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BSI Standards Publication

Cranes — Wire ropes — Care and maintenance, inspection and discard

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National foreword

This British Standard is the UK implementation of ISO 4309:2017. It supersedes BS ISO 4309:2010, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MHE/3/1, Crane design.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Cranes — Wire ropes — Care and maintenance, inspection and discard

*Appareils de levage à charge suspendue — Câbles en acier —
Entretien et maintenance, inspection et dépose*



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Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	2
3 Terms and definitions	2
4 Care and maintenance	4
4.1 General.....	4
4.2 Rope replacement.....	4
4.3 Offloading and storing the rope.....	6
4.4 Condition of the rope prior to installation.....	6
4.5 Installing the rope.....	7
4.6 Running-in the new rope.....	10
4.7 Maintaining the rope.....	11
4.8 Maintenance of rope-related parts of the crane.....	11
5 Inspection	12
5.1 General.....	12
5.2 Daily visual inspections.....	12
5.3 Periodic inspections.....	12
5.3.1 General.....	12
5.3.2 Frequency.....	13
5.3.3 Extent of inspection.....	13
5.3.4 Inspection at, or in the vicinity of, a termination.....	14
5.3.5 Inspection record.....	14
5.4 Inspection following an incident.....	15
5.5 Inspection following period with crane out of operation.....	15
5.6 Inspection by magnetic rope test method.....	15
6 Discard criteria	15
6.1 General.....	15
6.2 Visible broken wires.....	16
6.2.1 Criteria for visible broken wires.....	16
6.2.2 Use of Tables 3 and 4 and rope category number.....	16
6.2.3 Wire breaks other than those resulting from service.....	16
6.2.4 Single-layer and parallel-closed ropes.....	17
6.2.5 Rotation-resistant ropes.....	19
6.3 Magnetic rope test (MRT).....	19
6.4 Decrease in rope diameter.....	20
6.4.1 Uniform decrease along the rope.....	20
6.4.2 Calculation to determine actual uniform decrease in diameter and expression as percentage of nominal rope diameter.....	21
6.4.3 Local decrease.....	21
6.5 Fracture of strands.....	21
6.6 Corrosion.....	21
6.7 Deformation and damage.....	22
6.7.1 General.....	22
6.7.2 Waviness.....	22
6.7.3 Basket deformation.....	23
6.7.4 Core or strand protrusion or distortion.....	23
6.7.5 Protruding wires in loops.....	23
6.7.6 Local increase in rope diameter.....	23
6.7.7 Flattened portion.....	23
6.7.8 Kink or tightened loop.....	24
6.7.9 Bend in rope.....	24

This is a preview of "BS ISO 4309:2017". [Click here to purchase the full version from the ANSI store.](#)

6.7.10	Damage due to heat or electric arcing.....	24
Annex A	(normative) Key areas requiring particularly close inspection.....	25
Annex B	(informative) Typical modes of deterioration.....	27
Annex C	(informative) Discard criteria for MRT.....	37
Annex D	(informative) Internal examination of rope by use of clamps	39
Annex E	(informative) Typical examples of inspection records.....	42
Annex F	(informative) Useful information on rope deterioration and discard criteria.....	45
Annex G	(informative) Combined effect assessment of rope condition and severity rating — One method.....	48
Annex H	(informative) Examples of cross-sections of ropes and corresponding rope category number (RCN).....	51
Annex I	(informative) External corrosion.....	57
Bibliography	59

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 96, *Cranes*, Subcommittee SC 3, *Ropes*.

This fifth edition cancels and replaces the fourth edition (ISO 4309:2010), which has been technically revised and contains the following changes:

- magnetic rope test (MRT) methodology and discard criteria are introduced, as an aid to the internal inspection of wire ropes;
- guidance is given on when to use magnetic rope testing and how to combine its results with other inspection results;
- an example of an MRT report is provided.

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Introduction

A wire rope on a crane is regarded as an expendable component, requiring replacement when the results of inspection indicate that its condition has diminished to the point where further use might be unsafe.

By following well-established principles such as those detailed in this document, along with any additional specific instructions provided by the manufacturer of the crane or hoist and/or by the manufacturer of the rope, this point should never be exceeded.

When correctly applied, the discard criteria given in this document are aimed at retaining an adequate safety margin. Failure to recognize them can be extremely harmful, dangerous and damaging.

To assist those who are responsible for “care and maintenance” as distinct from those who are responsible for “inspection and discard”, the procedures are conveniently separated.

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Cranes — Wire ropes — Care and maintenance, inspection and discard

1 Scope

This document establishes general principles for the care and maintenance, and inspection and discard of steel wire ropes used on cranes and hoists.

In addition to guidance on storage, handling, installation and maintenance, this document provides discard criteria for those running ropes which are subjected to multi-layer spooling, where both field experience and testing demonstrate that deterioration is significantly greater at the crossover zones on the drum than at any other section of rope in the system.

It also provides more realistic discard criteria covering decreases in rope diameter and corrosion, and gives a method for assessing the combined effect of deterioration at any position in the rope.

This document is applicable to those ropes used on the following types of cranes, the majority of which are defined in ISO 4306-1:

- a) cable and portal cable cranes;
- b) cantilever cranes (pillar jib, wall or walking);
- c) deck cranes;
- d) derrick and guy derrick cranes;
- e) derrick cranes with rigid bracing;
- f) floating cranes;
- g) mobile cranes;
- h) overhead travelling cranes;
- i) portal or semi-portal bridge cranes;
- j) portal or semi-portal cranes;
- k) railway cranes;
- l) tower cranes;
- m) offshore cranes, i.e. cranes mounted on a fixed structure supported by the sea bed or on a floating unit supported by buoyancy forces.

This document applies to rope on cranes, winches and hoists used for hook, grabbing, magnet, ladle, excavator or stacking duties, whether operated manually, electrically or hydraulically.

It also applies to rope used on hoists and hoist blocks.

NOTE In view of the fact that the exclusive use of synthetic sheaves or metal sheaves incorporating synthetic linings is not recommended when single-layer spooling at the drum, due to the inevitability of wire breaks occurring internally in large numbers before there is any visible evidence of any wire breaks or signs of substantial wear on the periphery of the rope, no discard criteria are given for this combination.