

PD CEN/TR 17039:2017



BSI Standards Publication

Railway applications — Technical Report about the revision of EN 14363

National foreword

This Published Document is the UK implementation of CEN/TR 17039:2017.

The UK participation in its preparation was entrusted by Technical Committee RAE/1, Railway Applications, to Panel RAE/1/-/8, Railway Applications - Vehicle/Track Interaction.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2017.

Published by BSI Standards Limited 2017

ISBN 978 0 580 90721 0

ICS 45.060.01

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 March 2017.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

TECHNICAL REPORT

CEN/TR 17039

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

February 2017

ICS 45.060.01

English Version

Railway applications - Technical Report about the revision of EN 14363

Applications ferroviaires - Rapport technique de la
révision de la norme EN 14363

Bahnanwendungen - Fachbericht zur Überarbeitung
der EN 14363

This Technical Report was approved by CEN on 12 January 2017. It has been drawn up by the Technical Committee CEN/TC 256.

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



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

European foreword.....	5
1 Scope	6
2 Members of the different drafting groups for the revision of EN 14363.....	6
3 Changes to the scope	7
3.1 Scope extension	7
3.2 Limitation.....	7
3.3 Clarification.....	8
3.4 Shifted to other sections	8
4 Fault modes	8
4.1 What was changed?	8
4.2 Why was it changed?	9
4.3 Comments raised in the CRM process and how they were addressed	9
5 Load conditions for testing	9
6 First stage assessment.....	10
6.1 General	10
6.2 Safety against derailment on twisted track.....	10
6.3 Safety against derailment under longitudinal compressive forces in S-shaped curves.....	12
6.4 Evaluation of the torsional coefficient of a car body	12
6.5 Determination of displacement characteristics	12
6.6 Loading of the diverging branch of a switch.....	13
6.7 Running safety in curved crossings for vehicles with small wheels.....	14
7 Statistical analysis and multiple regression	14
7.1 Background	14
7.2 Relationship of assessment parameters and input variables.....	14
7.3 Assessment methods.....	16
7.4 Assessment by statistical methods in EN 14363	16
7.4.1 General.....	16
7.4.2 One-dimensional method.....	16
7.4.3 Two-dimensional method	24
7.4.4 Multiple regression	28
7.5 Regression assumptions.....	31
8 Recalculation of Y/Q (7.6.2.2.5)	32
8.1 What was changed	32
8.2 Why was it changed	33
8.3 Any references to useful background	33
8.4 What were the options, what was rejected and why?	33
9 Track loading parameters	36
10 Rail surface damage quantity T_{qst}	36
10.1 What was changed	36
10.2 Why was it changed	36
10.3 Approach	37
10.4 Derivation and definition of T_{qst}	38

10.5	Measurable quantities	39
10.6	Limit values.....	39
10.7	Verification from tests	40
11	Replacing of limit values of ride characteristics by informative guidance for assessment	40
11.1	General	40
11.2	Removing limit values for quasi-static lateral acceleration	41
11.3	Revision of accelerometer positions in the car body of freight vehicles.....	42
12	Track geometric quality and coordination with WG 28	42
12.1	Background.....	42
12.2	Joint Survey Group WG 10 / WG 28.....	44
12.3	DynoTRAIN project	45
12.4	Use of 50 % and / or 90 % levels.....	45
12.5	Changes from EN 14363:2005 and UIC 518:2009	45
12.6	Speed range used for Track Quality assessment.....	46
12.7	Wavelength Ranges.....	46
12.8	Requirements in different zones	47
12.9	Topics discussed but not changed	47
13	Contact conditions.....	47
13.1	Equivalent conicity.....	47
13.1.1	Summary of requirements of EN°14363:2005	47
13.1.2	Summary of requirements of UIC Leaflet 518:2009.....	48
13.1.3	Changes in EN 14363:2016.....	48
13.2	Background information about investigations carried out in the DynoTRAIN project	49
13.3	Radial steering index (RSI)	54
13.3.1	Summary of requirements of EN°14363:2005	54
13.3.2	Summary of requirements of UIC Leaflet 518:2009.....	54
13.3.3	Changes in EN°14363:2016	55
13.3.4	Background information about the radial steering index.....	55
14	Special vehicles.....	58
15	Simulation	59
15.1	General	59
15.2	Model validation	60
15.2.1	Principle of model validation.....	60
15.2.2	Evaluations to carry out model validation	60
15.2.3	Independent review.....	61
15.2.4	Validation proposal from DynoTRAIN	61
15.2.5	Efficiency of the usage of stationary tests.....	62
15.3	Fields and conditions for application of simulation	62
15.3.1	Introduction.....	62
15.3.2	Definitions of reference and modified vehicle.....	62
15.3.3	Scope of permitted modifications.....	63
15.3.4	Requirements regarding the modification of a validated model	63
15.3.5	Evaluation of estimated values.....	64
15.3.6	Application field: Extension of the range of test conditions	64
15.3.7	Application field: Approval of vehicle modification	64
15.3.8	Application field: Approval of new vehicles by comparison with a reference vehicle.....	65
15.3.9	Application field: Investigation of dynamic behaviour in case of fault modes.....	65
15.4	Input data for simulation	65
15.4.1	Introduction.....	65
15.4.2	Track layout.....	65

15.4.3	Track irregularity data	66
15.4.4	Frequency / wavelength content.....	66
15.4.5	Requirements for variation in input conditions.....	66
16	Extension of acceptance (Annex U).....	66
17	Topics discussed but postponed for future revisions.....	68
17.1	General.....	68
17.2	Y/Q.....	68
17.3	T_{qst}	68
17.4	B_{qst} and B_{max}	68
17.5	$Y_{a,max}$	68
17.6	Introduction of high frequency contents to the Q-force limits	68
17.7	Track geometry.....	69
17.8	Compatibility with track conditions outside the test conditions	69
17.9	WHEEL RAIL Geometric contact conditions	69
17.10	Cyclic top	70
17.11	Over-speed and over Cant deficiency testing.....	70
17.12	General points	70
18	Influence of the revision of EN 14363 on current TSIs	71
18.1	General.....	71
18.2	Letter to ERA.....	71
18.3	Annex 1 to letter to ERA.....	71
	Annex A (informative) Guideline for presentation of results from multiple regression	76
A.1	Introduction and purpose.....	76
A.2	Principles	76
A.3	Example	77
	Bibliography	80

European foreword

This document (CEN/TR 17039:2017) 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.

1 Scope

EN 14363 contains a lot of requirements which were modified during the last revision. The scope was also extended. It was found in the working group, that many decisions that were taken to formulate these modifications need to be documented to improve understanding and to allow a later further development if practice of applications shows the necessity. The work for the revision was organised in 8 subgroups. Many of these subgroups recorded the way to the proposals in reporting templates, which were used for the editing work. Afterwards discussion was ongoing in WG 10 and in the enquiry process. This available information needs to be summarised and presented in a common format in order to allow people not involved in the discussions to understand the background of the modifications.

2 Members of the different drafting groups for the revision of EN 14363

Bold X means group leader Normal X means group member	8.1 Editing	8.2 Test Conditions	8.3 Track Quality, Contact Conditions	8.4 Special vehicles	8.5 Stationary Tests	8.6 Simulation, Extension of acceptance	8.7 Track Loading	8.8 Ride Characteristics
HS (DE)	X	X		X	X		X	X
SZ (DE)	X	X				X		
MW (SE)		X	X	X		X		
BE (UK)			X			X		
PD (FR)		X	X	X			X	
AC (UK)	X	X			X	X		X
JS (AT)		X	X		X	X	X	
VB (FR)		X				X		
AB (FR)					X			
VB (DE)		X				X		
JC (FR)		X						
OC (FR)							X	
RD (FR)								X
HG (NO)		X	X				X	
AH (AT)		X	X				X	
TH (CZ)					X			X
M J (UK)				X				
AK (AT)						X		
TK (DE)		X	X		X			X
RK (DE)					X	X		X
NK (IT)			X			X		
DL (FR)		X			X		X	