Bulletin

CCS Australian Office, No. 050, 2015 Issue 010

AMSA Ship Safety Information

--- Failure of Lifting Wire Ropes

Some reminder information regards Lifting Appliance (Deck Crane) inspection on board the vessel was ever stipulated in CCS Bulletin (Issue No.26).

Marine Notice (No. 18/2015) was released from AMSA recently, mentioning that AMSA has received a number of incident reports involving crane wire ropes. These incidents involved the failure of lifting wire ropes, improper securing of wire ropes and operator error. Such incidents present risks of serious injury, fatality and/or damage to the vessel.

Analysis of incidents related to wire rope failure has identified a number of factors including:

- the age of the wire rope;
- inadequate care and maintenance;
- inadequate inspections to verify the condition of wires before use; and
- failure to consider the usage history.

MO32 Schedule 4 provision 8.2 outlines the requirements for the inspection of wire ropes while Schedule 5 provision 2 outlines conditions that a wire rope used in loading or unloading must comply with. Ship operators, masters and officers are urged to familiarise themselves with the requirements of MO32 and the associated ILO instruments.

【NOTE】*Extraction from MO32 Schedule 4 Provision8.2 as follows:* *(in which, "responsible person" means duty crew staff, and "competent person" may be Class surveyor)*

Schedule 4---8.2 Wire ropes — inspection

8.2.1 An inspection of wire ropes must be made by a responsible person at intervals not exceeding:

(a) for a wire rope which does not pass over a sheave or a winding drum — 12 months; or

(b) for a wire rope which passes over a sheave or winding drum — 6 months.

8.2.2 A wire rope may only be used if:

(a) a competent person has issued a certificate in respect of the rope; and

(b) a responsible person has inspected the rope, externally and, as far as practical, internally, in the period required by paragraph 8.2.1(a) or (b) immediately preceding the proposed use and found that the rope is not worn, corroded or otherwise defective to a degree that renders it unfit for the proposed use; and

(c) the rope is free from knots and kinks; and

(d) the rope complies with the structural requirements specified in Schedule 5; and

(e) evidence, based on prototype testing, that any terminal or end fitting on the rope complies with subclause 8.3 of this Schedule is recorded in the appropriate register of material handling equipment.

8.2.3 If a wire rope with a broken constituent wire is to be used, the following requirements apply:

(a) the rope must be inspected by a responsible person prior to its initial use, and at least monthly, to determine if the rope is fit for use; and

(b) the responsible person must record the result of the inspection in the appropriate register of material handling equipment; and

(c) the rope must not be used unless the responsible person has determined that the rope continues to be fit for use.

Additionally, Extraction from MO32 Schedule 5 Provision 2 as follows:

Schedule 5---Provision 2 Wire rope

2.1 A wire rope must not be used in loading or unloading, unless

(a) in the case of a rope for use other than as a guy pendant, a preventer guy, a stay or a net or sling:

(i) it contains at least 114 constituent wires; and

(ii) any fibre material in its construction is strand or rope core only; and

(b) in the case of a runner or purchase, it comprises 1 continuous length without joins; and

(c) any thimble or loop splice fitted to the rope complies with Schedule 10; and

(d) it is free from knots or kinks.

2.2 Where a constituent wire in a rope is broken, that rope must not be used unless:

(a) the rope has been inspected, in that condition, by a competent person within

the period of 1 month immediately preceding that use; and

(b) the total number of visible broken constituent wires in a length of the rope equal to 10 times its diameter does not exceed 5% of the wires constituting the rope; and

(c) there is no more than 1 broken wire immediately adjacent to a compressed metal ferrule.

2.3 Wire rope grips may only be used in standing rigging, including attachment to the drum.

The ILO Code, MO32 and referenced standards outline precautions in relation to the use of wire ropes. These precautions include:

1） All wire ropes should be of sound material, of good construction and adequate strength for the service required and maintained in good condition

2） Before use, all wire ropes should be inspected and confirmed suitable for the intended working load and equipment on which they are to be used.

3） All wire ropes used for load-bearing purposes should be periodically inspected

4） When any wire rope has been lengthened, altered or repaired, it should be examined and tested before it is used again 。

5） When not in use, wire ropes should be stowed under cover in clean, dry and well ventilated places and should not be exposed to excessive heat, humidity or harmful chemicals 。

6） Care should be taken to avoid damaging or weakening a wire rope through:

- excessive stress and strain;
- rubbing or chafing against sharp objects;
- passing it through too small a sheave or block; or
- the formation of a kink in any rope under strain.

For Good sake, Special reminder as follows:

1) Masters are reminded that a wire rope should not be accepted for use on board unless it is accompanied by a certificate stating that it has been manufactured to a recognized

national or international standard and which gives details of its construction, safe working load and minimum breaking strain.

2) Wire ropes should be regularly inspected for loose or broken strands or internal damage. It is recommended that special attention be paid to the condition of eye splices.

3) In considering the care of wire ropes the manufacturer's specified maintenance and care requirements should be complied with. Wire ropes used in lifting appliances should be treated at regular intervals with suitable lubricant, which is free from acid or alkali and is of a type recommended by the manufacturer.

4) When breaking a wire rope out of storage and before it is rigged as part of a lifting appliance, it should be thoroughly inspected for corrosion, broken strands or other damage that may render it unsafe. The rope certification should also be examined to ensure it has not exceeded any shelf-life, if one has been specified by the manufacturer.

As mentioned in the Marine Notice, any wire ropes on lifting appliances, intended to be used for cargo operations in an Australian port that:

- have been in service in excess of 2.5 years, and/or
- appear in poor condition, and/or
- have been subject to particularly harsh operating conditions for an extended period,

should be inspected to ensure the lifting appliance is fit for use. It is recommended this be done by a competent person (for example, Class surveyor).

If, in connection with the loading or unloading of a vessel covered by MO32, a component of lifting appliances, fails in operation, whether or not any person is injured because of the failure, the Master, on advice from the person in charge, must notify AMSA, as required by MO32. Failure to provide notice in accordance with MO32 may result in a fine. Following notification, an AMSA Surveyor may attend the vessel.

The Master is advised to cease cargo operations until such time as the safety of loading or unloading operations can be confirmed. Issues that may be considered in making such an

assessment are:

1) Safe Working Load or SWL of cargo handling gear and weight of load intended to be lifted;
2) whether lifting appliances are being used in accordance with design specifications and/or manufacturer's recommendations;
3) time in service of all wire ropes for each cargo lifting appliance that is intended to be used;
4) records of certification and test for wire ropes and lifting appliance, including testing of limits and safety devices;
5) whether the failure caused a shock loading to be exerted on the lifting appliance or otherwise caused damage to the lifting appliance or vessel; and
6) the condition of wire ropes on other cranes that are intended to be used

Where a failure occurs and an AMSA Inspector is satisfied that the material handling equipment is defective, the inspector may prohibit the use of the material handling equipment for loading or unloading a vessel.

All vessel MUST strictly fully comply with requirements of MO32, when using lifting appliance in Australian Port.

Appendix No.1: Marine Notice 18/2015

CCS Australia Office

November 30, 2015

Announcement:

1. Intention is to assist and ensure owners to understand and well prepared, ensuring all updated requirements from AMSA can be met
2. For more information, please visit AMSA website at www.amsa.gov.au and CCS website at www.ccs.org.cn
3. The information contained does not and cannot supersede any AMSA or related governing parties requirements as well as CCS class rules and regulations.

Appendix 1

Australian Government
Australian Maritime Safety Authority

MARINE NOTICE

Marine Notice 18/2015

Failure of Lifting Wire Ropes

Purpose

Ship operators, masters and crew are reminded they have a responsibility to ensure the safe operation of lifting appliances and associated equipment.

To meet these responsibilities, ship operators, masters and crew are urged to review and familiarise themselves with all the requirements of Marine Order 32. In order to ensure compliance with the Marine Order and to ensure safe operations, it is necessary to regularly inspect the condition of lifting appliances and associated equipment, including crane wire ropes.

> ***Note**: Marine Order 32 (Cargo handling equipment) 2011 defines "lifting appliance" as "a stationary or mobile cargo-handling appliance used on board a vessel for suspending, raising or lowering or moving loads from one position to another while suspended or supported, including a crane, a derrick crane, a derrick, a cargo lift and a mechanical ramp".*

Concerns with crane wire ropes

AMSA has received a number of incident reports involving crane wire ropes. These incidents involved the failure of lifting wire ropes, improper securing of wire ropes and operator error. Such incidents present risks of serious injury, fatality and/or damage to the vessel.

Of great concern is the sudden failure of a crane wire rope under load, resulting in uncontrolled dropping of the load. Analysis of incidents related to wire rope failure has identified a number of factors including:

- the age of the wire rope;
- inadequate care and maintenance;
- inadequate inspections to verify the condition of wires before use; and
- failure to consider the usage history.

Marine Order 32

Marine Order 32 (Cargo handling equipment) 2011 (MO32), details Australian requirements for the maintenance, inspection and testing of cargo handling equipment, including crane wire ropes. MO32 gives effect to parts of the following instruments of the International Labour Organization (ILO) that apply to machinery, appliances and equipment that belong to a vessel and are used for loading or unloading the vessel:

- Convention No. 27, Marking of Weight (Packages Transported by Vessels), 1929;
- Convention No. 152, Occupational Safety and Health (Dock Work), 1979;
- Recommendation No.160, Occupational Safety and Health (Dock Work), 1979; and
- ILO Code of Practice Safety and Health in Ports (the ILO Code), 2005.

MO32 Schedule 4 provision 8.2 outlines the requirements for the inspection of wire ropes while Schedule 5 provision 2 outlines conditions that a wire rope used in loading or unloading must comply with.

Ship operators, masters and officers are urged to familiarise themselves with the requirements of MO32 and the associated ILO instruments.

Guidance on the use, inspection and maintenance of wire ropes

The ILO Code, MO32 and referenced standards outline precautions in relation to the use of wire ropes. These precautions include:

a) All wire ropes should be of sound material, of good construction and adequate strength for the service required and maintained in good condition.

b) Before use, all wire ropes should be inspected and confirmed suitable for the intended working load and equipment on which they are to be used.

c) All wire ropes used for load-bearing purposes should be periodically inspected.

d) When any wire rope has been lengthened, altered or repaired, it should be examined and tested before it is used again.

e) When not in use, wire ropes should be stowed under cover in clean, dry and well ventilated places and should not be exposed to excessive heat, humidity or harmful chemicals.

f) Care should be taken to avoid damaging or weakening a wire rope through:
   - excessive stress and strain;
   - rubbing or chafing against sharp objects;
   - passing it through too small a sheave or block; or
   - the formation of a kink in any rope under strain.

***Note**: The ILO Code of Practice Safety and Health in Ports and referenced ISO standards contain guidance on the upkeep of wire and fibre ropes, particularly ropes used with lifting and other cargo-handling equipment.*

Masters are reminded that a wire rope should not be accepted for use on board unless it is accompanied by a certificate stating that it has been manufactured to a recognised national or international standard and which gives details of its construction, safe working load and minimum breaking strain.

Wire ropes should be regularly inspected for loose or broken strands or internal damage. It is recommended that special attention be paid to the condition of eye splices.

In considering the care of wire ropes the manufacturer's specified maintenance and care requirements should be complied with. Wire ropes used in lifting appliances should be treated at regular intervals with suitable lubricant, which is free from acid or alkali and is of a type recommended by the manufacturer.

When breaking a wire rope out of storage and before it is rigged as part of a lifting appliance, it should be thoroughly inspected for corrosion, broken strands or other damage that may render it unsafe. The rope certification should also be examined to ensure it has not exceeded any shelf-life, if one has been specified by the manufacturer.

Any wire ropes on lifting appliances, intended to be used for cargo operations in an Australian port that:

- have been in service in excess of 2.5 years, and/or
- appear in poor condition, and/or
- have been subject to particularly harsh operating conditions for an extended period,

should be inspected to ensure the lifting appliance is fit for use. It is recommended this be done by a competent person.

Actions in the event of a wire failure

Notification

If, in connection with the loading or unloading of a vessel covered by MO32, a component of 'material handling equipment' (which includes lifting appliances), fails in operation, whether or not any person is injured because of the failure, the Master, on advice from the person in charge, must notify AMSA, as required by MO32. Failure to provide notice in accordance with MO32 may result in a fine. Following notification, an AMSA Surveyor may attend the vessel.

Further action

The Master is advised to cease cargo operations until such time as the safety of loading or unloading operations can be confirmed. Issues that may be considered in making such an assessment are:

- Safe Working Load or SWL of cargo handling gear and weight of load intended to be lifted;
- whether lifting appliances are being used in accordance with design specifications and/or manufacturer's recommendations;
- time in service of all wire ropes for each cargo lifting appliance that is intended to be used;
- records of certification and test for wire ropes and lifting appliance, including testing of limits and safety devices;
- whether the failure caused a shock loading to be exerted on the lifting appliance or otherwise caused damage to the lifting appliance or vessel; and
- the condition of wire ropes on other cranes that are intended to be used.

In making such assessment, the Master is advised that such inspections should be made by the ship's Responsible Person, or through engagement of a competent person as defined in section 6 of MO32.

Where a failure occurs and an AMSA Inspector is satisfied that the material handling equipment is defective, the inspector may prohibit the use of the material handling equipment for loading or unloading a vessel.

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