

Natural Fibre Rope Ladders - Care and Maintenance

Introduction

Due to its strength, superior grip, good abrasion resistance and low stretch qualities, manila is usually the rope of choice when constructing lifeboat and liferaft embarkation ladders, pilot ladders and Jacobs ladders. In some cases ropes made from other natural fibres may be used. Following a recent incident involving the failure of a pilot ladder, this Bulletin has been written to provide guidance on the care and maintenance of natural fibre rope ladders.

Properties, Stowage and Care

Although natural fibre rope has properties that make it ideal for use in many marine applications, it is susceptible to damage and loss of strength due to a number of factors if it is not stowed and handled carefully.

Abrasion or cuts may occur during routine handling. Bulwarks, fish plates, deck edges, decks and any other surfaces which may come into contact with the ladder should therefore be smooth and free from obstructions or defects which may chafe or cut the rope.

Natural fibres are susceptible to dry rot and mildew, therefore the rope is normally treated with chemical preservatives in the factory to provide resistance to such problems. However, rope ladders should not be stowed when wet as the preservatives may become less effective over time.

Although natural fibre rope is resistant to alkalis and some chemicals, rope ladders should not be stored together with acids, detergents or paint as these products and their fumes may cause the fibres to deteriorate quickly.

Rope ladders should not be dragged over decks which need



A pilot ladder side rope which failed as a pilot climbed the ladder



An embarkation ladder resting on deck exposed to attack by water and cleaning chemicals

cleaning. Abrasive material such as cargo particles or blasting grit may penetrate the strands, and contact with hydraulic oil or fuel residues may also cause damage.

If a rope ladder is dirty, it should be washed with fresh water. Soap or detergent should not be used as these products may affect the natural oils and chemical preservatives in the rope. High pressure water guns should also be avoided as these may force dirt or grit into the fibres. The ladder should be allowed to dry naturally prior to storage, avoiding the use of hot air blowers or heated compartments. Once dry, the ladder should be shaken to remove any particles that may still remain.

Ideally, rope ladders should be stored in a cool, dry, well ventilated compartment and be stowed or hung in a manner which allows maximum exposure to the air. If kinks are present, these should be removed beforehand. However, embarkation ladders for lifeboats and liferafts are required, by their very nature, to be stowed on deck, as are pilot ladders on some vessels. Consequently, rope ladders stored outside should be inspected more frequently to ensure that they are still in good

condition. In sub-zero temperatures they should be thawed thoroughly before use as frozen rope fibres are more susceptible to breakage.

In order to protect rope ladders stored outside from the effects of rot, mildew, chemicals, acids and detergents, they should be stowed on a suitable grating. Wooden pallets, cut down to size, are ideal for this purpose. The height of the grating should be such that the ladder will not come into contact with free water on deck that may contain potentially harmful products.

Natural fibre rope is also susceptible to actinic degradation due to ultraviolet radiation, particularly in tropical areas. Rope ladders stored outside should therefore be covered when not in use to protect them from the effects of sunlight. Coverings will also protect ladders from precipitation and frost.

The shipboard ends of rope ladders stored outside on gratings are often shackled to padeyes, and it is not uncommon to find the rope between the grating and the padeyes uncovered and in contact with the deck. This may result in accelerated deterioration in the vicinity of the eye thimbles due to

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prolonged exposure to sunlight and water which may contain chemicals. Protecting the rope between the grating and the padeyes should not be over-looked when stowing and covering a rope ladder.

Inspection and Maintenance

The inspection and maintenance of rope ladders should be included in the vessel's Planned Maintenance System (PMS). A thorough inspection at least monthly is recommended together with a visual check prior to each use. The entire length of the ladder should be examined including all fixtures and fittings. Ladders in frequent operation, such as pilot ladders, should be thoroughly inspected more often.

The following points should be borne in mind:

- Although the surface of the rope may appear to be in satisfactory condition, natural fibre rope may self-abrade from the inside. Therefore the lay should be opened at regular intervals along the ladder to check for signs of wear.
- The presence of dark mould spots or a grey powdery substance within the lay of the rope may be an indication of rot or mildew, particularly if accompanied by a musty odour. Once mildew has taken hold it is very difficult to eradicate.
- A rope which is stained or has surface fibres which can be rubbed off easily may have been attacked by chemicals. Dark brown spots on the outside may indicate that the rope has been in contact with acid or acid fumes.
- If the fibres on the surface appear to be weak or frayed and can be picked away with a fingernail, the rope may be suffering from actinic degradation due to exposure to sunlight.

The inspection should also cover the fixtures and fittings:

- Spliced tail strands and rope ends should be either whipped or taped to prevent them from unravelling. Any splices with



An embarkation ladder stowed clear of the deck and suitably covered

loose tucks should be tightened or renewed.

- Steps and chocks should be inspected for damage including cracks, wear, splits, sharp edges and splinters. Checks should be made to ensure that any slip resistant material applied to the steps is still effective. All steps should be horizontal and none should be painted, either partially or completely, as this may mask the presence of flaws.
- Natural fibre seizings may be affected by rot, mildew, chemicals, acids, detergents, paint and sunlight in the same way as the rope itself. Their condition should be checked to confirm they have not degraded, even when tarred marlin has been used. Seizings should be intact and tight, holding the wooden chocks or rungs securely in place.
- Shackles securing ladders to padeyes on deck should be inspected to ensure that they are not corroded beyond acceptable limits. Ideally, stainless steel shackles should be used. Shackle pins should be screwed firmly into the shackle body and moused. Shackle bolt nuts should be tight and secured with a stainless steel split pin.
- Padeyes should be inspected for damage and corrosion, and welds checked for excessive wear and cracks.

It is also important to remember that new requirements regarding the construction, identification, inspection and repair



of pilot ladders entered into force on 1 July 2012. [SOLAS Chapter V, Safety of Navigation, Regulation 23, Pilot Transfer Arrangements](#) states that:

2.3 A pilot ladder shall be certified by the manufacturer as complying with this regulation or with an international standard acceptable to the Organisation. Ladders shall be inspected in accordance with regulations 1/6, 7 and 8.

2.4 All pilot ladders used for pilot transfer shall be clearly identified with tags or other permanent marking so as to enable identification of each appliance for the purposes of survey, inspection and record keeping. A record shall be kept on the ship as to the date the identified ladder is placed into service and any repairs effected.

Replacement Criteria

Any damage to or degradation of a natural fibre rope ladder should be evaluated by an appropriately experienced crewmember. If deemed necessary, or if any doubt exists, the ladder should be removed from service and repaired or replaced. Factors which may result in such action may include:

- Fraying, abrasion, cuts or signs of excessive wear
- Deterioration (particularly if long fibres pulled from the rope lack strength and break easily)
- Damage caused by chemicals, detergent or paint
- Powdering between strands
- Discolouration (other than benign stains)
- Rot or mildew
- Variations in diameter size
- Exposure to overloading or shock loads
- Kinks which are difficult to remove

If small sections of rope are found to be damaged or weakened, the entire length should be replaced completely. It

is not acceptable to crop out the affected areas and reconnect the rope regardless of the method used (eg splicing, joining shackles, knots).

Steps, rungs or chocks which are cracked, worn, split, splintered or painted should be replaced, as should any worn or missing anti-slip material. New chocks should always be secured with fresh seizings. Any seizings found to be in poor condition should be changed.

If it is necessary to replace a rope ladder completely, the old one should be dismantled or destroyed to prevent the possibility of inadvertent use.

Shackles should be replaced if wear or corrosion has reduced the diameter of the crown or pin by more than 10%.

Pad eyes found to be worn beyond Classification Society limits should be renewed. Any cracked welds should be ground out and repaired by a suitably qualified welder and subjected to Non-Destructive Testing (NDT) thereafter.