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STN	**Železnice Posudzovanie pevnosti konštrukcií koľajových vozidiel Časť 3: Posudzovanie únavovej pevnosti na báze kumulatívneho poškodenia**	**STN EN 17149-3 28 2263**

Railway applications - Strength assessment of rail vehicle structures - Part 3: Fatigue strength assessment based on cumulative damage

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

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Railway applications - Strength assessment of rail vehicle structures - Part 3: Fatigue strength assessment based on cumulative damage

Applications ferroviaires - Évaluation de la résistance des structures de véhicule ferroviaire - Partie 3 : Évaluation de la résistance à la fatigue basée sur la méthode des dommages cumulés

Bahnanwendungen - Festigkeitsnachweis von Schienenfahrzeugstrukturen - Teil 3: Betriebsfestigkeitsnachweis

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Contents

Page

European foreword

This document (EN 17149-3:2025) 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of an identical text or by endorsement, at the latest by July 2025, and conflicting national standards shall be withdrawn at the latest by July 2025.

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.

This document is part of the EN 17149 series, *Railway applications — Strength assessment of railway vehicle structures*, which consists of the following parts:

— *Part 1: General*;

— *Part 2: Static strength assessment*;

— *Part 3: Fatigue strength assessment based on cumulative damage*.

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Introduction

If a fatigue strength assessment is necessary for rail vehicle structures, this assessment may be made with an endurance limit approach or a cumulative damage approach.

An endurance limit approach is based on the assessment of the stress ranges (e.g. derived from the design load cases or from measurements) against an admissible endurance limit. Such an approach is applicable in combination with the loads given in the EN 12663 series or EN 13749.

A fatigue strength assessment based on cumulative damage takes into consideration stress spectra with variable amplitudes and numbers of cycles or stress time histories. This document provides the basic procedure and criteria for a pragmatic method to be applied for fatigue strength assessments based on the cumulative damage approach.

This document does not provide any procedures or criteria for an endurance limit approach. However, the fatigue strength data included in this document can also be applicable for an endurance limit approach.

The main body of the document is based on the nominal stress approach, but the consideration of variable amplitudes and number of cycles using methods described in this standard may equally be applied with the structural stress and the notch stress approach (additional information for these assessment methods is included as informative annexes).

Within this document, the term fatigue strength assessment is always related to the cumulative damage approach unless otherwise noted.

1 Scope

This document describes a procedure for fatigue strength assessment based on cumulative damage of rail vehicle structures that are manufactured, operated and maintained in accordance with standards valid for rail system applications.

This document is applicable for variable amplitude load data with total number of cycles higher than 10 000 cycles.

An endurance limit approach is outside the scope of this document.

The assessment procedure is restricted to ferrous materials and aluminium.

This document does not define design load cases.

This document is not applicable for corrosive conditions or elevated temperature operation in the creep range.

This document is applicable to all kinds of rail vehicles; however, it does not define in which cases a fatigue strength assessment using cumulative damage is to be applied.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 15085-3:2022+A1:2023, *Railway applications — Welding of railway vehicles and components — Part 3: Design requirements*

EN 17149-1:2024, *Railway applications — Strength assessment of rail vehicle structures — Part 1: General*

ISO/TR 25901-1:2016, *Welding and allied processes — Vocabulary — Part 1: General terms*