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Preface

This standard was prepared by the Management of Network Route Competence Development Group, overseen by the ARISO Operations Standing Committee.

Objective

The objective of this document is to specify the principles for the development, training, and assessment of route competence for rail traffic crew (RTC), and to provide guidance to rolling stock operators (RSO) on the development and management of route competence programs. This document supports rail transport operators in meeting their Rail Safety National Law obligations for the competence of rail safety workers and for managing risks associated with route knowledge and route competence.

Compliance

There are four types of provisions contained within Australian Standards developed by ARISO:

- (a) Requirements.
- (b) Recommendations.
- (c) Permissions.
- (d) Constraints.

Requirements – it is mandatory to follow all requirements to claim full compliance with the Standard. Requirements are identified within the text by the term ‘shall’.

Recommendations – do not mention or exclude other possibilities but do offer the one that is preferred. Recommendations are identified within the text by the term ‘should’.

Recommendations recognize that there could be limitations to the universal application of the control, i.e. the identified control is not able to be applied or other controls are more appropriate or better.

For compliance purposes, where a recommended control is not applied as written in the standard it could be incumbent on the adopter of the standard to demonstrate their actual method of controlling the risk as part of their WHS or Rail Safety National Law obligations. Similarly, it could also be incumbent on an adopter of the standard to demonstrate their method of controlling the risk to contracting entities or interfacing organisations where the risk may be shared.

Permissions – conveys consent by providing an allowable option. Permissions are identified within the text by the term ‘may’.

Constraints – provided by an external source such as legislation. Constraints are identified within the text by the term ‘must’.

ARISO Standards address known hazards within the railway industry. Hazards, and clauses within this Standard that address those hazards, are listed in Appendix A.

Appendices in ARISO Standards may be designated either “normative” or “informative”. A “normative” appendix is an integral part of a Standard and compliance with it is a requirement, whereas an “informative” appendix is only for information and guidance.

Commentary

Commentary C Preface

This Standard includes a commentary on some of the clauses. The commentary directly follows the relevant clause, is designated by ‘C’ preceding the clause number and is printed in italics in a box. The commentary is for information and guidance and does not form part of the Standard.

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Section 1 Scope and general

1.1 Scope

The scope of this document covers the development, implementation, and maintenance of route competence for RTC. It includes training, assessment, and ongoing management of route competence to support safe and effective operations under varying route, environmental, and operational conditions.

This document applies to RSO that develop, implement, or manage route competence as part of their rail safety management system.

Registered training organisations (RTO) and other training providers may also use it to inform the design, delivery, and assessment of route competence training undertaken for RSOs.

This document is intended to support the development and implementation of competence management for RTC as required under the Rail Safety National Law and should be applied in alignment with nationally endorsed units of competency relevant to route competence.

This document is not specifically intended to cover urban on-street tramway or light rail networks, or heritage railways operating on isolated networks, but elements of this document may be applied to such systems as deemed appropriate by the relevant Rail Infrastructure Manager (RIM).

1.2 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:

- *Rail Safety National Law (South Australia) Act 2012*

NOTE:

Documents for informative purposes are listed in a Bibliography at the back of the Standard.

1.3 Defined terms and abbreviations

For the purposes of this document, the following terms and definitions apply:

1.3.1

individual factors

factors concerning experience, capabilities and learning styles that can affect a person's ability to learn a route

1.3.2

rail infrastructure manager (RIM)

As defined in Rail Safety National Law.

1.3.3

rail traffic crew (RTC)

As defined in Rail Safety National Law.

1.3.4

registered training organization (RTO)

entity registered by the Australian Skills Quality Authority (ASQA) to deliver and assess nationally recognised training and issue qualifications in the Vocational Education and Training (VET) sector

1.3.5

risk-based training needs analysis (RBTNA)

systematic process of using risk assessment outcomes to prioritise training content, methods and assessment focus, ensuring that higher-risk tasks and locations receive greater emphasis in competence development

1.3.6

rolling stock operators (RSO)

As defined in Rail Safety National Law.

1.3.7

route competence

application of knowledge and skills that enables an individual to safely and effectively operate rail traffic over a route

1.3.8

route competence assessment

assessment to determine whether an individual has the required knowledge and skills to operate rail traffic over a route

1.3.9

route competence criteria

part of an organizations competence management system that details the required training, monitoring, development and assessments for each route

1.3.10

route factors

elements of a route which rail transport operators have identified as potentially affecting the ability of RTC to learn a route

1.3.11

route knowledge

essential knowledge required to enable RTC to operate rail traffic safely over a route

1.3.12

route learning

training and development of RTC required to equip them with the knowledge and operating experience to enable them to operate rail traffic safely over a route

1.3.13

route learning objectives

set of learning requirements which contribute to the development of RTC competence on the route

1.3.14

route learning plan

method of providing route knowledge information and guidance to RTC

General rail industry terms and definitions are maintained in the ARISO Glossary. Refer to:

<https://www.ariso.org.au/glossary/>

Section 2 General requirements

2.1 Introduction

This document specifies the requirements for the development, implementation and management of network route competence for RTC operating rail traffic on the railway network. Route learning is aimed at providing RTC with the knowledge, skills and confidence to safely operate rail traffic over track infrastructure in accordance with applicable operating procedures and operational requirements.

Route competence encompasses the practical application of theoretical knowledge, including rail traffic dynamics, braking and operating procedures, on a specific route.

Route competence integrates operational knowledge of network operating rules and local instructions with:

- (a) practical understanding of route conditions and route risks;
- (b) rail traffic performance characteristics (including braking, tractive effort, traction management and train load); and
- (c) relevant human factors that influence safe operation.

Applied route knowledge, in this context, is the practical capability of RTC to understand where the rail traffic has been, where it is now, and where it is going, to plan for the characteristics of the route ahead and to be prepared for what follows.

RSO shall ensure that their route competence systems comply with the Rail Safety National Law and are integrated within their safety management system, including meeting organisational expectations for training and instruction.

The RSO shall map route learning objectives and route competence assessment tools to the elements, performance criteria, performance evidence, and knowledge evidence of each relevant nationally recognised unit of competency where route competence contributes to, or is assessed against, that unit (refer Appendix A for guidance).

Where an RSO is also a registered training organisation (RTO), its route competence system should be aligned with the TLI Transport and Logistics Training Package and the relevant nationally recognised units of competency.

Where the RSO is not an RTO, it should ensure that its internal route competence standards support RTO delivery and recognition of prior learning, including the use of relevant nationally recognised units of competency.

2.2 Route knowledge

The RSO shall determine the requirements for route knowledge needed for RTC to safely operate rail traffic over designated routes.

Route knowledge shall form the basis of supplementary route information specific to the operations, including:

- (a) passenger operations (i.e. metro, country, long-distance);
- (b) freight;
- (c) heavy haul; and
- (d) track vehicles operating on the network.

Guidance on route knowledge requirements is provided in Appendix B.

2.3 Route risk assessments

The RSO shall undertake route risk assessments for each route as part of an RBTNA.

These assessments shall identify factors that increase safety risk, characterise route complexity, and inform the prioritisation of route learning objectives and assessment focus.

To ensure assessments are complete, the RSO should draw on outcomes from:

- (a) incident investigations;
- (b) signal-sighting committees;
- (c) relevant rules and operating procedures;
- (d) information from RIMs;
- (e) input from experienced RTC; and
- (f) trainers and assessors.

Route risk assessments shall be applied consistently across all routes. Appendix C provides guidance on the elements to be factored.

2.4 Factors affecting route learning

Route factors can include environmental conditions, complex junctions, associated signals and yard layouts.

Individual factors can include each RTC's operational experience (e.g., new, existing or transferring RTC) and learning needs.

The RSO shall identify and document the route and individual factors that affect the ability of RTC to learn and retain route knowledge.

The RSO shall implement systems to minimize the impact of route and individual factors on learning outcomes.

Where route competence is delivered or assessed by an RTO, these systems should be integrated with the RTO's training and assessment strategies.

Route learning design shall apply adult-learning principles informed by RBTNA, including:

- (a) progressive development from simple to complex routes;
- (b) the use of distributed and scenario-based learning methods; and
- (c) focused practice on high-risk locations identified in Appendix C.

NOTE:

Distributed means spacing learning over time rather than doing it in one block. A distributed learning method refers to structuring route learning so RTCs revisit and reinforce material across multiple sessions, shifts or route trips, instead of a single intensive exposure.

2.5 Defining route learning objectives

Route risk assessments and RBTNA shall inform the identification of route learning objectives and the development of route learning plans.

RSOs should take into account and document the individual learning needs of RTC so that route learning can be aligned with each person's prior experience, skills, knowledge and abilities. Individual learning preferences should also be taken into account when tailoring route learning plans.

Route learning objective and route competence assessments shall be documented and consistent with competency-based training principles as:

- (a) observable; and
- (b) measurable behaviours (including clear actions, conditions and standards).

Route learning objectives should also include the following:

- (c) The minimum route learning time for RTC learning the route for the first time.
- (d) The frequency that RTC should work over each route to retain route competence.
- (e) Refresher training requirements where RTC do not work over the route after a predetermined time.
- (f) The complexity of each route, including all known hazards.
- (g) The material and information to be developed and made accessible to RTC.
- (h) The assessment methods to be used to determine RTC route competence.

2.6 Developing route learning plans

Route learning plans should be used to communicate the schedule of route learning, the learning objectives and the timeframe for learning or reviewing routes.

The outcomes of the route risk assessment should be used to determine the minimum period available for individuals to learn each route.

2.7 Route information

The RSO shall provide RTC with current, route-specific information needed to commence practical route learning safely.

This information shall be based on documented route risk assessments and other relevant operational and environmental data.

The RSO shall assess and record risks associated with each operating route and ensure that route-related risks are included in training and briefing materials.

A route briefing program should be implemented to provide RTC with the information needed to commence route learning safely and to minimize identified risks.

A route briefing program should, as a minimum, address the following:

- (a) principles of route learning, including theoretical and practical requirements;
- (b) a pre-brief on the routes to be learned, including operational and environmental risks;
- (c) the route learning materials available; and
- (d) rail traffic cab protocols when undertaking route learning.

Route learning information shall be kept current and subject to version control.

Systems shall be in place to prevent RTC from using out-of-date route information.

2.8 Training and assessment roles

Individuals delivering training, providing instruction or assessing route knowledge shall be competent on the routes concerned, against route competence criteria determined by the RSO.

Assessors shall meet the applicable national VET assessor requirements or work under the supervision of a qualified assessor.

Where route competence is delivered or assessed for the purposes of issuing or contributing to a national unit of competency, this requirement shall apply.

The RSO should maintain a training program to provide these individuals with the skills required to perform their training and assessment roles effectively.

Section 3 Route learning

3.1 Route learning plans

A route learning plan shall be developed for each route.

Route learning plans shall set out the:

- (a) route learning objectives;
- (b) learning outcomes;
- (c) sequence of learning;
- (d) learning activities;
- (e) practice opportunities (including degraded scenarios);
- (f) formative checks; and
- (g) route learning methods, tools and materials to be used to support a successful learning outcome for each RTC.

Route learning plans should take account of:

- (h) individual factors such as prior experience, skills and learning preferences; and
- (i) adult-learning principles, including:
 - (i) scaffolding from simple to complex routes;
 - (ii) spaced practice;
 - (iii) scenario-based learning; and
 - (iv) deliberate practice on high-risk locations identified in Appendix C.

3.2 Route learning methods, tools and materials

The RSO shall identify appropriate route learning methods to ensure individuals can obtain the required route knowledge for the routes being learned. Route learning methods may include a combination of theoretical, practical and simulated environments, such as:

- (a) desktop learning;
- (b) theoretical instruction;
- (c) simulation environments;
- (d) observations in the field from the train or at stations, yards and other locations; and
- (e) practical train management, including route dynamics and strategic train operating methodology applicable to the train type over the track profile.

Route learning methods should take into account and document conditions that can affect operations, such as emergency and degraded operations, environmental conditions and working in darkness as well as daylight.

Tools and materials relevant to the routes being learned shall be accessible during the route learning period.

These may include:

- (f) simulators;

- (g) computer generated imagery (CGI);
- (h) tablet devices;
- (i) route maps;
- (j) signalling plans;
- (k) route diagrams;
- (l) recorded route footage;
- (m) photographs;
- (n) risk assessments; and
- (o) route assessments.

3.3 Managing risks in the rail traffic cab

The RSO shall document and manage the risks associated with RTC undertaking route learning in the rail traffic cab based on operational requirements and the risks identified in the formal route learning program.

As a minimum, this process should include:

- (a) authorization for access to the rail traffic cab (e.g., authorized route learning forms);
- (b) cab protocols for route learning to minimize distraction;
- (c) limiting the number of individuals in the cab to maintain an unrestricted view; and
- (d) ensuring competent and sufficiently experienced RTC to support safe and effective route learning.

Section 4 Route competence assessment

4.1 Assessing route competence

The assessment of route competence for RTC shall be undertaken by personnel in accordance with Clause 2.8 of this document.

The RSO shall have a documented process and system to assess and measure RTC performance against the learning objectives defined in the route learning plan, including assessment during route learning and in degraded operating conditions.

Route learning objectives and route competence assessments shall be defined in accordance with Clause 2.5 of this document.

The assessment system shall:

- (a) define assessment conditions (e.g., real or simulated operations, day or night, degraded conditions);
- (b) cover the full range of route risks identified in Appendix C;
- (c) meet principles equivalent to fairness, validity, reliability and sufficiency; and
- (d) use assessment instruments that include clear marking guides or decision rules linked to the route learning objectives.

Assessment methods should include a combination of:

- (e) direct observations;
- (f) written or verbal testing;

- (g) simulation, where available;
- (h) data recorder evidence, where available; and
- (i) verbal evidence by the RTC being assessed, including specific hazards.

These methods may be adapted to address the specific risks of a given route and to observe the rail traffic handling methodologies applied at particular locations.

4.2 Assessing the impact of change

The RSO shall have systems to identify and communicate network changes that affect route knowledge and route competence requirements for RTC, and to determine the level of change at which additional controls are required to manage safety risk.

A review of the original route risk assessment should be undertaken to identify further training or assessment requirements for both new and currently competent RTC on the affected route, and incident and safety records should be used to identify and address deficiencies in route learning and assessment methods.

4.3 Re-assessment of route competence

The RSO shall provide opportunities for RTC who are deemed not yet competent in route competence to be reassessed following any additional training arising from an initial assessment.

Feedback on the initial assessment shall be provided to each RTC so they understand the improvements required and can prepare effectively for reassessment.

Section 5 Route learning and assessment process review

Route learning and assessment processes, including tools and materials, should be reviewed at a period set by the RSO to identify improvements and to confirm that the processes remain credible, valid and educationally effective.

RSOs should develop an internal verification system to check that route knowledge and competence assessments are applied consistently and achieve the intended outcomes, including;

- (a) validation and moderation of assessment tools;
- (b) analysis of learner feedback; and
- (c) review of training effectiveness against incident and near-miss trends.

Where safety incidents indicate a trend in route competence deficiency, a review of the route risk assessment, RBTNA, route learning and route competence assessment processes shall be undertaken to determine whether:

- (d) the structure or duration of the process needs to be amended;
- (e) the route competence criteria need to be amended; or
- (f) the structure of the route competence assessment process needs to be amended.

Section 6 Route experience

6.1 Developing route experience

The RSO should provide RTC with opportunities to operate over newly learned routes within a specified timeframe so that new route knowledge is consolidated in practical operation.

Where RTC are undertaking continuous programs covering multiple routes, the RSO should schedule refresher training or supervised operation on previously learned routes before the RTC resumes independent working on those routes, to minimize skill fade and associated operational risk.

6.2 Route pilot

Where RTC are not currently competent on a route, including when temporarily routed, by network control officer, over an unfamiliar or degraded route, the RSO shall provide a suitably competent route pilot to accompany the movement and ensure the rail traffic is operated safely over the affected route.

Section 7 Managing route competence and records

7.1 Managing the route competence of transferring RTC

To ensure appropriate route competence and safety requirements are met, the RSO shall determine the level of training required for all RTC who transfer into the organisation. Training should be undertaken through the following steps:

- (a) conducting a gap analysis comparing the RTC's current experience and competence with the route learning objectives and any relevant nationally recognised units of competency;
- (b) documenting a detailed individual route learning plan to address the identified gaps;
- (c) providing training in accordance with the plan;
- (d) assessing and documenting the RTC's competence using RTO aligned processes; and
- (e) where applicable, recognising existing nationally recognised units of competency as part of the evidence set for route competence decisions and credit transfer.

7.2 Factors that affect individuals route competency

The RSO shall identify factors that limit an RTC's opportunity to operate over a route frequently enough to maintain competence.

The RSO shall implement systems to minimize skill fade, including targeted refresher training aligned to nationally recognised units of competency where applicable.

Factors that may affect competence include:

- (a) changes to roster structures;
- (b) frequent changes in route exposure; and
- (c) extended periods away from normal duties such as annual leave, sickness, absence or secondment to other roles.

7.3 Managing and retaining route competence

The RSO shall have a route competence assessment process, based on established requirements, to ensure RTC are competent to operate rail traffic over each specified route.

The RSO shall determine the route competence levels required for all RTC.

The RSO shall ensure that all classifications of RTC (for example full-time, part-time, limited hours, and contracted) maintain the required level of route competence.

The RSO shall ensure all RTC maintain competence on the routes they operate on.

Risk-based systems shall be in place to ensure individuals work each route with sufficient frequency to retain competence.

The RSO shall define the maximum elapsed time after which an RTC is considered non-competent on a route.

The RSO shall implement systems to:

- (a) generate alerts before this time is reached; and
- (b) periodically reassess RTC route competence as part of the competence management system.

An RTC may be deemed non-competent when:

- (c) they have not operated over the route for an extended period, as defined by the RSO; or
- (d) changes to the route are significant enough to require retraining.

7.4 Route competence records

The RSO shall record and store RTC route competence records for future reference and operational requirements.

These records shall be reviewed and updated to reflect routes that have been newly learned and the removal of routes on which the RTC has not operated within the defined retention period.

7.5 Transfer of records

The RSO should convey evidence of RTC route competence to other RSOs on request when transferring RTC to undertake the same role and operate over the same network routes.

This evidence should, where applicable, include records of nationally recognised units of competency so they can support route competence decisions and, where appropriate, credit transfer.

Appendix A Alignment with national units of competency (Informative)

A.1 General

This Appendix specifies requirements for aligning route competence management with national units of competency relevant to route competence.

A.2 Identification of relevant units

The RSO shall identify all nationally endorsed units of competency that are applicable to the development, training and assessment of route competence for RTC within the scope of this document.

A.3 Mapping of learning objectives

For each applicable unit of competency, the RSO shall:

- (a) map route learning objectives to the elements and performance criteria of the unit; and
- (b) ensure that the mapped route learning objectives collectively address all relevant performance criteria for the unit.

A.4 Mapping of assessment tools

The RSO shall ensure that assessment tools and processes for route competence are:

- (a) explicitly mapped to the elements, performance criteria, performance evidence and knowledge evidence of each relevant unit of competency; and
- (b) designed so that assessment decisions are supported by evidence that is valid, sufficient, current and authentic for the purposes of the unit of competency.

A.5 Maintenance of mapping

The RSO shall review and update the mapping required by Clauses A.4 when:

- (a) units of competency are added, updated or superseded; or
- (b) material changes are made to route learning objectives, assessment tools or the network that affect route competence requirements.

Appendix B List of Route Knowledge Factors (Informative)

	Requirements	Definitions
B1	Route Features	Stations, depots, yards, sidings, junctions, points, crossings, area of control, bridges, tunnels, names of running lines, direction of travel of running lines (including bi-directional lines), gradients (in relation to the type(s) of rail traffic), termination and limiting points of movements, systems of safeworking, rail traffic management and operation of rail traffic type over the track infrastructure
B2	Signalling	The signalling system(s) and method(s) of authorising rail traffic movements applicable to the route, including fixed lineside signals, in-cab signalling systems, and train order or other communication-based authorities. This includes the type, position, sighting, and function of signals, signs, indicators, and relevant communication points or display interfaces. Particular attention is to be given to signals or authority indicators positioned on the right-hand side of the running line, in the direction of travel, or those located out of sequence over the route. Any recent changes to infrastructure (internal or external to the railway) that may affect the visibility, operation, or interpretation of signalling or movement authority information is also to be identified.
B3	Train Protection Systems	Areas where systems such as Train Protection and Warning System (TPWS), Automatic Train Protection (ATP) and European Train Control System (ETCS) that influence the management of the rail traffic
B4	Train Radio Systems	Commencement and termination points of the infrastructure equipment for Digital Train Radio (DTRS), Cab Secure Radio (CSR), In Cab Equipment (ICE) and Global System for Mobile communications-railway (GSM-r) where relevant to the operation, this will include channel change locations.
B5	Lineside Signage	Location and meaning of lineside signs applicable to the safe operation of rail traffic.
B6	Permissible Speeds	Permitted line speed restrictions in relation to the type(s) of rail traffic to be operated, applicable to all normal and degraded situations.
B7	Level Crossings	The location of all level crossings, relevant speed restrictions, including any special working arrangements for degraded situations.
B8	Power Supplies	As applicable, neutral sections, section gaps, wired / unwired sections of route, isolation procedures, overhead line equipment (OLE) switching points.
B9	Communications	Systems in operation along with relevant contact number for operational control centres. The location of any limited communication or communications blackspots.
B10	Operating Restrictions	Where operations limit the safe movement in the rail corridor such as prohibition of dangerous goods, out of gauge rolling stock or high axle loads.
B11	Local Working Instructions	Applicable to stations, depots, running lines, yards and sidings.

	Requirements	Definitions
B12	Authorized Walking Routes	Knowledge of authorized walking routes applicable to all locations to which the person is required to visit.

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Appendix C Factors to be Assessed as Part of the Route Risk Assessment (Informative)

Route Risk Criteria	Definitions
C1 Multi SPAD signals	A signal or location that has been passed or exceeded twice in a three-year period. Signals are identified because they are more likely to be involved in another incident and RTC need to be aware of their location.
C2 Signals that have a high-risk profile	Signals that are not multi SPAD but have been identified through risk assessments as being of higher likelihood.
C3 Signals which are positioned in a non-standard location	Signals that are not positioned in a usual location, e.g., on the right-hand side of the track, lower or higher than normal. These signals need to be identified, as their sighting may be less than that of a traditional signal at close range (both main and shunt signals).
C4 Signals that have the potential to read through or read across	Read through signals that are close together and can be clearly seen to have the potential for the RTC to read the signal in advance and risk passing the closer of the two signals at stop. Read across signals are free standing adjacent to each other or on gantries that have multiple signals on them always have the potential for RTC to inadvertently look at the wrong aspect, especially on lines that are curved on the approach.
C5 Signal locations where there is limited sighting due to infrastructure	Signals that are difficult to view on approach due to foliage, bridges, buildings, etc.
C6 Signals protecting the entrance to single, bi-directional or reversible lines	RTC need to be aware of the increased likelihood of a head-on collision in the event of a passing a signal at stop or limit of authority being exceeded.
C7 Imperfectly displayed signal	Unable to visually sight the signal aspect when a warning is applied
C8 Signals located on a severely curved line	Signals that are more than 45 degrees from the direction of travel.
C9 Change of signal aspect or system	Changes from 3 position to 2 position speed signalling and the changes that exist from route signalling to speed signalling, as well as the transition from line-side signalling to cab based signalling.
C10 Signalling and associated equipment is non-standard	Equipment identified as unusual or uncommon.
C11 Short or no safety overlaps	Overlaps where they are not of a standard or minimum distance.

	Route Risk Criteria	Definitions
C12	Short sections and inconsistent braking distances between signals	Locations where signal spacing varies, there is the potential for a RTC to misinterpret the location of a signal that is at stop.
C13	Locations where signal sequence control turnouts	Locations where the signal is approach control and the approach speed could be misinterpreted.
C14	Start of Yellow SPAD locations	Locations where rail traffic usually stop and the next signal is not in view from the station stopping point and there is potential not to remember the last signal received.
C15	Start Against Stop SPAD locations	Locations where the stop point is adjacent/close to the signal and there is potential to start against a signal at stop. This must include stations where the normal stopping point is close to a signal and there is potential to start against a signal at stop.
C16	Signals that have potential to be affected by sunlight	At certain times of the day and seasonal sunlight (glare and reflective).
C17	Multiple routes	Locations where there is the potential for a RTC to inadvertently take an incorrectly set route at a junction where there is more than one route available from the main signal.
C18	Unusual rail traffic movement	Locations where a rail traffic movement is required to be performed with local restrictions or special instructions.
C19	A significant reduction in speed	Reductions in speed, RTC need to be aware that if rail traffic exceeds the target speed there is potential for derailment.
C20	Critical safety signage	Locations where signage provides information on safe operations of rail traffic operations.
C21	Locations where trains have suffered from low adhesion	Include any known locations where low adhesion may occur especially on approach to stations, junctions and specific signals, which are commonly at stop and because of low adhesion there may be a risk of increased stopping distances (vegetation, environmental, seasonal and climatic factors).
C22	Major falling gradients	Gradients that can influence the braking and stopping point of a rail traffic, specifically on the approach to signals, stations and other stopping points
C23	Stopping point at the signal is on a gradient	Areas where the rail traffic has the potential to roll back (ascending gradients).
C24	Potential differences between driving over the route in daylight and darkness	Dependency on situational awareness and approach to stopping points or where the rail traffic operations alter.
C25	Complex locations where high workload is apparent	Signalling or track layouts. These locations are identified as higher levels of workload and tasks

	Route Risk Criteria	Definitions
C26	Locations with potential line side distractions when approaching signals, stations and stopping points	Locations that have distractions that could lead to a RTC being taken away from the actions required to stop the train at a specific area (red signal in advance). Distractions include busy motorways, yards, depots, known trespass sites and change points.
C27	Locations where there is a timetabled service of long train and short platform.	Where unusual position of stop marks and could contribute to rail traffic off platform resulting in potential incident.
C28	Locations where local instructions apply to movements	Locations need to be briefed to RTC so they are aware of the possibility of the types of movement that may be needed.
C29	Locations where station over runs occur	Know locations where RTC have attempted to stop resulting in the rail traffic fully off or part on platform.
C30	Complex layouts with route/ line identification	Locations where there are indications to assist with identification of the correct signals. These are normally put in place because of several previous incidents at the location.
C31	Communication black spots	Where transmission of critical information could be delayed or stopped.
C32	Signals and identification of braking areas that have potential to be affected by light pollution	Locations where signal sighting is fine in daylight but during the hours of darkness lights on nearby roads, industrial areas, car parks, platforms, etc. could lead to misreading signals.

NOTE:

The list above is not exhaustive and other specific requirements may apply to route knowledge and assessment.

Appendix D Hazard register (Informative)

Hazard number	Hazard
7.1.1.3	Miss-communication
7.1.1.12	Loss of situational awareness
7.2.1.3	Miss-communication
7.2.1.12b	Loss of situational awareness
7.3.1.3	Miss-communication.
7.3.1.12	Loss of situational awareness
7.4.1.	Miss-communication
7.4.1.12	Loss of situational awareness
8.1.1.3	Operator Rules & Procedural Breaches
8.2.1.1	Derailment or Collision
8.2.1.5	Operator procedural breach
8.2.1.9	Network Rules and or Procedure breach
8.3.1.1	Derailment or Collision
8.3.1.5	Operator Procedural Breach
8.3.1.9	Network Rules and or procedure breach
10.3.1.1	Overrun of Limit of Authority
10.3.1.3	Failure to obey Speed restrictions, other instructions, signs, indications or warnings
10.3.1.4	Route Knowledge / equipment knowledge failure
10.4.1.2	Track specific speed limits exceeded
10.4.1.4	Infrastructure specific speed limits exceeded
10.4.1.5	Authority related speed limits exceeded
10.14.1.1	Ineffective or no training

Bibliography (Informative)

- TAE40122 Certificate IV in Training and Assessment
- TLI42622 Certificate IV in Train Driving
- TLIC0024 Operate rail traffic with due consideration of route conditions

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