used in such a case must be long enough to cover the distance from sea level to the point of access to, or egress from the ship, and is equipped with a full set of steps all the way through, even if the distance exceeds 9 metres.

Indication of the hoisting position on the ship's side

6.6 The position on the ship's side where the hoist will be lowered shall be indicated.

* The position on the ship's side where the hoist will be lowered shall be indicated with clear and thick markings so that the pilot boat will not miss the point of access.
* This indication is required to be provided above the load line but as low as possible so that pilot boat crew can easily find the mark.

Protective stowage and means in very cold weather

6.7 An adequate protected stowage position shall be provided for the portable hoist. In very cold weather, to avoid the danger of ice formation, the portable hoist shall not be rigged until its use is imminent.

* The hoist shall be stowed in a sufficiently enclosed place to protect the function of the hoist.

Requirements of the mechanical pilot hoists

* Mechanical pilot hoists are more complicated mechanical arrangements than pilot ladders, and the following detailed requirements with a wider coverage are prescribed in paragraph 4 of A889. See the relevant paragraph for details.

4.1 Location and maintenance
4.2 Construction of hoist
4.3 Mechanically powered winch
4.4 Controls
4.5 Falls
4.6 Ladder or platform section
4.7 Operation of the hoist
4.8 Testing

7. Associated equipment

7.1 The following associated equipment shall be kept at hand ready for immediate use when persons are being transferred;

   1. two man-ropes of not less than 28 mm in diameter properly secured to the ship if required by the pilot;

* The diameter of man-ropes is prescribed to be not less than 28 mm. If it is too large, however, difficulties would be experienced by pilots with small hands. The diameter of 28 mm, therefore, is desirable. (In the old SOLAS, Two man ropes are prescribed
as "not less than 65 millimetres in circumference")

* A man-rope used mainly when the pilot disembarks the ship is convenient, particularly in foul weather, because he can slide down rapidly without altering his grip. It, therefore, is necessary to make the length of the man-rope equal to the pilot ladder, applying neither rope covers nor making knots.

* Although many pilots do not use man-ropes, positioning of unused man-ropes in such a case might interfere with pilot transfers. It, therefore, is necessary to follow the instructions of the pilot on the preferred disposition.

* Man-ropes shall be kept ready for use even in the case of combination ladders.

| .2 | a lifebuoy equipped with a self-igniting light; |
| .3 | a heaving line. |

* Lifebuoys shall be arranged for accidental falling overboard of the pilot, paying attention to the following points:
  - Lifebuoys shall be kept ready for use even in daytime.
  - Lifebuoys shall not be connected to the ship structure with a line. Pilot transfers are usually carried out while the ship is proceeding, and if lifebuoys are connected, they can come free from the pilot.
  - The self-igniting light shall be connected to the lifebuoy with a line.
  - When falling overboard of the pilot is noticed, the lifebuoy shall be thrown overboard immediately. Prompt action is important because the distance from the
pilot rapidly increases. Particularly at night, the self-igniting light connected to the lifebuoy serves as the sole means to identify the position of the pilot, so it is necessary to throw the lifebuoy in the proximity of the pilot.

* The heaving line is used to haul in a pilot who has fallen overboard. In many cases, it is used for transferring the pilot’s belongings. The heaving line shall be kept ready for use with the following points in mind:
- SOLAS does not provide any requirements for the material and dimensions of the heaving line, but a buoyant and flawless line with a diameter of approximately 10 millimetres and a length the twice of the pilot ladder should be used.
- When used as a heaving line, it is suggested that one end of the line be belayed at the ship structure to prevent possible drifting and loss.

8. Lighting

Adequate lighting shall be provided to illuminate the transfer arrangements overside, the position on deck where a person embarks or disembarks and the controls of the mechanical pilot hoist.

* Lighting for the pilot ladder shall not be provided directly above, but obliquely from above to avoid dazzling the pilot and the crew of the pilot boat.

Lighting should be from aft.
9. Other Important Items

(1) How to rig the pilot ladder to the ship

* The following are specified in ISO and JIS, although none are prescribed by SOLAS:
  - ISO standard specifies that a single manila securing rope (of 20 mm diameter, 3 metres in length (minimum)) shall be fitted to each side rope thimble by means of an eye splice.
  - JIS specifies that the pilot ladder shall be directly lashed tightly with a ring plate provided near the ship's side for exclusive service, with no other items connected. It also specifies that when the full length of the pilot ladder is not used, each of the two stopper ropes with an adequate length shall be connected to a rigid structure such as the ring plate using shackles to rig the ladder firmly.

![Shortening the pilot ladder in use](image)

* In addition to the above, precautions shall be taken for the following points:
  - The pilot ladder shall be adjusted and rigged so that each step on the ship's side is always kept level.
  - It shall be ascertained so that the pilot ladder does not interfere with any protrusions on the ship's side. It is desirable that the safety of the rigging of the pilot ladder be tested by weighing a crew member descending several steps after it is rigged preliminarily.
  - The pilot ladder shall always be rigged on the lee side of the ship against wind and waves. It is important to ascertain which side of the ship is the lee side at the pilot boarding station before the ship arrives. If necessary, the ship must be maneuvered even with slight course alternations so that an adequate lee side becomes available.
The preferred distance between sea level and the lower end of the pilot ladder depends upon the size of the pilot boat used. As a rule of thumb, it ranges from 0.5 to 1 metre for ordinary pilot boats, and 2 to 3 metres for tugs. In any event, the instructions of the pilot or the skipper of the pilot boat must be followed. The distance shall be made slightly larger than the reference value in rough seas. Under any circumstances, the lower end of the pilot ladder should not become awash in the water.

* It seems to be common practice today for the pilot ladder to be wound in a reel and stowed to save labour. It is unwound by turning the reel for use. In such a case, the ladder should not rely on the braking force of the reel, but should be secured firmly against the ship's structure as mentioned in "How to rig the pilot ladder to the ship" above.

(2) Retrieving lines to recover pilot ladders
* Recognizing a number of dangerous incidents involving pilot boats capsizing due to being trapped by a hanging line in a loop with one end connected to the lower end of the pilot ladder for recovery operation, IMPA recommends that such a line should not be used.
* The Ministry of Transport (existing: Ministry of Land, Infrastructure and Transport) of Japan takes the stance that when fitting a line to facilitate the recovery of the pilot ladder is unavoidable, it approves use of the line providing that adequate safety precautions are taken by making a groove in the aft (stern side) end of the spreader with a depth that does not affect its strength and service and fix the rope thereto.
(3) Transfer arrangements and passages in ships carrying on-deck timber cargoes

* For ships carrying on-deck timber or steel pipe cargoes, it is normally difficult to provide a safe passage on the deck. On the other hand, it is extremely dangerous to transfer the pilot using the pilot ladder rigged on the curved hull near the stern of the ship. In this connection, JPA directed the following requests to shipping companies in April 1991 to enforce, as a tentative measures, the requirements prescribed in SOLAS to rig the pilot ladder within the parallel body length of the ship and within the midship half length, while addressing its requests to the Ministry of Transport to conduct an extensive review on the laws and regulations for ensuring the safety of pilot transfer.

<table>
<thead>
<tr>
<th>Requirement for ensuring the safety of pilots in embarking on or disembarking from ships carrying on-deck timber cargoes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ship with breadth 22.5m or over</td>
</tr>
<tr>
<td>- Provide a recess of 1.5 square metres at the point of access near the bulwark of the ship.</td>
</tr>
<tr>
<td>- Provide passages that do not conflict with the interpretation of ICLL. Ships other than newly built ships are also requested to adopt these measures as soon as possible. And, until improved, the measures described in Chapter 2 can be taken.</td>
</tr>
</tbody>
</table>
2. Ship with breadth under 22.5m

In case a ship cannot take the measures described in Chapter 1 owing to a conflict with the interpretation of ICLL the pilot has to walk on the wood on deck between the access point and the house of the ship.

Measures for such case are as follows;

- Provide handholds at an access point on top of the wood in case measure "1-①" can not be taken.
- Pilot ladder shall be made fast at her bulwark when the total height of the wood top from sea level exceed 9 metres.
- In case the pilot is requested to transfer between access point and passage on the wood top, a pilot ladder or an equally safe means shall be provided and firmly secured.
- Passage on wood top shall be flat.
- Provide gangboard and handholds at dangerous well part.
- Provide means as described in (①) for vertical transfers between wood top and deck near the house.
- Provide adequate lighting.
- Provide spike over-shoes.
- Pilot transfer shall be escorted by a responsible officer and a crew member.

Note: The ship's breadth of 22.5 metres was determined considering the interpretation 1977 of Regulation 44 of the International Convention on Load Lines, 1966 (ICLL) prescribing that the "breadth of ship side recess shall be not more than 4% of the ship's breadth", and the breadth of ship side recess of 90 centimetres desired by JPA.
(4) Use of gangway ladders

* No specific requirements are provided in SOLAS on the gangway ladder used for ship-shore transfer. The following simple requirements are provided in Articles 105 and 115-27 of the Regulations for Equipment of Ships.

Requirements of the Regulations for Equipment of Ships

Article 105  
Passenger ships shall be equipped with suitable gangway ladders and rigid gangway ladder hooks. However, the requirements may be dispensed with for ships assigned to a coastal area of service or below, providing that the competent maritime authority deems it to be appropriate.

The gangway ladders prescribed in (1) above shall be provided with handrails, and their rear side be covered with wooden boards or canvas sheets.

Article 115-27  
The requirements in Article 105 apply correspondingly to ships with a gross tonnage of not less than 300 tons other than passenger ships. However, the application of wooden boards or canvas sheets on the rear side of the gangway ladders may be dispensed with.

* When a pilot is transferred between ship and shore using the gangway ladder, the above requirements shall be observed, and, in addition, precautions shall be taken for the following points:
  - Guide ropes or handrails must be rigged securely.
  - The lower platform of the gangway ladder shall be horizontal.
  - During transfer of the pilot, the gangway ladder shall not be moved.

* The pilot ladder shall, in principle, be used for the transfer of the pilot between the ship and the pilot boat. However, the gangway ladder may be used if the sea is calm without waves and swells, and the pilot approves the use of it. In this case, it is necessary to take safety precautions including adequate adjustment of the distance between sea level and the lower platform of the gangway ladder, in addition to those mentioned above.

(5) Measures against ships not conforming to SOLAS

* For ships committing minor offences of the SOLAS requirements, a notice is directed to the master of the ship requesting him to improve the deficiency. For ships committing more serious offences or those neglecting the request for an improvement, rendering of pilotage services may be refused in accordance with the provisions of Article 6 of the Pilotage Agreement.
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APPENDIX

Provisions of the relevant conventions and recommendations
CHAPTER V Application

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974
CHAPTER V SAFETY OF NAVIGATION

Regulation 1 Application

1 Unless expressly provided otherwise, this chapter shall apply to all ships on all voyages, except:
   .1 warships, naval auxiliaries and other ships owned or operated by a Contracting Government and used only on government non-commercial service; and
   .2 ships solely navigating the Great Lakes of North America and their connecting and tributary waters as far east as the lower exit of the St. Lambert Lock at Montreal in the Province of Quebec, Canada.

However, warships, naval auxiliaries or other ships owned or operated by a Contracting Government and used only on government non-commercial service are encouraged to act in a manner consistent, so far as reasonable and practicable, with this chapter.

2 The Administration may decide to what extent this chapter shall apply to ships operating solely in waters landward of the baselines which are established in accordance with international law.

3 A rigidly connected composite unit of a pushing vessel and associated pushed Vessel, when designed as a dedicated and integrated tug and barge combination, shall be regarded as a single ship for the purpose of this chapter.

4 The Administration shall determine to what extent the provisions of regulations 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27 and 28 do not apply to the following categories of ships:
   .1 ships below 150 gross tonnage engaged on any voyage;
   .2 ships below 500 gross tonnage not engaged on international voyages; and
   .3 fishing vessels.
NEW SOLAS

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974
CHAPTER V  SAFETY OF NAVIGATION

Regulation 23  Pilot transfer arrangements

1  Application
1.1 Ships engaged on voyages in the course of which pilots are likely to be employed shall be provided with pilot transfer arrangements.
1.2 Equipment and arrangements for pilot transfer which are installed on or after 1 January 1994 shall comply with the requirements of this regulation, and due regard shall be paid to the standards adopted by the Organization *.
* Refer to the Recommendation on pilot transfer arrangements, adopted by the Organization by resolution A.889(21) MSC/Circ.568/Rev.1: Required Boarding Arrangement for Pilots.
1.3 Equipments and arrangements for pilot transfer which are provided on ships before 1 January 1994 shall at least comply with the requirements of regulation 17 of the International Convention for the Safety of Life at Sea, 1974 in force prior to that date, and due regard shall be paid to the standards adopted by the Organization prior to that date.
1.4 Equipment and arrangements which are replaced after 1 January 1994 shall, in so far as is reasonable and practicable, comply with the requirements of this regulation.

2  General
2.1 All arrangements used for pilot transfer shall efficiently fulfill their purpose of enabling pilots to embark and disembark safely. The appliances shall be kept clean, properly maintained and stowed and shall be regularly inspected to ensure that they are safe to use. They shall be used solely for the embarkation and disembarkation of personnel.
2.2 The rigging of the pilot transfer arrangements and the embarkation of a pilot shall be supervised by a responsible officer having means of communication with the navigation bridge who shall also arrange for the escort of the pilot by a safe route to and from the navigation bridge. Personnel engaged in rigging
and operating any mechanical equipment shall be instructed in the safe procedures to be adopted and the equipment shall be tested prior to use.

3 Transfer arrangements

3.1 Arrangements shall be provided to enable the pilot to embark and disembark safely on either side of the ship.

3.2 In all ships where the distance from sea level to the point of access to, or egress from, the ship exceeds 9 m, and when it is intended to embark and disembark pilots by means of the accommodation ladder, or by means of mechanical pilot hoists or other equally safe and convenient means in conjunction with a pilot ladder, the ship shall carry such equipment on each side, unless the equipment is capable of being transferred for use on either side.

3.3 Safe and convenient access to, and egress from, the ship shall be provided by either:

.1 a pilot ladder requiring a climb of not less than 1.5 m and not more than 9 m above the surface of the water so positioned and secured that:

.1.1 it is clear of any possible discharges from the ship;

.1.2 it is within the parallel body length of the ship and, as far as is practicable, within the mid-ship half length of the ship;

.1.3 each step rests firmly against the ship's side; where constructional features, such as rubbing bands, would prevent the implementation of this provision, special arrangements shall, to the satisfaction of the Administration, be made to ensure that persons are able to embark and disembark safely;

.1.4 the single length of pilot ladder is capable of reaching the water from the point of access to, or egress from, the ship and due allowance is made for all conditions of loading and trim of the ship, and for an adverse list of 15 °; the securing strong point, shackles and securing ropes shall be at least as strong as the side ropes;

.2 an accommodation ladder in conjunction with the pilot ladder, or other equally safe and convenient means, whenever the distance from the surface of the water to the point of access to the ship is more than 9 m. The accommodation ladder shall be sited leading aft. When in use, the lower end of the accommodation ladder shall rest firmly against the ship's side within the parallel body length of the ship and, as far as is
practicable, within the mid-ship half length and clear of all discharges; or

3 a mechanical pilot hoist so located that it is within the parallel body length of the ship and, as far as is practicable, within the mid-ship half length of the ship and clear of all discharges.

4 Access to the ship’s deck

Means shall 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 or other appliance, and the ship’s deck. Where such passage is by means of:

1 a gateway in the rails or bulwark, adequate handholds shall be provided;

2 a bulwark ladder, two handhold stanchions rigidly secures 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.

5 Shipside doors

Shipside doors used for pilot transfer shall not open outwards.

6 Mechanical pilot hoists

6.1 The mechanical pilot hoist and its ancillary equipment shall be of a type approved by the Administration. The pilot hoist shall be designed to operate as a moving ladder to lift and lower one person on the side of the ship, or as a platform to lift and lower one or more persons on the side of the ship. It shall be of such design and construction as to ensure that the pilot can be embarked and disembarked in a safe manner, including a safe access from the hoist to the deck and vice versa. Such access shall be gained directly by a platform securely guarded by handrails.

6.2 Efficient hand gear shall be provided to lower or recover the person or persons carried, and kept ready for use in the event of power failure.

6.3 The hoist shall be securely attached to the structure of the ship. Attachment shall not be solely by means of the ship's side rails. Proper and strong attachment points shall be provided for hoists of the portable type on each side of the ship.

6.4 If belting is fitted in the way of the hoist position, such belting shall be cut
back sufficiently to allow the hoist to operate against the ship's side.

6.5 A pilot ladder shall be rigged adjacent to the hoist and available for immediate use so that access to it is available from the hoist at any point of its travel. The pilot ladder shall be capable of reaching the sea level from its own point of access to the ship.

6.6 The position on the ship's side where the hoist will be lowered shall be indicated.

6.7 An adequate protected stowage position shall be provided for the portable hoist.

In very cold weather, to avoid the danger of ice formation, the portable hoist shall not be rigged until its use is imminent.

7 Associated equipment

7.1 The following associated equipment shall be kept at hand ready for immediate use when persons are being transferred;

.1 two man-ropes of not less than 28 mm in diameter properly secured to the ship if required by the pilot;

.2 a lifebuoy equipped with a self-igniting light;

.3 a heaving line.

7.2 When required by paragraph 4, stanchions and bulwark ladders shall be provided.

8 Lighting

Adequate lighting shall be provided to illuminate the transfer arrangements overside, the position on deck where a person embarks or disembarks and the controls of the mechanical pilot hoist.
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
2.1 Position and construction
2.1.1 The securing strongpoints, shackles and securing ropes should be at least as strong as the side ropes specified in 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 300 mm or more than 380 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.
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.

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

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 55°.
3.3 The lower platform of the accommodation ladder should be in a horizontal position when in use.
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.
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.
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. 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.
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 Administration.

4 MECHANICAL PILOT HOISTS

4.1 Location and maintenance

4.1.1 From a standing position at the control point, it should be possible for the operator to have the hoist under observation continuously between its highest and lowest working positions.

4.1.2 There should be on board a copy of the manufacturer's maintenance manual, approved by the Administration, which contains a maintenance log book. The hoist should be kept in good order and maintained in accordance with the instructions of the manual.

4.1.3 A record of maintenance and repairs of the hoist should be entered in the maintenance log book by the officer responsible for its maintenance.

4.2 Construction of hoist

4.2.1 The working load of a hoist should be the sum of the weight of the hoist ladder or lift platform and falls in the fully lowered condition and the weight of the maximum number of persons which the hoist is designed to carry, the weight of each person being taken as 150 kg. The maximum complement a hoist is permitted to carry should be clearly and permanently marked on the hoist.

4.2.2 Every hoist should be of such construction that, when operating under the working load determined in accordance with paragraph 4.2.1, each component has an adequate factor of safety having regard to the material used, the method of construction and the nature of its duty:

.1 the average lifting and lowering speeds should be between 15 m/min and 21 m/min when the pilot hoist is carrying its full working load;

.2 the pilot hoist should be capable of lifting, lowering, and stopping when carrying 2.2 times its working load.

4.2.3 In selecting the materials of construction, regard should be paid to the conditions under which the hoist will be required to operate.

4.2.4 Any electrical appliance associated with the ladder section of the hoist should not be operated at a voltage exceeding 25 V.

4.2.5 The hoist should consist of the following main parts:

.1 a mechanically powered winch;

.2 two separate falls;

.3 a ladder or platform consisting of two parts;

.3.1 a rigid upper part for the transportation of any person upwards or
downwards;
3.2 a flexible lower part, consisting of a short length of pilot ladder, which enables any person to climb from the pilot launch or tender to the rigid upper part of the ladder and vice versa.

4.3 Mechanically powered winch

4.3.1 The source of power for the winches should be electrical, hydraulic or pneumatic. In the case of a pneumatic system, an exclusive air supply should be provided, with adequate arrangements to control its quality. In the case of ships engaged in the carriage of flammable cargoes, the source of power should not be such as to cause a hazard to the ship. All systems should be capable of efficient operation under the conditions of vibration, humidity and range of temperature likely to be experienced in the ship in which they are installed.

4.3.2 The winch should include a brake or other equally effective arrangement such as a properly constructed worm drive which is capable of supporting the working load in the event of power failure. The brake or other arrangement should be capable of supporting the working load when the hand gear is in use.

4.3.3 Any crank handle provided for manual operation should, when engaged, be so arranged that the power supply is automatically cut off.

4.3.4 Efficient arrangements should be provided to ensure that the falls wind evenly on to the winch-drum.

4.4 Controls

4.4.1 Hoists should be fitted with automatic safety devices in order to cut off the power supply when the ladder comes against any stop so as to avoid overstressing the falls or any other part of the hoist: in the case of hoists operated by pneumatic power, the safety cut-out device may be omitted provided that the maximum torque available from the air motor cannot result in overstressing of the falls or other parts of the hoist.

4.4.2 All hoist controls should incorporate an emergency stop to cut off the power supply and, in addition, an emergency stop switch within easy reach of the person or persons carried.

4.4.3 The hoist controls should be clearly and durably marked to indicate "lift", "stop" and "lower". The manner in which these controls operate should correspond to the manner in which the hoist operates and should automatically return to the "stop" position when released.

4.4.4 A portable hoist should be equipped with an interlock that prevents operation of the hoist when the hoist is not correctly installed.
4.5 Falls
4.5.1 Two separate wire falls should be used, made of flexible steel rope of adequate strength and resistant to corrosion in a salt-laden atmosphere.
4.5.2 The falls should be securely attached to the winch-drums and the ladder. These attachments should be capable of withstanding a proof load of not less than 2.2 times the load on such attachments. The falls should be maintained at a sufficient relative distance from one another to reduce the possibility of the ladder becoming twisted.
4.5.3 The falls should be of sufficient length to allow for all conditions of freeboard likely to be encountered in service and to retain at least three turns on the winch-drums with the hoist in its lowest position.
4.5.4 The falls should be so arranged that the ladder or lift platform remains level if one fall breaks.
4.5.5 A minimum safety factor of 6 should be applied to the falls. The devices for attaching the falls to the winch should be capable of supporting 2.2 times the working load with the falls run all the way out.

4.6 Ladder or platform section
4.6.1 The rigid ladder part should be not less than 2.50 m in length and be equipped in such a way that the person carried can maintain a safe position whilst being hoisted or lowered. Such part should be provided with:
   .1 a sufficient number of steps to provide a safe and easy access to and from the platform referred to in paragraph 4.6.2;
   .2 safe handholds capable of being used under all conditions, including extremes of temperature, together with non-slip steps;
   .3 a spreader at the lower end of not less than 1.80 m. The ends of the spreader should be provided with rollers which should roll freely on the ship's side during the whole operation of embarking or disembarking;
   .4 an effective guard ring, suitably padded, so positioned as to provide physical support for the person carried without hampering movement;
   .5 adequate means for communication between the person carried and the operator and the responsible officer who supervises the embarkation or disembarkation of the person carried.
4.6.2 A hoist designed to operate as a lift platform should have a platform:
   .1 with a non-slip surface at least 750 mm by 750 mm exclusive of the surface area of any trap door in the floor;
   .2 limited to one person per square metre of floor area or fraction thereof.
exclusive of the area of any trapdoor;

3. with a trapdoor, if provided, at least 750 mm by 750 mm, so arranged that a pilot ladder may be rigged through the trapdoor, extending above the platform to the height of the handrail;

4. enclosed by a guard-rail at least 1 m above the surface of the platform. At least two intermediate rails should be provided between the floor and the guard-rail. The rails should be set back from the edge of the platform at least 50 mm. Each gate in the rails should have a latch that can keep the gate securely closed.

4.6.3 Below the rigid part mentioned in paragraph 4.6.1, a section of flexible ladder comprising eight steps should be provided and constructed in accordance with the requirements of section 2, except that it need not be equipped with spreader steps; however, it should have appropriate fittings at the top for securing it to the rigid ladder.

4.6.4 The side ropes of the flexible ladder section should be in accordance with section 2.2. Each rope should be continuous, with no joins below the top step.

4.6.5 The steps of the flexible ladder section and those of the rigid ladder section should be in the same vertical line, of the same width, spaced vertically equidistant and placed as close as practicable to the ship's side. The handholds of both parts of the ladder section should be aligned as closely as possible.

4.6.6 If belting is fitted in way of the hoist position, such belting should be cut back sufficiently to allow the hoist to be placed as close as practicable to the ship's side.

4.7 Operation of the hoist

4.7.1 Rigging, testing and use of the hoist should be supervised by a responsible officer of the ship. Any person engaged in rigging and operating the hoist should have been instructed in the rigging and operating procedures as contained in the approved manual and the equipment should be tested prior to use.

4.7.2 Lighting should be provided so that the hoist overside, its controls and the position on the ship where the person carried embarks or disembarks, are adequately lit. A lifebuoy equipped with a self-igniting light and a heaving line should be kept at hand ready for use.

4.7.3 A pilot ladder complying with the provisions of section 2 should be rigged adjacent to the hoist and available for immediate use, so that access to it is available from the hoist during any point of its travel. The pilot ladder should be capable of reaching the sea level from its own point of access to the ship.
4.7.4 The position on the ship's side where the hoist will be lowered should be indicated.

4.7.5 An adequate protected stowage position should be provided for the portable hoist. In very cold weather, to avoid the danger of ice formation, the portable hoist should not be rigged until use is imminent.

4.7.6 The assembly and operation of the pilot hoist should form part of the ship's routine drills.

4.8 Testing

4.8.1 Every new hoist should be subjected to an overload test of 2.2 times the working load. During this test the load should be lowered a distance of not less than 5 m and the brake applied to stop the hoist drum. Where a winch is not fitted with a brake, and depends upon an equally effective arrangement, as prescribed in paragraph 4.3.2, to support the load in the event of power failure, the load should be lowered at the maximum permitted lowering speed, and a power failure should be simulated to show that the hoist will stop and support the load.

4.8.2 An operating test of 10% overload should be carried out after installation on board the ship to the satisfaction of the Administration.

4.8.3 Subsequent examinations of the hoists under working conditions should be made at each annual or intermediate survey and at each renewal survey for the ship's safety equipment certificate.

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;
2 a bulwark ladder, such 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.
REGULATION 17 PILOT LADDERS AND MECHANICAL PILOT HOISTS

Ships engaged on voyages in the course of which pilots are likely to be employed shall comply with the following requirements:

(a) Pilot Ladders

\(\text{i} \) The ladder shall be efficient for the purpose of enabling pilots to embark and disembark safely, kept clean and in good order and may be used by officials and other persons while a ship is arriving at or leaving a port.

\(\text{ii} \) The ladder shall be secured in a position so that it is clear from any possible discharges from the ship, that each step rests firmly against the ship's side, that it is clear so far as is practicable of the finer lines of the ship and that the pilot can gain safe and convenient access to the ship after climbing not less than 1.5 metres (5 feet) and not more than 9 metres (30 feet). A single length of ladder shall be used capable of reaching the water from the point of access to the ship; in providing for this due allowance shall be made for all conditions of loading and trim of the ship and for an adverse list of 15 degrees. Whenever the distance from sea level to the point of access to the ship is more than 9 metres (30 feet), access from the pilot ladder to the ship shall be by means of an accommodation ladder or other equally safe and convenient means.

\(\text{iii} \) The steps of the pilot ladder shall be:

\(\text{1} \) of hardwood, or other material of equivalent properties, made in one piece free of knots, having an efficient non-slip surface; the four lowest steps may be made of rubber of sufficient strength and stiffness or of other suitable material of equivalent characteristics;

\(\text{2} \) not less than 480 millimetres (19 inches) long, 115 millimetres (4 1/2 inches) wide, and 25 millimetres (1 inch) in depth, excluding any non-slip device;

\(\text{3} \) equally spaced not less than 300 millimetres (12 inches) nor more than 380 millimetres (15 inches) apart and be secured in such a manner that they will
remain horizontal.

iv No pilot ladder shall 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 shall be replaced as soon as reasonable practicable by steps secured in position by the method used in the original construction of the ladder. When any replacement step is secured to the side ropes of the ladder by means of grooves in the sides of the step, such grooves shall be in the longer sides of the step.

v The side ropes of the ladder shall consist of two uncovered manila ropes not less than 60 millimetres 2 1/4 inches in circumference on each side. Each rope shall be continuous with no joints below the top step. Two man ropes properly secured to the ship and not less than 65 millimetres 2 1/2 inches in circumference and a safety line shall be kept at hand ready for use if required.

vi Battens made of hardwood, or other material of equivalent properties, in one piece and not less than 1.80 metres 5 feet 10 inches long shall be provided at such intervals as will prevent the pilot ladder from twisting. The lowest batten shall be on the fifth step from the bottom of the ladder and the interval between any batten and the next shall not exceed 9 steps.

vii Means shall be provided to ensure safe and convenient passage on to or into and off the ship between the head of the pilot ladder or of any accommodation ladder or other appliance provided. Where such passage is by means of a gateway in the rails or bulwark, adequate handholds shall be provided. Where such passage is by means of a bulwark ladder, such ladder shall be securely attached to the bulwark rail or platform and two handhold stanchions shall be fitted at the point of boarding or leaving the ship not less than 0.70 metre 2 feet 3 inches nor more than 0.80 metre 2 feet 7 inches apart. Each stanchion shall be rigidly secured to the ship's structure at or near its base and also at a higher point, shall be not less than 40 millimetres 1 1/2 inches in diameter and shall extend not less than 1.20 metres 3 feet 11 inches above the top of the bulwark.

viii Lighting shall be provided at night such that both the pilot ladder overside and also the position where the pilot boards the ship shall be adequately lit. A lifebuoy equipped with a self-igniting light shall be kept at hand ready for use. A heaving line shall be kept at hand ready for use if required.

ix Means shall be provided to enable the pilot ladder to be used on either side of the ship.
The rigging of the ladder and the embarkation and disembarkation of a pilot shall be supervised by a responsible officer of the ship.

Where on any ship constructional features such as rubbing bands would prevent the implementation of any of these provisions, special arrangements shall be made to the satisfaction of the Administration to ensure that persons are able to embark and disembark safely.

(b) Mechanical Pilot Hoists

A mechanical pilot hoist, if provided, and its ancillary equipment shall be of a type approved by the Administration. It shall be of such design and construction as to ensure that the pilot can be embarked and disembarked in a safe manner including a safe access from the hoist to the deck and vice versa.

A pilot ladder complying with the provision of paragraph (a) of this Regulation shall be kept on deck adjacent to the hoist and available for immediate use.
A275

IMCO-RESOLUTION A275 (VIII), 1973, ANNEX
RECOMMENDATION ON PERFORMANCE STANDARDS
FOR
MECHANICAL PILOT HOISTS

1. GENERAL
1.1 Mechanical pilot hoists and ancillary equipment should be of such design and
construction as to ensure that the pilot can be embarked and disembarked in a
safe manner. The hoist should be used solely for the embarkation and
disembarkation of personnel.
1.2 The working load should be the sum of the weight of the ladder and falls in the
fully lowered condition and the maximum number of persons which the hoist is
designed to carry the weight of each person being taken as 150 kgs.
1.3 Every pilot hoist should be of such construction that when operating under the
defined working load each component should have an adequate factor of safety
having regard to the material used, the method of construction and the nature of
its duty.
1.4 In selecting the materials of construction, due regard should be paid to the
conditions under which the hoist will be required to operate.
1.5 The pilot hoist should be located within the parallel body length of the ship and
clear of all discharges.
1.6 The operator should be able to control the hoist when he is in a standing position
and looking over the ship's side for observing the hoist, even in its lowest position.
1.7 The manufacturer of the pilot hoist should supply with each installation an
approved maintenance manual, together with a maintenance log; Each
installation should be kept in good order and maintained in accordance with the
instructions of the manual. All maintenance and repairs of the installation should
be recorded in the log.

2. CONSTRUCTION
2.1 The hoist should generally consist of the following three main parts, but hoists of
other equally efficient constructions may be considered:
- a mechanical powered appliance together with means for a safe passage from
the hoist to the deck and vice versa;
\[ \text{b} \] two separate falls;
\[ \text{c} \] a ladder consisting of two parts:
\[ \text{i} \] a rigid upper part for the transportation of the pilot upwards or downwards;
\[ \text{ii} \] a lower part consisting of a short length of pilot ladder, which enables the pilot to climb from the pilot launch to the upper part of the hoist and vice versa.

2.2 Mechanical powered appliance
\[ \text{a} \] The source of power for the winches may be electrical, hydraulic or pneumatic. In the case of a pneumatic system an exclusive air supply should be provided with arrangements to control its quality. It may be necessary to give special consideration to the selection of the type of source of power for ships engaged in the carriage of flammable cargoes. All systems should be capable of efficient operation under the conditions of vibration, humidity and change of temperature likely to be experienced in the vessel in which they are installed.
\[ \text{b} \] The design of the winch should include a brake or other equally effective arrangement such as a properly constructed worm drive, which is capable of supporting the working load in the event of power failure.
\[ \text{c} \] Efficient hand gear should be provided to lower or recover the pilot at a reasonable speed in the event of power failure. The brake or other arrangement in sub-paragraph \[ \text{b} \] above should be capable of supporting the working load when the hand gear is in use.
\[ \text{d} \] Crank handles provided for manual operation should, when engaged, be interlocked so that the power supply is automatically cut off.
\[ \text{e} \] Hoists should be fitted with safety devices to automatically cut off the power supply when the ladder comes against any stop to avoid overstressing the falls or other parts of the hoist. However, in the case of hoists operated by pneumatic power, if the maximum torque available from the air motor cannot result in overstressing of the falls or other parts of the hoist, the safety cut-out device may be omitted.
\[ \text{f} \] All hoist controls should incorporate an emergency stop to cut off the power supply.
\[ \text{g} \] The winch controls should be clearly and durably marked to indicate the action to "Hoist", "Stop" and "Lower". The movement of these controls should correspond with the movement of the hoist returning to the stop-position when released.
h. Efficient arrangements should be provided to ensure that the falls wind evenly onto the winch-drums.
g. Pilot hoist should be securely attached to the structure of the ship. Proper and strong attachment points should be provided for hoists of the portable type on each side of the ship. Attachment of the pilot hoist should not be solely by means of the ship's side rails.
h. The winch should be capable of hoisting or lowering the pilot at a speed of between 15 and 30 metres per minute.
i. There should be safe means of access between the top of the hoist and the deck and vice versa; such access should be gained directly by a platform securely guarded by handrails.
j. Any electrical appliances associated with the ladder section of the hoist should be operated at a voltage not exceeding 25 volts.

2.3 Falls
a. Two separate wire rope falls should be used, made of flexible steel of adequate strength and resistant to corrosion in a salt-laden atmosphere.
b. Wire ropes should be securely attached to the winch-drums and the ladder. These attachments should be capable of withstanding a proof load of not less than 2.2 times the load on such attachments. The falls should be maintained at a sufficient relative distance from one another.
c. The wire rope falls should be of sufficient length to allow for all conditions of freeboard encountered in service and to retain at least three turns on the winch-drums with the hoist in its lowest position.

2.4 Ladder section
The ladder section should comprise a rigid and flexible part, complying with the following requirements:

a. The rigid part should be not less than 2.50 metres (7 3/4 feet) in length and be equipped in such a way that the pilot can maintain a safe position whilst being hoisted or lowered.
   Such parts should be provided with:
   i. a sufficient number of steps to provide a safe and easy access to and from the platform referred to in paragraph 2.2, sub-paragraph (k)
   ii. suitable protection against extremes of temperature to provide safe handholds and fitted with non-skid steps;
   iii. a spreader at the lower end of not less than 1.80 metres (5 feet 10 inches).
   The ends of the spreader should be provided with rollers of adequate size
which should roll freely on the ship's side during the whole operation of embarking or disembarking;
iv an effective guard ring, suitably padded, so positioned as to provide physical support for the pilot without hampering his movements;
v adequate means for communication between the pilot and the operator and/or the responsible officer who supervises the embarkation or disembarkation of the pilot;
vii whenever possible an emergency stop switch within easy reach of the pilot by means of which he may cut off the power.
b Below the rigid part mentioned in sub-paragraph a above, a section of pilot ladder comprising 8 steps should be provided, constructed in accordance with the following requirements:
ii The steps of the pilot ladder should be:
i of hardwood, or other material of equivalent properties, made in one piece free of knots, having an efficient non-slip surface; the four lowest steps may be made of rubber of sufficient strength and stiffness or of other suitable material of equivalent characteristics;
ii not less than 480 millimetres 19 inches long, 115 millimetres 4 1/2 inches wide, and 25 millimetres 1 inch in depth, excluding any non-slip device;
iii equally spaced not less than 300 millimetres 12 inches nor more than 380 millimetres 15 inches apart and be secured in such a manner that they will remain horizontal.
iv 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 ladder. When any replacement step is secured to the side ropes of the ladder by means of grooves in the sides of the step, such grooves should be in the longer sides of the step.
vi The side ropes of the ladder should consist of two uncovered manila ropes not less than 60 millimetres 2 1/4 inches in circumference on each side. Each rope should be continuous with no joins below the top step.
iv The steps of the flexible pilot ladder and those of the rigid ladder should be in the same vertical line, of the same width, spaced vertically equidistant and placed as close as practicable to the ship's side. The handholds of both parts of
the ladder should be aligned as closely as possible.

2.5 Operational aspects

a. Rigging and testing of the hoist and the embarkation and disembarkation of a pilot should be supervised by a responsible officer of the ship. Personnel engaged in rigging and operating the hoist should be instructed in the safe procedures to be adopted and the equipment should be tested prior to the embarkation or disembarkation of a pilot.

b. Lighting should be provided at night such that the pilot hoist overside, its controls and the position where the pilot boards the ship should be adequately lit. A lifebuoy equipped with a self-igniting light should be kept at hand ready for use. A heaving line should be kept at hand ready for use if required.

c. A pilot ladder complying with the provisions of Regulation 17, Chapter V, of the International Convention for the Safety of Life at Sea, 1974, should be rigged on deck adjacent to the hoist and available for immediate use.

d. The position on the ship's side where the hoist will be lowered should be indicated as well as possible.

e. An adequate protected stowage position should be provided for the portable hoist. In very cold weather to avoid the danger of ice formation, the portable hoist should not be rigged until use is imminent.

f. The assembly and operation of the pilot hoist should form part of the ship's routine drills.

2.6 Testing

a. Every new pilot hoist should be subjected to an overload test of 2.2 times the working load. During this test the load should be lowered a distance of not less than 5 metres (15 feet).

b. An operating test of 10 percent overload should be carried out after installation on board the ship to check the attachment and performance of the hoist to the satisfaction of the Administration.

c. Subsequent examinations of the hoists under working conditions should be made at each survey for the renewal of the vessel's safety equipment certificate.
IMCO-RESOLUTION A426(XI), 1979, ANNEX
RECOMMENDATION ON ARRANGEMENT
FOR
EMBARKING AND DISEMBARKING PILOTS IN VERY LARGE SHIPS

1. In all ships where the distance from sea level to the point of access to, or egress from, the ship exceeds 9 metres, and when it is intended to embark and disembark pilots by means of the accommodation ladder in conjunction with a pilot ladder, the ship should carry an accommodation ladder on each side, unless such accommodation ladder is capable of being transferred.

2. The ladder should be sited leading aft. When in use, the lower end of the ladder should rest firmly against the ship's side within the parallel body length of the ship and within the mid-ship half section and clear of all discharges. Equally safe arrangements which might be more suitable for special types of ships should be acceptable.

3. The length of the accommodation ladder should be sufficient to ensure that its degree of slope does not exceed 55 degrees.

4. The lower platform of the accommodation ladder should be in a horizontal position when in use.

5. 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.

6. 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.

7. 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 metres above the lower platform.

8. Lighting should be provided at night such that the full length of the ladder is adequately lit.

9. If a trap door is fitted in the lower platform to allow access from and to the pilot ladder, the aperture should be not less than 750 x 750 mm. In this case the after part of the lower platform should also be fenced as in paragraph 6, and the pilot ladder should extend above the lower platform to the height of the handrail.

10. The accommodation ladder together with any suspension arrangements or attachments, fitted and intended for use in accordance with this Recommendation should be to the satisfaction of the Administration.
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<thead>
<tr>
<th>INDEX</th>
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