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Railway applications - Guidance for the use of simulations - Guidance for the use of simulations to demonstrate compliance with technical and regulatory requirements and on the introduction and development of simulation requirements into standards

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English Version

Railway applications - Guidance for the use of simulations - Guidance for the use of simulations to demonstrate compliance with technical and regulatory requirements and on the introduction and development of simulation requirements into standards

Bahnanwendungen - Leitfaden für den Einsatz von Simulationen - Leitfaden für den Einsatz von Simulationen zum Nachweis der Einhaltung technischer und regulatorischer Anforderungen sowie zur Einführung und Entwicklung von Simulationsanforderungen in Normen

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

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European foreword

This document (CEN/TR 17833:2022) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

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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1 Scope

The aim of this document is to help CEN/CENELEC Working Group convenors and experts to promote/develop simulation in their standards as an alternative to physical tests on the real system for proving conformity. It can also provide useful guidance to assessors in the railway sector in approving simulations where they are not yet specifically defined or where physical tests on the real system are not defined in standards. Consequently, this document is also relevant to companies developing and applying simulations with the intention to achieve their acceptance for the purpose of system validation. It is not intended to provide technical guidance on applying simulations in general.

Where simulations are already introduced in existing standards, this guide is not intended to modify the specified requirements. However, technical harmonisation between standards might benefit from this guide for the introduction of additional alternative methods for simulations.

This document principally covers:

— numerical simulation, using complex methods or using simple spreadsheets methods;

— hardware and software in the loop;

— mathematical models solved using numerical methods or iteration, including spreadsheets.

It does not cover the following, although the general principles outlined can be applied to these methods:

— laboratory tests of components;

— fatigue rig tests;

— model scale tests;

— mathematical models solved analytically.

NOTE Due to the limited experience in the railway sector in the application of data-based (as opposed to model-based) simulations, for example using artificial intelligence (AI), neural networks, big data, etc., this approach is not further developed at this stage in this document.

2 Normative references

There are no normative references in this document.