

ICS 17.160
CCS J 04



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

GB/T 23713.1-2024

Replacing GB/T 23713.1-2009

**Condition monitoring and diagnostics of machines -
Prognostics - Part 1: General guidelines
(English Translation)**

Issued on: December 31, 2024

Implemented on: July 1, 2025

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Preface	
Introduction	
1 Scope	
2 Normative references	
3 Terms and Definitions	
4 Data requirements	
5 Forecast Concept	
5.1 Basic Concepts	
5.2 Impact Factor	
5.3 Trend, setting of warning, alarm and trip (shutdown) limits	
5.4 Multi-parameter analysis	
5.5 Starting criteria	
5.6 Prediction of the onset of failure modes	
6 Predicted failure and degradation models	10
6.1 Concepts of modeling failure mode behavior	
6.2 Modeling Types	
7 General forecasting process	
7.1 Forecast Confidence	
7.2 Forecasting process	
7.3 Forecast report	
Appendix A (Normative) Condition Monitoring Flowchart	
Appendix B (Informative) Example of determining forecast confidence	
Appendix C (Informative) Failure Modeling Techniques	
C.1 Five common modeling methods	
C.2 Three Modeling Applications	

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 is part 1 of GB/T 23713 "Machine Condition Monitoring and Diagnosis and

Prognosis". GB/T 23713 has been published as follows part.

--- Part 1: General guidance.

This document replaces GB/T 23713.1-2009 "Machine Condition Monitoring and Diagnosis and Prognosis Part 1: General Guidelines" and Compared with GB/T 23713.1-2009, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

--- Added the terms "forecast", "remaining useful life" and "forecast domain" (see 3.2, 3.9, 3.10);

--- Change the term "failure mode effects analysis" to "failure mode influence analysis" (see 3.5, 3.4 of the 2009 edition);

--- Change the term "failure mode effect criticality analysis" to "failure mode, effect and criticality analysis" (see 3.6, 2009 edition) 3.5);

--- Change the term "failure mode symptom analysis" to "failure mode sign analysis" (see 3.7, 3.6 of the 2009 edition);

---Added data requirements, mainly including. performance thresholds related to system health, configuration status in equipment manufacturing (production batch number, product batch number) and environmental data on health effects of parts (see 4.1);

--- Added two methods of representing the diagnosis and budget process, including. diagnosis and prediction diagram of the fault progression timeline, and diagnosis and Process diagram of prediction (see 5.1);

--- Added two weighted assessment factors in the general forecast process, including. future load conditions and future environmental conditions [see 7.1l), m)];

--- Added forecast reporting process (see 7.1);

--- Change "later behavior forecast" to "later forecast" (see 7.2.5, 7.2.5 of the 2009 edition).

This document is equivalent to ISO 13381-1:2015 "Machine condition monitoring and diagnostic prognosis Part 1: General guidance".

Introduction

The complete process of machine condition monitoring consists of the following five different stages.

---Discover problems (deviation from normal state);

---Diagnosis of faults and their causes;

--- Forecast of fault development trend;

---Recommendations for troubleshooting measures;

---Post-mortem analysis.

GB/T 23713 aims to establish technical issues related to prediction in the process of machine condition monitoring and diagnosis, and is intended to consist of the following parts.

--- Part 1: General guidance. The purpose is to provide general guidance on prediction concepts, failure and degradation models and prediction processes.

--- Part 2: Methods based on performance parameters. The purpose is to provide prediction methods based on performance parameters.

--- Part 3: Application technology of cyclic drive life. The purpose is to provide application technology for predicting cyclic drive life.

--- Part 4: Remaining useful life prediction model. The purpose is to provide a remaining useful life prediction model.

The prediction of machine health status requires predicting its future integrity and degradation degree, so the prediction process is difficult to be rigorous.

The standardization of machine health prediction focuses more on guidelines, methods and concepts rather than strict procedures and standards.

operate.

Prediction of future fault progression requires the prediction of possible failure modes and the tasks that the machine will undertake in the future, as well as an understanding of the failure modes and operation.

This may require understanding the physics behind the failure mode and require data collection before inference, prediction, and forecasting can be performed.

Operating conditions and operating parameters, maintenance history, inspection results, pre-failure data, trajectory and related operating data, as well as current status parameters, performance parameter.

The prediction process needs to take into account the damage analysis model.

As computing power continues to increase and data storage costs decrease, multi-parameter analysis and modeling will become more complex.

In addition to the future characteristics under certain conditions, if the initial criteria are known (expressed as a set of parameter values for a given model), it is feasible to predict the damage accumulation process.

Now.

Machine condition monitoring and diagnostic prediction Part 1: General Guidelines

1 Scope

This document provides guidance for the application and development of forecasting processes. It aims to.

- Let developers, suppliers, users and manufacturers share the general concept of forecasting;
- Enable users to determine the data, characteristics, processes and performance necessary for accurate forecasting;
- Summarize the general methods and processes for forecast development;
- Introducing the concept of prediction to facilitate the development and training of future systems.

This document provides normative terms, definitions, data collection requirements, forecast concepts, model criteria, prediction, and General guidance on failure and degradation models and prediction procedures.

This document applies to guidelines in the field of machine condition monitoring and diagnosis, including research on machine condition monitoring and diagnosis methods, monitoring and diagnosis the development of equipment and predictive maintenance of equipment, as well as other international normative documents and information documents applicable to national standards, such as Technical report.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

ring-Vocabulary)

Note: GB/T 2298-2010 Mechanical vibration, shock and condition monitoring vocabulary (ISO 2041:2009, IDT) Vocabulary Note. GB/T 20921-2007 Machine condition monitoring and diagnostic vocabulary (ISO 13372:2004, IDT) machines-General guidelines) Note. GB/T 22393-2015 General Guidelines for Machine Condition Monitoring and Diagnosis (ISO 17359:2011, IDT)