澳大利亚水域航行船舶安全提示

CCS 澳大利亚办事处，2015 年第 010 期，总第 050 期

AMSA 船舶安全检查信息

---船载起货设备钢丝绳失效

关于船舶起货设备（deck crane）的检查注意事项，我们曾经在《澳大利亚水域航行船舶安全提示》（No.26期）做了相应描述。

近日，AMSA发布了一期海事通告(Marine Notice 18/2015)。基于AMSA对船舶事故报告分析，发现许多起货设备缺陷系由吊货钢丝绳失效引发，包括船员未正确安装和使用钢丝绳。并直接导致了人员伤亡和船舶损坏。

分析认为，造成吊货钢丝绳失效的主要原因集中在：钢丝绳老化、缺少保养、使用之前缺少应有的检查、未考虑钢丝绳的使用历史等。

AMSA在Marine Order 32（MO32）中明确了船舶起货设备的检查和使用要求。其中，附录4中的8.2规定了船员对钢丝绳的检查要求，附录5中的2规定了钢丝绳需要满足的技术条件，参见下面的NOTE表述。船公司和船员应熟知这些规定。

【NOTE】*MO32附录4 中8.2的规定内容如下：（其中下文中的responsible person通常指责任船员，competent person可以是船级社验船师）*

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.

另外，MO32附录5 中2的规定内容如下：

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.

ILO和AMSA MO32 提出了钢丝绳正确使用的如下措施：

1） 钢丝绳材质、结构、强度及保养应满足预定用途。

2） 钢丝绳使用前，应进行检查并确保满足预期负载重量。

3） 钢丝绳应定期进行检查。

4） 钢丝绳加长、改装、修理后，应接受检验和试验。

5） 不适用的钢丝绳应保存在清洁、干燥和良好通风的处所，避免接触过热、潮湿和化学腐蚀环境。

6） 避免如下因素导致钢丝绳损坏和承载减弱：

- 钢丝绳承受过度负荷。
- 与尖锐物体碰擦。
- 绕过了较小的滑车。
- 非正常受力导致的打结。

为确保起货设备安全使用，特别提醒如下：

1） 现有和新供上船的钢丝绳必须持有有效的证明文件，该文件中必须明确钢丝绳的制造标准、结构情况、安全工作负荷、破断强度。

2） 船员要定期检查钢丝绳。例如，钢丝绳有无松脱、断股、内部损坏等，并特别关注锁眼插接的完整性。

3） 船员应参照厂家说明书要求及注意事项，定期对钢丝绳涂抹润滑油。建议使用厂家推荐的非酸性或碱性润滑油。

4） 当船员从仓库中截取新的钢丝绳，拟对现有钢丝换新时，应全面检查钢丝绳的腐蚀情况、确认无断股和其他导致险情的损坏现象发生。核查证书情况。部分钢丝绳规定了货架期（保存期），严谨更换已经超出货架期的钢丝绳。

AMSA在本期的Marine Notice中提到，当钢丝绳出现下列情况时应接受检查，以确保其使用安全性，AMSA建议该检查由Competent Person（例如船级社验船师）进行：

- 钢丝绳使用超过了2.5年；和/或

- 钢丝绳状况较差；和/或
- 钢丝绳经历了恶劣的使用操作

按照AMSA MO32 的规定，在澳洲港口使用起货设备进行作业时，应第一时间向AMSA报告船舶起货设备缺陷（Fails in operation），不管是否出现了人员伤亡。船长没有按照MO32 要求报告AMSA，将有可能导致罚款。

AMSA在本期的Marine Notice中提到，对故障的起货设备，评估过程中将考虑如下方面：

1) 起货设备的安全工作负荷、拟起吊的货物重量。
2) 起货设备是否按照设计要求和厂家说明书进行了操作。
3) 每台起货设备钢丝绳的使用时间。
4) 钢丝绳和起货设备的证书和试验记录，包括限制和安全装置试验。
5) 起货设备故障是否需要对滑车进行负载试验，或者，该故障是否对起货设备或船舶造成了损坏。
6) 船上其他拟使用的起货设备钢丝绳技术确认。

船舶起货设备发生故障后，在修复并得到确认之前，起货设备将被禁止使用。

总之，船舶拟在澳洲港口使用起货设备，必须严格执行并满足MO32 的所有要求。

附件一、海事通告(Marine Notice 18/2015)

CCS 澳大利亚办事处
2015 年 11 月 30 日

特别提示：

1. 本文的目的是协助船公司及时了解 AMSA 检查要求，更加准确地遵守澳大利亚水域的相关规定
2. 详细资料可访问 AMSA 网站 www.amsa.gov.au，CCS 网站 www.ccs.org.cn
3. 本文内容不替代 CCS 规范、相关公约、AMSA 及其他主管机关的任何规定

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.

Gary Prosser
Deputy Chief Executive Officer
October 2015

Australian Maritime Safety Authority
GPO Box 2181
CANBERRA ACT 2601

File No. 2015/3854