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

GB/T 33208-2025

Replacing GB/T 33208-2016

**Equipment structure health monitoring - Practice for the turbine
blades on-line vibration monitoring based on tip-timing theory**

设备结构健康监测 基于叶尖定时原理的透平叶片振动在线监测方法

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document replaces GB/T 33208-2016 "Online monitoring method for blades based on blade tip timing principle for non-destructive testing" and GB/T 33208- Compared with 2016, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

- a) Personnel requirements have been deleted (see Chapter 3 of the 2016 edition);
- b) Added terms and definitions (see Chapter 3);
- c) Deleted the preparation before monitoring (see Chapter 4 of the 2016 edition);
- d) added an overview of the methodology (see Chapter 4);
- e) The system composition has been changed (see 5.1, 6.1 of the 2016 edition);
- f) The basic parameters of the sensor have been changed (see 5.2, 6.2 of the 2016 edition);
- g) Added data analysis methods (see 5.4.2);
- h) Added fault diagnosis method (see 5.4.3);
- i) Added monitoring implementation process (see Chapter 6).

Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

This document was proposed and coordinated by the National Equipment Structural Health Monitoring Standardization Working Group (SAC/SWG22).

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This document was first published in 2016 and this is the first revision.

Equipment structural health monitoring based on blade tip timing principle On-line monitoring method for turbine blade vibration

1 Scope

This paper describes an online monitoring method for turbine blade vibration based on the blade tip timing principle, including an overview of the method, a monitoring system, and monitoring implementation.

Implementation process, monitoring system installation, monitoring system maintenance, and monitoring reports.

This document is applicable to large turbine machinery blades such as aircraft engines, gas turbines, steam turbines, fans, water turbines, compressors, flue gas turbines, etc.

Online monitoring of vibration.

2 Normative references

GB/T 19873.1

GB/T 19873.2

3 Terms and definitions

The terms and definitions defined in GB/T 19873.1 and the following apply to this document.

3.1 Turbine blade turbineblade

A heavy object used in turbine machinery (such as steam turbines, gas turbines, water turbines, etc.) to guide the fluid to flow in a certain direction and drive the rotor to rotate. Required parts.

Note. The blades mounted on the casing are called stationary blades or guide vanes, and the blades mounted on the rotor are called moving blades. Flat flow capacity.

3.2 Tip-timing

The time it takes for the blade to reach the sensor during the rotation of the blade. The blade tip timing sensor is installed on the casing of a large turbine machine, and the sensor measures The time it takes for each blade to arrive at the sensor.

3.3 Speed sensor speedsensor

A sensor that converts the speed of a rotating object into an electrical output.

3.4

The smallest physical change in displacement that a sensor can detect.

3.5 responsivebandwidth

The maximum sine wave frequency to which the servo system can respond.