Railway applications - Track - Noise barriers and related devices acting on airborne sound propagation - Non-acoustic performance - Part 2-2: Mechanical performance under dynamic loadings caused by passing trains - Calculation method

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NATIONAL FOREWORD

See Eesti standard EVS-EN 16727-2-2:2016 sisaldab Euroopa standardi EN 16727-2-2:2016 ingliskeelset teksti.	This Estonian standard EVS-EN 16727-2-2:2016 consists of the English text of the European standard EN 16727-2-2:2016.
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Bahnanwendungen - Oberbau - Lärmschutzwände und verwandte Vorrichtungen zur Beeinflussung der Luftschallausbreitung - Nicht akustische Eigenschaften - Teil 2-2: Mechanische Eigenschaftsanforderungen unter dynamischen Belastungen infolge Zugverkehr - Berechnungsverfahren

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (EN 16727-2-2:2016) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by November 2016, and conflicting national standards shall be withdrawn at the latest by November 2016.

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.

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This European Standard is one of the series EN 16727, *Railway applications — Track — Noise barriers and related devices acting on airborne sound propagation — Non-acoustic performance*, as listed below:

— *Part 1: Mechanical performance under static loadings — Calculation and test methods* [currently at Enquiry stage];

— *Part 2-1: Mechanical performance under dynamic loadings due to passing trains — Resistance to fatigue* [currently at Enquiry stage];

— *Part 2-2: Mechanical performance under dynamic loadings caused by passing trains — Calculation method* [published];

— *Part 3: General safety and environmental requirements* [currently at Enquiry stage].

It should be read in conjunction with:

— EN 1990, *Eurocode — Basis of structural design*;

— EN 1991-2, *Eurocode 1: Actions on structures — Part 2: Traffic loads on bridges*;

— EN 1992 series, *Eurocode 2: Design of concrete structures*;

— EN 1993 series, *Eurocode 3: Design of steel structures*;

— EN 1997 series, *Eurocode 7: Geotechnical design*;

— EN 1999 series, *Eurocode 9: Design of aluminium structures*;

— EN 14067-4, *Railway applications — Aerodynamics — Part 4: Requirements and test procedures for aerodynamics on open track*.

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Introduction

Passing trains generate pressure variations in the shape of air pressure waves which impact on noise barriers installed alongside the track. Noise barriers need to withstand this impact without any part of them becoming detached or displaced in a way that creates a safety hazard for passing trains or people. This European standard presents a calculation method to assess the capacity of noise barriers having a post-and-panel structure with piled foundations to resist this pressure variation including an allowance for dynamic response of the structure.

The air pressure wave generated by a passing train is described in terms of two block loads in EN 1991-2:2003, 6.6.2. For calculating realistic static and dynamic actions on noise barriers, it is necessary to consider also the shape of the air pressure wave and the dynamic effects.

1 Scope

This European standard defines the loading, the relevant load model positions and the internal forces acting on noise barriers, due to the air pressure wave set out in EN 1991-2:2003, 6.6.2. The vertical and horizontal shapes of the air pressure wave and the dynamic effects have been taken into account. The calculation method described in this European standard has been developed for noise barriers having a post-and-panel structure with piled foundations. It can also be used where cladding is attached to a rigid structure. For structures with piled foundations, an empirical formula for determination of the natural frequency is given in Annex A. Annex B contains an example of application of the calculation method for determination of internal forces and moments acting on a mid-post. The design of noise barriers (e.g. to fatigue resistance) is not part of this standard.

2 Normative references

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

EN 1991-2:2003, *Eurocode 1: Actions on structures - Part 2: Traffic loads on bridges*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
noise barrier
noise reducing device, which obstructs the direct transmission of airborne sound emanating from railways and which will typically span between posts and also may overhang the railway

Note 1 to entry: Noise barriers are generally made of acoustic and structural elements (3.3 and 3.4).

3.2
cladding
noise reducing device, which is attached to a wall or other structure and reduces the amount of sound reflected

Note 1 to entry: Claddings are generally made of acoustic and structural elements (3.3 and 3.4).

3.3
acoustic element
element whose primary function is to provide the acoustic performance of the device

3.4
structural element
element whose primary function is to support or hold in place acoustic elements

Note 1 to entry: In some noise barriers the acoustic function and the structural function cannot be clearly separated and attributed to different components.

3.5
added device
added component that influences the acoustic performance of the original noise-reducing device (acting primarily on the diffracted energy)