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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 44125.1-2024

**Railway applications - Calculation of braking
performance(stopping, slowing and stationary braking) - Part 1:
General algorithms utilizing mean value calculation**

铁路应用 制动性能计算（停车、减速和静态制动）第1部分：平均计算法
(English Translation)

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is Part 1 of GB/T 44125 "Calculation of braking performance for railway applications (parking, deceleration and static braking)".

GB/T 44125 has published the following parts.

--- Part 1: Average calculation method;

--- Part 2: Distribution calculation method.

This document is modified to adopt ISO.20138-1.2018 "Calculation of braking performance for railway applications (parking, deceleration and static braking) Part 1.

Average Calculation Method.

This document has the following structural adjustments compared to ISO.20138-1.2018.

--- Deleted the contents of 5.3.7, 5.3.8, 5.4.4 and 5.4.5 in ISO.20138-1.2018 regarding the braking form to be developed;

--- Changed the order of formula (43), formula (44) and formula (45);

The technical differences between this document and ISO.20138-1.2018 and their reasons are as follows.

--- Replaced ISO.20138-2.2019 (see 5.1) with the normative reference GB/T 44125.2. The consistency between the two documents is the degree has been modified to adapt to my country's technical conditions and increase operability;

--- The formula for the static braking force transmitted to the wheelset [see formula (77)] has been changed to improve the accuracy of the calculation;

--- The formula for average deceleration force of hydraulic brakes [see formula (D.10)] has been changed to improve the accuracy of calculation.

The following editorial changes were made to this document.

--- Deleted the terminology database statement in Chapter 3 of ISO.20138-1.2018;

--- Added the definition of symbols v_1 and ECB in Table 1;

--- Changed the deceleration force "acting on the unit" in Figure 1 "Overview of the braking system and other forces" to "acting on the vehicle/unit/column" the deceleration force of the "car" has been deleted from the figure corresponding to the braking form to be developed;

--- Changed the typical double-side tread brake configuration in Figure 5, the typical single-side brake shoe configuration in Figure 6, and the typical hand-crank parking brake in Figure 17 in dynamic (tread braking) conditions, the variables l_c and l_d are $l_{c,n}$ and $l_{d,n}$ (see 5.3.2 and 6.7.1);

--- Changed the brake cylinder diagram in Figure 7 "Typical tread unit brake" (see 5.3.3);

--- Changed the variables F_r, ECB in Figure 13 "Correspondence between typical working current and deceleration force and speed of linear eddy current brake" to $F_r ECB$ (see 5.4.2);

--- Changed Figure 15, the variable b in formula (34), formula (35), formula (36) and formula (39) to b_1 (see 5.6.1 and 5.6.2);

--- Changed the variable η_{face} to η_{face} in Figure 19 "Typical hand-operated parking brake (disc brake)" (see 6.7.3);

--- Changed the flow chart of parking and deceleration braking distance calculation in Figure A.1;

--- Changed the variable $\tau_{a,req,max,ax,i}$ in Figure B.2 "Blocking Braking Calculation Flowchart" to $\tau_{a,req,max,ax,j}$ and the variable $\tau_{a,req,i}$ to $\tau_{D,req,ax}$ (see B.3);

--- Changed the variables $l_{c,i}$ and $l_{d,i}$ in the formula to $l_{c,n}$ and $l_{d,n}$ (see formulas 7, 8, 60, 61);

--- Changed the variable $irig,ax,i$ in the static force formula of a brake shoe in the attached table to $irig,ax,n$ [see formula (59) in Table C.3], brake clip the variable $Fpad,i$ in the clamping force formula is $Fpad,n$ [see formula (21) in Table C.6], and the variable ae,MTB in the stopping distance formula is ae,Mg [see formula (49) in Table C.6], the variable Fb,tot in the total force formula for all brake disc surfaces is Fb [see formula (49) in Table C.6] (68)] to be consistent with the main text.

--- Changed the description of brake system types in Table C.10.

Introduction

The International Organization for Standardization Railway Application Technical Committee (ISO/TC269) has developed the braking performance calculation (parking, deceleration and static braking) Standards for dynamics. average calculation method and step-by-step calculation method for calculating the braking distance, deceleration, power and energy of railway vehicles.

The calculation method of braking performance is in line with China's national conditions and in line with international standards. GB/T 44125 "Calculation of braking performance for railway applications (parking, Deceleration and Static Braking)", which is planned to consist of two parts.

--- Part 1: Average calculation method. The purpose is to use a general algorithm and formula with average value input to calculate all types of trains and the stopping or deceleration distance of a single rolling stock and the corresponding braking power and energy for the corresponding braking distance.

--- Part 2: Step-by-step calculation method. The purpose is to use a general algorithm and formula with instantaneous value input to calculate all types of trains and the stopping or deceleration distance of a single rolling stock and the corresponding braking power and energy for the corresponding braking distance.

Braking performance calculations for railway applications (stopping, deceleration and Static braking) Part 1: Average calculation method

1 Scope

This document specifies the calculation of the braking system stopping/decelerating distance and the braking power and A general algorithm for energy and other braking performance.

This document applies to the calculation of the braking forces generated by common types of braking systems.

This document is not applicable to the calculation of parking brake distances in conditions exceeding the available adhesion level (wheel slip).

Note 1: This document does not specify specific acceptance criteria such as pass/fail.

NOTE 2 This document is not intended as a design guide for the selection of braking systems, nor does it specify performance requirements for braking systems.

NOTE 3 If other types of braking systems are used, such as new equipment or new types of equipment, other methods of calculating braking force are used.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

GB/T 44125.2 Calculation of braking performance for railway applications (parking, deceleration and static braking) Part 2: Step-by-step calculation method (GB/T 44125.2-2024, ISO.20138-2-2019, MOD)

3 Terms and definitions

The following terms and definitions apply to this document.

train

An operating group consisting of one or more units.

Trainset

As a fixed marshaling unit for train operation.

Unit

An element of a train formation consisting of one or more vehicles.

vehicle

A single element of a unit.

Note: Such as locomotives, passenger cars, freight cars and passenger cars with driver's cabs.

Retention force

A force greater than or equal to the sum of the downhill force due to external forces and gravity.