SLOVENSKI STANDARD
SIST EN 15433-3:2008
01-februar-2008

Obremenitve pri transportu - Merjenje in analiza dinamiļ no mehanskih obremenitev - 3. del: Preverjanje veljavnosti podatkov in urejanje podatkov za ovrednotenje

Transportation loads - Measurement and analysis of dynamic-mechanical loads - Part 3: Data validity check and data editing for evaluation

Transportbelastungen - Messen und Auswerten von mechanisch-dynamischen Belastungen - Teil 3: Datengültigkeitsüberprüfung und Datenaufbereitung für die Auswertung

Charges de transport - Mesurage et analyse des charges mécaniques dynamiques - Partie 3 : Contrôle de validité des données et édition des données pour évaluation

Ta slovenski standard je istoveten z: **EN 15433-3:2007**

ICS:
55.180.01

SIST EN 15433-3:2008 **en,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15433-3

December 2007

ICS 55.180.01

English Version

Transportation loads - Measurement and evaluation of dynamic mechanical loads - Part 3: Data validity check and data editing for evaluation

Charges de transport - Mesurage et analyse des charges mécaniques dynamiques - Partie 3 : Contrôle de validité des données et édition des données pour évaluation

Transportbelastungen - Messen und Auswerten von mechanisch-dynamischen Belastungen - Teil 3: Datengültigkeitsüberprüfung und Datenaufbereitung für die Auswertung

This European Standard was approved by CEN on 28 October 2007.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 15433-3:2007: E

Contents

Page

Foreword

This document (EN 15433-3:2007) has been prepared by Technical Committee CEN/TC 261 "Packaging", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2008, and conflicting national standards shall be withdrawn at the latest by June 2008.

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

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This standard was originally prepared by working group NAVp-1.4, Requirements and Testing, of the German Standardization Institute (DIN). It is part of a complete normative concept to acquire and describe the loads acting on goods and influencing them during transport, handling and storage.

This standard becomes significant when related to the realisation of the European Directive on Packaging and Packaging Waste (Directive 94/62 EC, 20 December 1994). This directive specifies requirements on the avoidance or reduction of packaging waste, and requires that the amount of packaging material is adjusted to the expected transportation load, in order to protect the transportation item adequately. However, this presumes some knowledge of the transportation loads occurring during shipment.

At present, basic standards, based on scientifically confirmed values, which can adequately describe and characterize the magnitudes of transportation loads, especially in the domain of dynamic mechanical loads do not exist nationally or internationally. Reasons for this are mainly the absence of published data and insufficient description of the measurements or restrictions on the dissemination of this information.

This standard will enable measurement and evaluation of dynamic mechanical transportation loads, thus enabling the achievement of standardized and adequately documented load values.

This series of standards consists of the following parts:

— Part 1: General requirements

— Part 2: Data acquisition and general requirements for measuring equipment

— Part 3: Data validity check and data editing for evaluation

— Part 4: Data evaluation

— Part 5: Derivation of test specifications

— Part 6: Automatic recording systems for measuring randomly occurring shock during monitoring of transports.

1 Scope

This standard defines procedures for assessing the validity of results acquired in accordance with EN 15433-2, and for evaluating these results.

NOTE When measuring and analysing dynamic processes, quite often unnoticed or difficult to recognize disturbances or erroneous measurements occur, which impair the application of these values. These procedures are necessary in order to detect possible errors before any actual analysis occurs.

Figure 1 provides an overview of the data validation and editing processes in this standard.

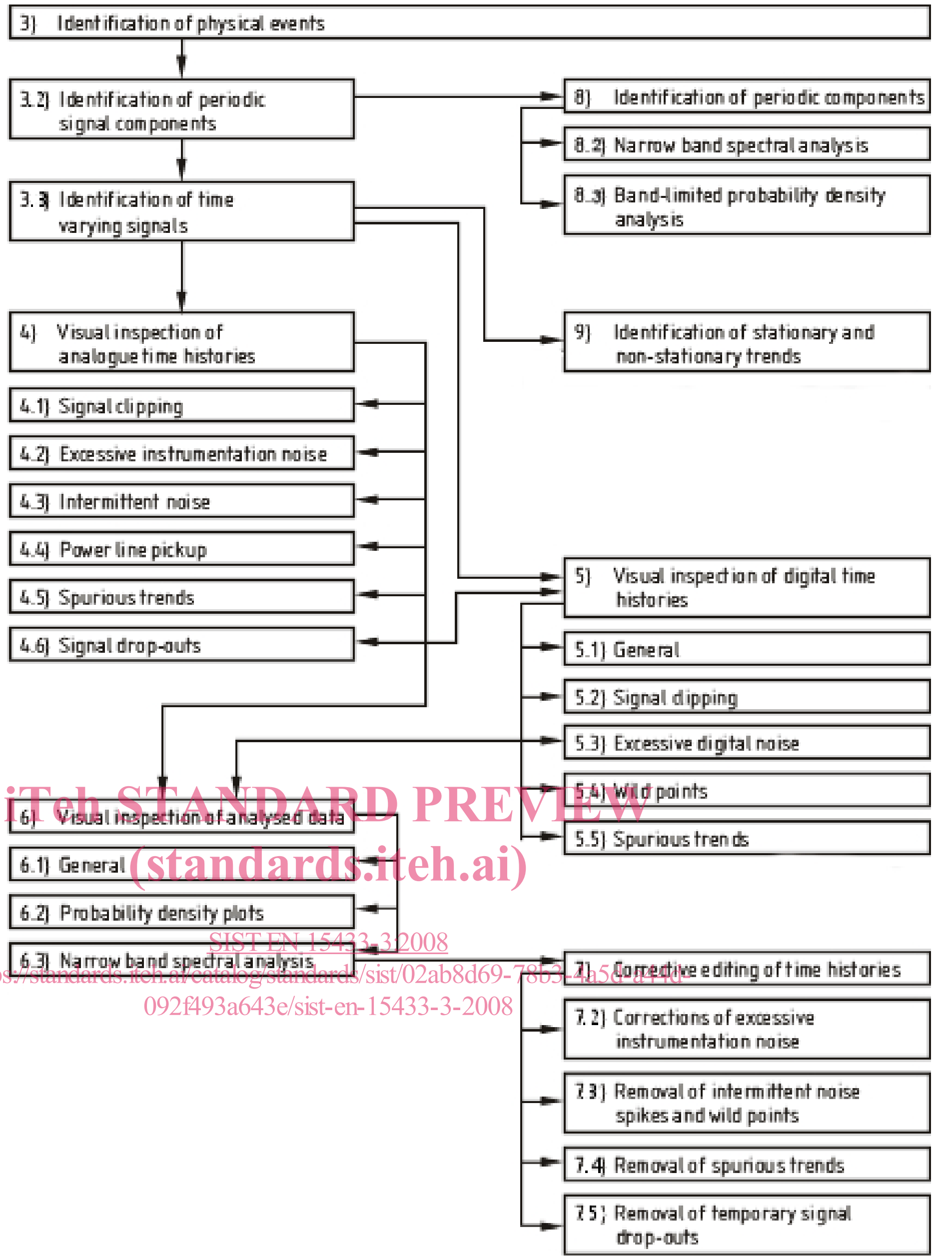


Figure 1 — Outline of data validation and editing procedures

2 Normative references

Not applicable.

3 Identification of physical events

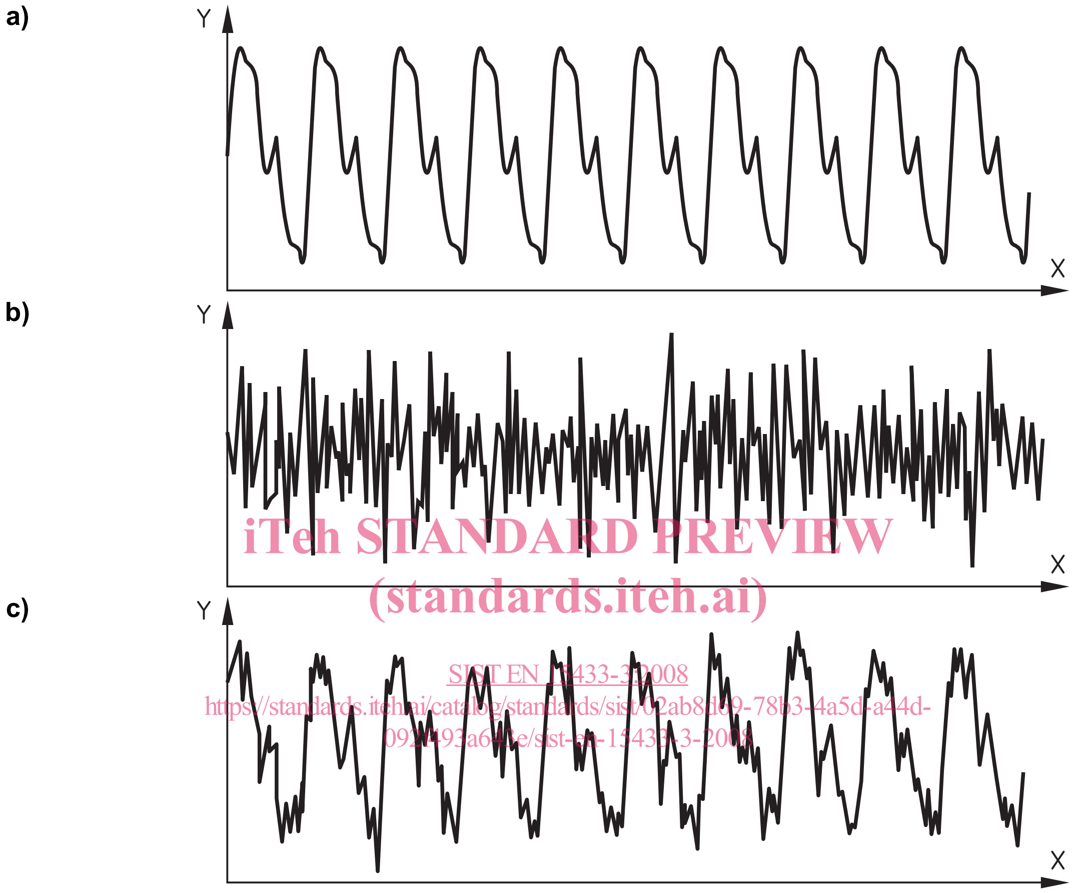
3.1 General

A measured time signal shall be associated with the physical events that happen during a measurement. If the data are produced by a printer or plotter or with an analogue recorder, then the frequency response of these devices shall be equal to or greater than the frequency range of interest in the data.

NOTE The first step in data validation and editing is identifying each signal at all relevant physical events associated with the measurement.

Identification should preferably be achieved by inspecting the analogue or digital signals visually, either on paper copies or on the monitor.

It is assumed that the measured signal is of a periodic, random or transient nature [see Figure 2 a) and b)]. In practice, these signals are most commonly of a combined nature [see Figure 2c)].



Key
X-axis Time t
Y-axis Instantaneous value $x(t)$

Figure 2 — Periodic (a), random (b), and mixed signals (c)

3.2 Identification of periodic signal components

Periodic components in measured signals shall be identified, e.g. by visual inspection of paper recordings, in order to treat them correctly during the analysis.

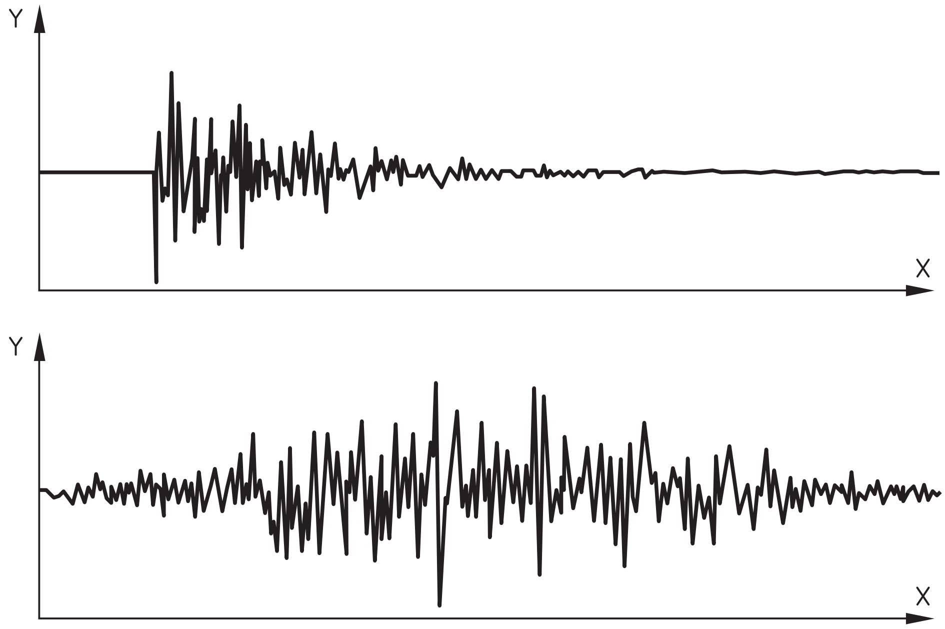
3.3 Identification of time-varying signals

Transient or non-stationary physical events shall be identified by measured time signals (see Figure 3), in order to separate them at a later time, and to perform a separate analysis.

NOTE 1 Transient signals are broadly defined as those that have a definite beginning and end [see Figure 3a)].

a)

b)



Key

X-axis Time t

Y-axis Instantaneous value $x(t)$

Figure 3 — Transient (a) and non-stationary random signal (b)

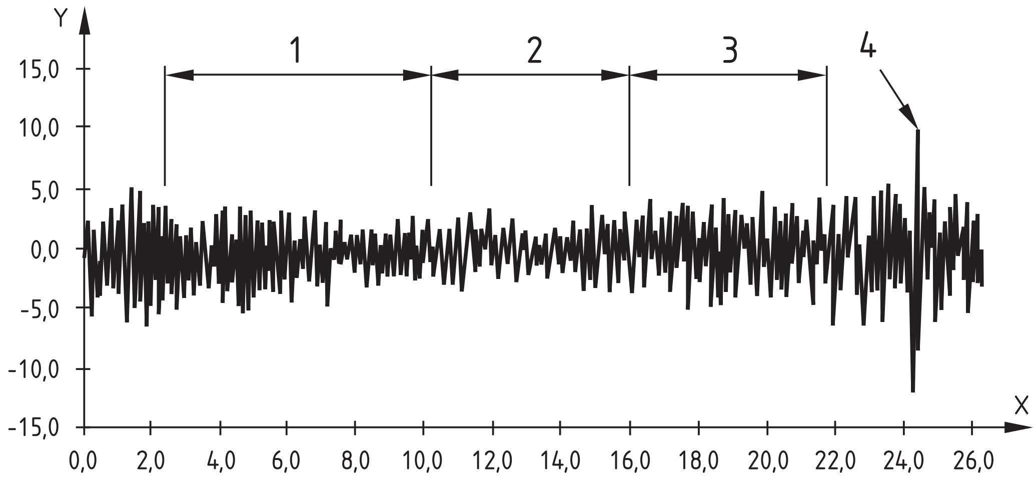
NOTE 2 Non-stationary occurrences are due to long-lasting events with continuous varying characteristics.

Figure 4 shows the main transients and superimposed occurrences during a road transport.

The identification of transients and non-stationary events is not only needed to assist the data validation, but is essential also for the selection of appropriate analysis procedures.

Based upon physical considerations, situations may arise where a measured time history reveals an apparent non-stationary trend, which is not anticipated. This trend can be wrong.

On the other hand, it might be indicative of an unexpected time-varying property of the measured phenomenon, in which case the presence of a trend could have important physical implications.



Key

1 Deceleration
2 Branching off; changing road surface condition
3 Acceleration
4 Pothole

Figure 4 — Identification of physical events in a measured signal

4 Visual inspection of analogue time histories

4.1 Signal clipping

Measured time signals of a periodic, random or transient nature shall be checked for signal clipping (see Figure 5).

If signal clipping is detected during data acquisition, then the recorded data are useless.

No attempt shall be made to introduce non-linear corrections to signals that have been clipped.

NOTE 1 One of the most common errors in data acquisition is too high a setting of the sensitivity of any one of the data acquisition instruments. The result is signal limitation or signal clipping.

An insufficient (high) sensitivity setting can also result in signal limitation, because the signal disappears within the noise. Such problems are easily corrected, but the corrections shall be performed immediately after the first measurements, and checks shall be repeated.

Contrary to the two-sided clipping shown in Figure 5, a clipping can appear one-sided as well.

Low-pass filtering of clipped signals obscures the results shown in Figure 5.

After a filtering operation, it is difficult to detect a limited signal.

Signal saturation in certain instruments of the measuring chain may also produce more complicated results than the ideal amplitude limiting shown in Figure 5, and shall therefore not be used.

Specifically, there may be a zero shift in the signal level followed by a slow recovery, which appears as a time-varying trend in the mean value of the signal.

The probability density analysis of a signal (in particular, a stationary random signal), provides a powerful tool to detect clipping.

As Figure 5c) shows, the detection of signal clipping by visual inspection is most difficult for a transient signal, particularly if it is a single pulse transient.

To assist the detection of possible clipping in transient signals, it is recommended that the peak output voltage of each instrument within the measuring chain be determined and compared to the peak voltage represented by the measured transient. If the peak voltage of the signal is equal to or greater than 95 % of the peak voltage of the instrumentation, this suggests that clipping might have occurred.