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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 28784.4-2017

**Mechanical vibration -- Measurement of vibration on ships --
Part 4: Measurement and evaluation of vibration of the ship
propulsion machinery**

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Foreword

GB/T 28784 "mechanical vibration ship vibration measurement" is divided into four parts.

- Part 1. General guidelines;

- Part 2. Structural vibration measurement;

Part 3. Vibration measurement before installation of shipboard equipment;

- Part 4. Measurement and evaluation of vibration of ship propulsion devices.

This part is part 4 of GB/T 28784.

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This part uses the translation method equivalent to ISO 20283-4..2012 "Vibration measurement of mechanical vibration vessels Part 4. Ship propulsion

Measurement and evaluation of vibration "(in English).

This part of the National Mechanical Vibration, Impact and Condition Monitoring Standardization Technical Committee (SAC/TC53) proposed and centralized.

This part of the drafting unit. China Shipbuilding Industry Corporation No. 703 Research Institute, China Shipbuilding Industry Corporation seventh study

, Wuhan University of Technology, Shanghai Jiaotong University, China Shipbuilding Industry Corporation No. 702 Institute, China Classification Society Shanghai Standard Research

Institute.

Introduction

In general, the classification societies will require a numerical study of the torsional vibration characteristics of the marine propulsion system during the design phase as design

approval

Basis. In order to verify the specific problem, further torsional vibration studies can be made based on the numerical results and the type of equipment. According to international ship

Class agency standards and international classification societies unified assessment of the requirements to reverse the load test, especially IACSURM68 [10], the standard mainly for the twist

Moments, such as shafts, gears, couplings, and connectors. When the system due to the use of some special design and the need for some additional analysis

During the study, the classification societies may require the study of the rotational characteristics of the shaft and the longitudinal vibration of the propulsion system or crankshaft.

The propulsion system may be exposed to high amplitude vibrations mainly caused by the engine and/or propeller. In addition to the numerical evaluation of torsional vibration

Criteria, may be some, such as in the transmission chain to avoid the load reverse and other special requirements. In general, the design of mechanical parts

Are better able to bear the reverse load, however, some warships or yachts of these special ships of the shipowners or managers will also equipment in the reverse transport

The stability of the line made some special requirements.

Users of this section should take into account the latest specifications and effectiveness of the classification societies when evaluating the measurement data of the ship propulsion device

Of the International Association of Classification Society requirements.

The contents of this section are directly or indirectly related to the classification societies or other internationally recognized rules, such as the International Maritime Organization

(IMO) rules, the International Convention for the Safety of Life at Sea, the relevant provisions of the maritime and marine police departments of the countries concerned. Whether in this section or not

There are special provisions, measurement methods should meet the requirements of these rules or norms.

Vibration measurement of mechanical vibration ship

Part 4. measurement and evaluation of vibration of ship propulsion devices

1 Scope

This part of GB/T 28784 gives the instrument, measurement and data processing

procedures required to obtain reliable vibration data from the ship propulsion system

Order of the guide. This section also provides guidance on the application of specific measurement techniques for mechanical vibration of marine and inland river propulsion units

Measurements are more common and appropriate. These measurement techniques are suitable for diesel, steam turbine or electric propulsion equipment, in the application to consider each

Measure the specific limits of the program.

The procedures specified in this part apply to reciprocating mechanical vibrations (quasi-steady state conditions for steady-state or similar scans), as specified in this section

The program does not apply to the measurement and evaluation of transient, rapid change or shock signals.

This part mainly stipulates the measurement technology of the mechanical vibration of the main propulsion device during the test. The same or similar measurement principle applies to the other

Purposes such as performance monitoring, analysis of abnormal vibrations during operation, and status assessment of restored components. In these cases, the measurement procedure should be

Adapt to some specific requirements.

2 normative reference documents

The following documents are indispensable for the application of this document. For dated references, only the dated edition applies to this article

Pieces. For undated references, the latest edition (including all modifications) applies to this document.

GB/T 2298-2010 Mechanical vibration, shock and condition monitoring vocabulary (ISO 2041..2009, IDT)

3 terms and definitions

The following definitions and definitions as defined in GB/T 2298 apply to this document.

3.1

Free sail freeroute

The ship to maintain a stable speed sailing, the number of steels as little as possible, and the steering angle does not exceed $\pm 2^\circ$ state.

[GB/T 28784.2-2014, definition 3.3]

3.2

Vibration intensity

Such as the maximum, mean, rms value, or other one or a set of values that describe the vibration parameters, involving multiple transient values or multiple levels

Mean.

[GB/T 2298-2010, definition 3.51]

Note. The vibration intensity is a generic term used in the past when it involves vibration speed. But now more for displacement, acceleration and other measurements.

3.3

Peak peakvalue

The maximum value of vibration in a given time interval.

[GB/T 2298-2010, definition 3.44]

Note 1. The vibration peak is usually taken as the maximum offset of the vibration relative to its average. Positive peak is the maximum positive deviation, negative peak is the maximum negative deviation, see Fig.

Note 2. Since the positive and negative peaks of the vibration can be different, the peak value is usually considered to be one-half of the peak-to-peak value, see 3.4.