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Mechanical vibration — Measurement of vibration generated internally in railway tunnels by the passage of trains

*Vibrations mécaniques — Mesurage des vibrations produites
à l'intérieur des tunnels ferroviaires par le passage des trains*



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Contents

	Page
1 Scope	1
2 Normative references	1
3 Definitions	1
4 Factors affecting vibration	2
4.1 Tunnel-related factors	2
4.2 Source-related factors	2
5 Quantities to be measured	2
6 Measurement methods	3
6.1 Positioning the pick-ups with respect to the passage of trains	3
6.2 Fastening the pick-ups	4
6.3 Signal-to-noise ratio	4
7 Measuring instruments	5
8 Measurement for internal sources	5
8.1 Conditions of the track	5
8.2 Conditions of the train	5
9 Types of test	6
9.1 Full tests	6
9.2 Limited tests	6
10 Evaluation of measurements	7
11 Test report	7

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Annexes

A	Tunnel vibration resulting from the passage of trains	9
B	Examples of railway tunnels	10
C	Bibliography	24

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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.

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.

International Standard ISO 10815 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration and shock*, Subcommittee SC 2, *Measurement and evaluation of mechanical vibration and shock as applied to machines, vehicles and structures*.

Annexes A to C of this International Standard are for information only.

Introduction

Railway tunnels are regularly exposed to vibration originating from internal sources (trains and service carriages, maintenance work, etc.).

In this International Standard only vibration resulting from the passage of trains is considered.

Vibration is measured in tunnels for different purposes, which are summarized as follows.

When a tunnel is reported to be exposed to vibration which might cause concern regarding its integrity, suitable measurements (see 9.1) should be taken to assess whether the levels are acceptable.

Measurements of vibration might be carried out in the following cases:

- when the maximum allowable vibration level has been established and a regular check is required (see 9.2);
- when the dynamic performance of a newly built tunnel has been predicted and performance must be checked against design data (see 9.1);
- a special situation may arise when the tunnel has been exposed to abnormal external action (e.g. due to fires, earthquakes, blasting, pile drivers or demolition of nearby buildings) and the integrity of the structure has to be checked (see 9.1);
- when any modification to the track and/or internal vibration sources (e.g. load on vehicle axles) has been made.

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Mechanical vibration — Measurement of vibration generated internally in railway tunnels by the passage of trains

1 Scope

This International Standard establishes the basic principles for measuring, processing and evaluating vibration generated internally in railway tunnels by the passage of trains.

By establishing a standard procedure, comparative data may be obtained on response of the tunnel elements from time to time, provided that the excitation source is the same. Data obtained in different tunnels may also be compared.

The measurements considered in this International Standard concern the response of the structure and secondary elements mounted in the tunnel. They do not concern the response of persons in the tunnel or in its vicinity, or of passengers on trains running through the tunnel.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1683:1983, *Acoustics — Preferred reference quantities for acoustic levels*.

ISO 4866:1990, *Mechanical vibration and shock — Vibration of buildings — Guidelines for the measurement of vibrations and evaluation of their effects on buildings*.

ISO 5348:1987, *Mechanical vibration and shock — Mechanical mounting of accelerometers*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 tunnel: An underground structure in which passenger trains, freight trains or service trains travel.

3.2 background noise: Sum of all the signals except the one under investigation.