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GB/T 37452-2019

Wire Rope Selection Methods for Offshore Cranes

海洋平台起重机钢丝绳选型方法

Issued on: May 10, 2019

Implemented on: December 01, 2019

**Issued by: State Administration for Market Regulation;
Standardization Administration of PRC.**

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Wire Rope Selection Methods for Offshore Cranes

1 Scope

This Standard specifies the types, selection requirements and selection methods of the wire ropes for the offshore cranes.

This Standard is applicable to the hoisting mechanism and luffing mechanism of the offshore crane (amplitude-variable wire rope running rigging and standing rigging).

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 20118-2017 Steel Wire Rope for General Purpose

ISO 4306-1 Cranes – Vocabulary – Part 1: General

API Spec 9A Specification for Wire Rope

3 Terms and Definitions

For the purpose of this document, the terms and definitions given in ISO 4306-1 and the following apply.

3.1 Safety working load; SWL

Under the given working conditions, the maximum rated load within the rated capacity of the crane.

3.2 Safe working load hook; SWLH

The weight of safe working load plus hook and load tackle.

3.3 Standing rigging

A fixed steel wire rope for support.

opposite to the rotation direction of the roll.

The galvanized layer on the surface of the steel wire rope shall be no less than the Grade-AB galvanized layer specified in GB/T 20118-2017.

5.5 Nominal breaking force of the steel wire rope

When selecting the nominal breaking force of the steel wire rope, the following factors shall be considered:

- a) Structure of the steel wire rope (see GB/T 20118-2017 or the data provided by the manufacturer of the steel wire rope);
- b) Nominal tensile strength of the steel wires in the rope (see GB/T 20118-2017 or the data provided by the manufacturer of the steel wire rope).

6 Selection Method

6.1 General

The nominal breaking force of the steel wire rope and the corresponding nominal diameter d shall be selected as per the minimum breaking force of the steel wire rope.

The minimum breaking force of the steel wire rope depends on the steel wire rope load, reeving pulley block rate, reeving system efficiency and minimum design factor.

6.2 Calculation of minimum breaking force of the steel wire rope

6.2.1 The minimum breaking force of the steel wire rope shall be calculated as per the Formula (1):

$$BL = \frac{W \times DF}{N \times \eta_{rs}} \dots\dots\dots (1)$$

Where:

BL – minimum breaking force of single piece of steel wire rope, in kN;

W – steel wire rope load, in kN; see 6.2.2 for the calculation method;

DF – minimum design factor, see 6.3 for the calculation method;

N – reeving pulley block rate;

η_{rs} – reeving system efficiency, see 6.4 for the calculation method.

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