INTERNATIONAL STANDARD

ISO 16587

First edition
2004-10-01

Mechanical vibration and shock — Performance parameters for condition monitoring of structures

Vibrations et chocs mécaniques — Paramètres de performance pour la surveillance des structures

Reference number
ISO 16587:2004(E)

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Published in Switzerland

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 16587 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration and shock*.

Introduction

This International Standard provides general guidelines for the condition monitoring of structures, using parameters typically used to measure or monitor structure performance, such as displacement, strain, vibration, settlement, rotation, temperature, and foundation pore pressure.

It has been structured to be consistent with ISO 13380 and ISO 17359 in order to facilitate a consistent approach to the condition monitoring of systems.

The information provided in this International Standard will be supplemented by ISO 18431 which will be published in several parts.

Mechanical vibration and shock — Performance parameters for condition monitoring of structures

1 Scope

This International Standard describes the performance parameters for assessing the condition of structures, including types of measurement, factors for setting acceptable performance limits, data acquisition parameters for constructing uniform databases, and internationally accepted measurement guidance (e.g. terminology, transducer calibration, transducer mounting and approved transfer function techniques).

The procedures relate to in-service monitoring of structures, and include all components and sub-assemblies necessary to provide the functioning of the structure as a complete entity. The monitoring is intended to be ongoing in nature through the lifecycle of the structure.

NOTE 1 Figure 1 is a flowchart showing how this International Standard takes the user from the initial client need for condition monitoring of structures through to the point where the corresponding performance parameters have been chosen. Subsequent standards will deal with how these parameters are measured and processed.

This International Standard presupposes that a “high level” need for condition monitoring of structures already exists.

NOTE 2 Some useful guidance on identifying this need, by the use of asset identification and reliability/criticality audits, is contained in ISO 17359.

The target industries for this International Standard include

— construction,

— infrastructure,

— transportation,

— power generation,

— oil and gas, and

— leisure and entertainment.

This International Standard is applicable to stationary structures, such as

— buildings,

— bridges and towers,

— towers, masts and antennae,

— tanks and silos,

— retaining walls and dams,

— jetties and other shore-side structures,

— offshore platforms,

— pressure vessels, and

— pipelines.

Non-stationary structures (e.g. self-propelled ships) and mobile structures (e.g. offshore jack-up platforms) are excluded from this International Standard.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2041:1990, *Vibration and shock — Vocabulary*

3 Terms and definitions

For the purposes of document, the terms and definitions given in ISO 2041 and the following apply.

3.1
defect
structural defect
event occurring when the condition of any of the components of a structure or their assembly is degraded or exhibits abnormal behaviour

NOTE This may lead to failure of the structure.

3.2
failure
structural failure
termination of the ability of a structure to perform its required function

NOTE This generally happens when one or more of the components of a structure are in a defective condition, either at a service or ultimate limit state. Also, failure is an event as distinguished from fault, which is a state.

3.3
performance parameter
structural performance parameter
one or more characteristic quantities such as displacement, strain, velocity, settlement, rotation and acceleration

NOTE Performance is derived by measurement and calculation of one or more parameters, which singly or together provide information on the characteristic quantity. Performance may be described in terms of static, quasi-static or dynamic parameters, depending on the type of loading being experienced.

3.4
baseline values
parameters or derived quantities, determined under specific loading configurations and specified environmental conditions, which may be stored or kept as reference values or characteristic profiles

NOTE Baseline values are normally strongly dependent on temperature.