International Standard

ISO 24675-2

First edition
2026-04

Railway applications — Running time calculation for timetabling —

Part 2: Distance-speed diagrams and speed curves

Applications ferroviaires — Calcul des temps de parcours pour la construction des horaires —

Partie 2: Diagrammes distance-vitesse et diagrammes de vitesse

Reference number
ISO 24675-2:2026(en)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 269, *Railway applications*, Subcommittee SC 3, *Operations and services*.

A list of all parts in the ISO 24675 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The purpose of this document is to help railway-related organizations around the world, regardless of their experience, to calculate accurate train running time between two points such as stations for all rolling stock types and its speed, helping to improve the punctuality of railways around the world.

Improving railway punctuality can increase the competitiveness of railway transportation against other modes of transportation such as planes, buses and cars. More customers using railway means more income for railway infrastructure managers, railway operators and related organizations. It also means the promotion of national economic growth, increased social efficiency and the use of environmentally friendly energy leading to increased global sustainability. Overall, an increased use of railways leads to an improvement of quality of life (QOL) for customers.

In order to create punctual timetables, it is necessary to accurately calculate and plan out running time between stopping or passing points, headway between trains, train scheduling, rolling stock scheduling, driver and crew scheduling, operation scheduling in stations and depots and both line and infrastructure capacities. Among these values, shortest running time between stopping or passing points is calculated first, as this is the basis of timetabling.

This enables railway stakeholders to calculate the time accurately at the stage of setting up timetables of a railway system, such as daily timetables, seasonal timetables, annual timetables, strategic timetables for long-term perspective and other timetables of a railway system. These timetables are created not only with the shortest running time shown in this document but also with other factors for safety and punctuality during commercial operations.

Generally, running time calculation is realized using many detailed factors related to real railway operations. However, it is almost impossible to verify the appropriateness of the running time calculation from the viewpoint of all such factors. On the other hand, suitable and practical verification procedures for running time calculation need to be identified to ensure the quality and validity of the running time calculation for punctual timetabling.

A practical running time calculation involves numerous factors of real railway operations. In order to establish clear verification procedures of running time calculation, this document mainly focuses on physical movements of a train.

ISO 24675-1 specifies the requirements with input parameters for running time calculation and with verification of the usage of those parameters. Figure 1 shows the relation between this document and ISO 24675-1.

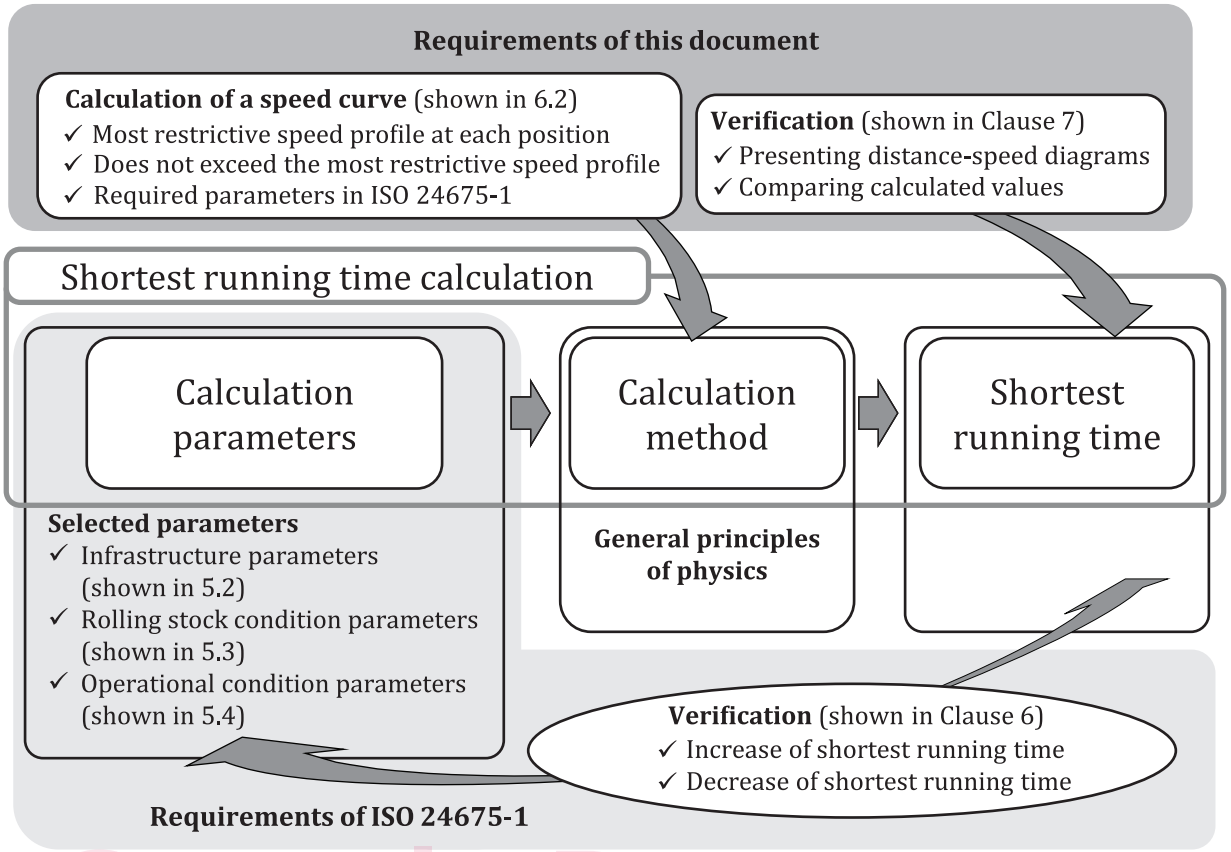

Figure 1 — Relation between this document and ISO 24675-1

In addition to this document, further documents will complete the ISO 24675 series on railway timetabling. All parts of the ISO 24675 series will together form a specific and comprehensive guidance for railway timetabling. Figure 2 shows a roadmap of the target for railway timetabling. It involves important elements of railway timetabling to be standardized in the future.

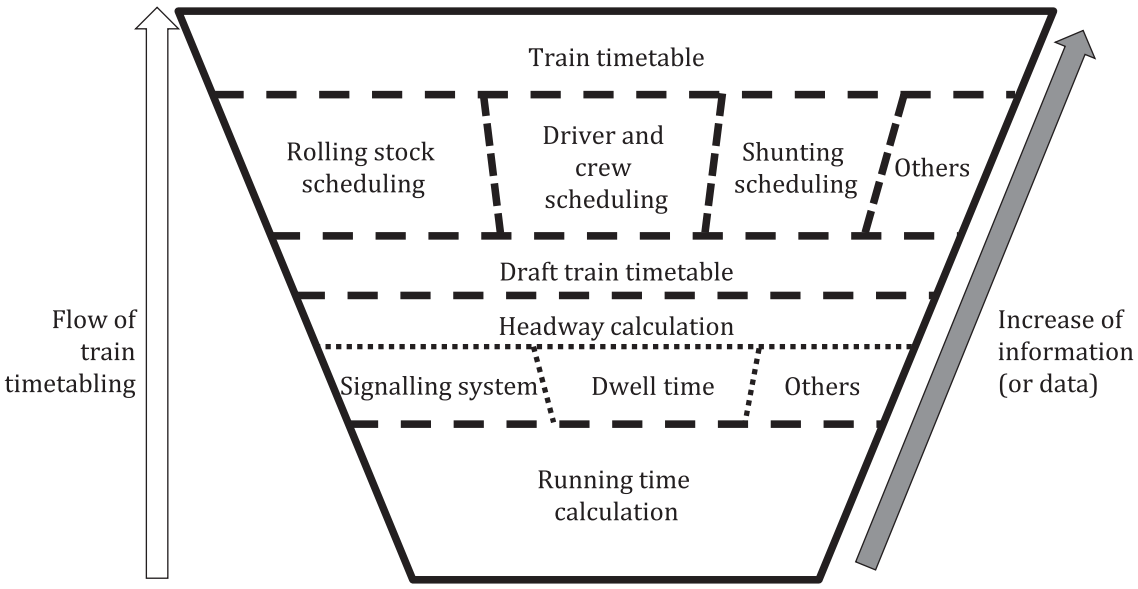

Figure 2 — Roadmap for railway timetabling

Railway applications — Running time calculation for timetabling —

Part 2: Distance-speed diagrams and speed curves

1 Scope

This document specifies a practical procedure to create and verify distance-speed diagrams and speed curves using the parameters specified in ISO 24675-1, from which the shortest running time for railway timetabling is obtained by numerically integrating the speed curves.

This document excludes running time calculation used for purposes other than timetabling.

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.

ISO 24675-1:2022, *Railway Applications — Running time calculation for timetabling — Part 1: Requirements*

ISO 24478:2023, *Railway applications — Braking — General vocabulary*

IEC 60050-811:2017, *International Electrotechnical Vocabulary (IEV) — Part 811: Electric traction*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 24675-1, ISO 24478, IEC 60050-811 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1 General terms

3.1.1
position
distance from a specific reference point on a defined path on the infrastructure

[SOURCE: ISO 24675-1:2022, 3.1.3]

3.1.2
stopping point
point where a train stops or starts

[SOURCE: ISO 24675-1:2022, 3.1.4]

3.1.3
passing point
pre-defined point where the passing time of the train is recorded

3.1.4
starting point
point where a running time calculation starts

3.1.5
ending point
point where a running time calculation ends

3.1.6
speed curve
function from a *position* (3.1.1) value to a speed value showing speed changing of a train according to its position

3.1.7
timetabling
defining a set of train schedules for a railway system to provide a service considering conditions such as the interaction between trains, infrastructure capacity, rolling stock, personnel, stations and depots scheduling, shunting, commercial requirements, etc. according to its validity period or application

[SOURCE: ISO 24675-1:2022, 3.1.7]

3.1.8
running time
amount of time, on a defined path on the infrastructure, for the head of a train to pass from one *stopping point* (3.1.2) or *passing point* (3.1.3) to another without making any stops in between

[SOURCE: ISO 24675-1:2022, 3.1.1]

3.1.9
shortest running time
running time (3.1.8) when a train is driven in the quickest way while conforming with predetermined operating restrictions

[SOURCE: ISO 24675-1:2022, 3.1.2]

3.1.10
unit time
minimum time that constitutes the timetable

3.2 Terms related to infrastructure

3.2.1
gradient resistance force
force derived from track gradient

[SOURCE: ISO 24675-1:2022, 3.2.1]

3.3 Terms related to rolling stock

3.3.1
static mass
mass of the rail vehicle/unit/train in a stationary condition

[SOURCE: ISO 24478:2023, 3.5.5]

3.3.2
running resistance force
resistance to motion of a vehicle or train

[SOURCE: ISO 24675-1:2022, 3.3.2]

3.3.3
tractive force
force in direction of travel exerted by traction motors, engines or other means of propulsion

[SOURCE: ISO 24675-1:2022, 3.3.3]

3.3.4
braking deceleration
deceleration throughout the distance travelled from the commencement of the brake application until achieving standstill or the final speed

Note 1 to entry: The braking distance represents the distance travelled from the commencement of the brake application until achieving standstill or the final speed.

[SOURCE: ISO 24478:2023, 3.6.30, modified — "braking distance" has been replaced with the text after "throughout" in the definition.]

3.3.5
inertia ratio
factor greater than unity applied to the mass of a train or vehicle to make allowance for the inertia of the revolving masses inseparable from the movement of the train

[SOURCE: IEC 60050-811:2017, 811-05-07, modified — the text "same as allowance for rotating parts " has been deleted from the end of the definition.]

4 Relation between shortest running time and timetabling

A running time used for timetabling is not always equal to the shortest running time. Adding additional time is necessary to consider actual driving conditions for increasing safe operations and punctuality. This clause shows four elements of a running time used for timetabling.

Figure 3 shows the following elements in a running time structure used for timetabling with the shortest running time.

a) Shortest running time: The shortest running time is calculated using at least all the mandatory parameters specified in ISO 24675-1.

b) Slack time: The slack time is calculated by rounding up to the unit time of the corresponding railway line such as five-seconds, ten-seconds, fifteen-seconds or a half-minute.

c) Supplemental time: In the process of timetabling, feasible driving operations, vehicle variation, track conditions and driving guidance should be considered. Given those factors differ according to the conditions and features of the railway lines, based on these factors, the addition of supplemental time to the shortest running time is necessary to appropriately prepare a running time for real railway operation conditions. The supplemental time also serves in order to ensure punctuality, considering the potential slight delays occurring in real railway operation conditions.

d) Running time used for timetabling: The running time used for timetabling is the sum of the shortest running time, slack time and supplemental time.