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Steel wire ropes -- Determination of rotational properties

钢丝绳 旋转性能测定方法

(English Translation)

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Foreword

This Standard was drafted as per the rules specified in GB/T 1.1-2009.

This Standard adopted the re-drafting method to modify and use ISO 21669.2005 Steel Wire Rope - Determination of Rotational Properties (English Version).

This Standard revised and supplemented the international standard in the following aspects.

- Add the reference of GB/T 16825.1 in the normative references;
- Add the Appendix A Using Material Tester to Determine the Rotational Properties of Steel Wire Rope.

For the benefit of convenient use, this Standard also made the following editorial changes.

- Delete the introduction of the international standard;
- Change the standard name into Steel Wire Rope - Determination of Rotational Properties;
- Change "this international standard" into "this Standard";
- Replace "comma" as a decimal point by a "decimal point".

This Standard was proposed by China Iron and Steel Industry Association.

This Standard shall be under the jurisdiction of National Technical Committee for Standardization of Steel (SAC/TC 183).

Drafting organizations of this Standard. China National Center for Quality Supervision & Test of Metallic Products, China Metallurgical Information and Standardization Research Institute, Guizhou Steel Rope (Group) Co., Ltd., Jiangsu Safety Wire Rope Co., Ltd., Henan Zhongwei Metal Product Co., Ltd., Guangdong Kinlong Hardware Products Co., Ltd.

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Steel Wire Ropes -

Determination of Rotational Properties

1 Scope

This Standard specifies the determination range of rotational properties of steel wire rope, terms and definitions, specimen test device, test procedures, rotational properties, test report etc.

This Standard is applicable to determine the rotational property of steel wire rope.

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 8706 Steel Wire Rope - Vocabulary, Designation and Classification (GB/T 8706-2006, ISO 17893:2004, IDT)

GB/T 16825.1 Verification of Static Uniaxial Testing Machines - Part 1.

Tension/Compression Testing Machines - Verification and Calibration of the Force-Measuring System (GB/T 16825.1-2008, ISO 700-1:2004, IDT)

3 Terms and Definitions

The terms and definitions stipulated in GB/T 8706 are applicable to this document.

4 Specimen

The specimen shall be sufficient to represent the properties of the entire steel wire rope, free from defects, and the steel wire rope shall be used independently for the lifting load.

The free length between the specimen ends of steel wire rope shall be at least $100d$, d is the nominal diameter of steel wire rope in millimeter.

6 Test Procedures

Measure the free length of the steel wire rope specimen.

Exert the load to the tested steel wire rope specimen, and determine the benchmark of pointer.

Lift the load from the ground, and ensure that the load and the ground to maintain a certain distance.

Avoid the rotational inertia of the load from the rise to the balance position.

During the load exerting period, observe the full rotation number of the pointer, and measure the angle that the pointer is deflected relatively from the benchmark.

Record the total angle that the point is deflected.

7 Rotational Properties

The rotational properties shall be determined by the rotation angle and specimen actually-measured length, which are observed in the test.

The rotation angle observed in the test shall be converted into a value of steel wire rope length of $1000d$.

When the measured free length of specimen is not $1000d$, the rotation angle (the number of rotation) observed at the free length between specimen ends shall be converted to the rotation angle at the length of $1000d$ in the directly proportional relationship. For instance, if the rotation angle observed at the free length of $250d$ is

1-turn rotation, the rotation angle per 1000d length is 4-turn rotation.

The rotational properties shall be expressed by the number of rotations per unit length of 1000d, thereof 1-turn rotation is 360°.

8 Test Report

The test report shall include minimum the following contents.

- a) Specimen number;
- b) This Standard number;
- c) Steel wire rope mark and minimum breaking force, in kN;

Appendix B

(Informative)

Application Guide of Rotation Joint

To limit the damage caused by the rotating load during the lifting operation, and guarantee the personal safety of the staff on the operation site, it's better to select the rotation-resisting steel wire rope with small rotation angle during the loading period, see the situation in a). When using such steel wire rope, the application of rotation joint can reduce the rotation due to the deflection of the steel wire rope on the pulley or drum.

Other rotation-resisting steel wire rope with small rotation-resisting function during the loading period can refer to the situation in b), the rotation joint can be used to minimize the damage. However, in this case, it shall be recognized that excessive rotation may adversely affect the properties of the steel wire rope, meanwhile it may also reduce the breaking force of steel wire rope; the affecting degree may be determined by the selected steel wire properties and the lifting load.

Each lifting operation shall be evaluated by the person in charge, meanwhile check s the application requirement of rotation joint under the maximum lifting load according to the crane manual, and inspect the steel wire rope within the specified cycle.

According to the rotational properties of steel wire rope, the application guide of rotation joint is given as follows.