

1 Signal Details

Signal Number

Signal Location

Signal Type

Geographical Location

Direction

What does the signal protect?

Give details

Signal Characteristics

Position to running line

Distance to fouling point

Sighting Distance

m

m

Signal History

Give details

Speed limit of track where signal is located

km/h

2 Vehicle Details

Technical

LRV Speed

km/h

Type of Vehicle

Is there an allegation against the vehicle?

Yes

explain

No

Service Information

Origin

Destination

3 Driver

Profile

Occupational details:

1 Was the driver registered for secondary employment?

Yes

explain

No

2 Was the driver on a support / development plan?

Yes

explain

No

3 Was the driver competent?

Yes

No

explain

4 Does the driver have the appropriate practical / route knowledge?

Yes No **explain**

Multi-LRTAE? Incidents in previous 2 years

Job Role:
Present Job Role Time in Job Role

Current Medical Restrictions (if applicable)

Driver Roster (Current Shift Details):
Proximity to Annual Leave

Duration of Driving Shift Hours

How long since / until crib, the driver changed ends or was relieved?

Shift Rotation

Driver Roster (Historical Shift Details):

FAID Score

Driver Testimonial

Contributing Factors

1 Aspect seen prior to LRTAE

2 Describe any **internal** distractions that the driver was aware of (e.g. electronic device was switched on)

3 Describe any external distractions that the driver was aware of (e.g. pedestrian activity)


Driver's Recollection of Environmental Conditions:

Glare was a factor Other describe

Timeline Reconstruction:

Fitness for Duty:
Sleep Prior

Was the driver taking medications?

Yes  provide details No



Medical Treatment

Personal Issues


Driver wearing visual/aural aid if required? Yes No

4 Other Actor(s)



Was the Controller involved?

Yes  explain No  skip

Nature of Controller Involvement

Controller - Sleep Prior to LRTAE  Give details

Was an anyone else involved in the LRTAE?

Yes  explain No  skip to next section

Nature of Other Actor(s) Involvement

5 Damage Assessment

Was there damage?

Yes

No

explain

skip to Injury Details

Equipment Damage

Give details

Motor Vehicle Damage

Give details

Injury Details

Were there injuries?

Yes

No

explain

Other Important Details

Was there an operational interruption?

Yes

No

explain

6 Incident Details

Location

Overrun Distance

Line ID

m

Intersection Location

Did the LRTAE Occur Before or After a Platform?

Service Information

Incident Date

Incident Time

Environmental and Weather Conditions:

Noise

Vibration

Light

Glare

Fallen Foliage

Track Gradient

Rain

Snow

Visibility

Sun Angle

Other (give details)

Rail Condition

Adhesion

Safety Actions Taken

Give details

Post Incident Procedure

Is the driver suspended pending investigation?

Yes

No

Was EAP offered?

Yes

No

Was a drug / alcohol test given?

Yes

No

Date Given (if applicable)

Time Given (if applicable)

Test Result - Driver

Test Result - Other Actor

State of the LRV

LRV was...

Emergency brake application?

Yes

No

Conflicting move / train?

Yes

No

Schedule State

Reason for Signal Stop

Give details

7 Contributory Factors - Immediate

Driver (select all applicable)


<u>Misjudgement:</u> <i>Misjudged environment</i> <i>Misjudged LRV handling</i>	<u>Memory Error:</u> <i>Mental block</i> <i>Insufficient knowledge, learning or retention</i> <i>Information overload</i> <i>Distraction / Preoccupation</i> <i>Confusion</i>	<u>Action Error (Failure):</u> <i>to react to caution signal</i> <i>to locate signal</i> <i>monitor for signal</i> <i>to check signal aspect</i> <i>to maintain correct operating speed</i>
<u>Intentional Behaviour / Violation of Rules:</u> <i>Blatant disregard of rules</i> <i>Management pressure</i> <i>Unavoidable departure from rules</i> <i>Short cuts</i> <i>Horseplay, thrill seeking etc.</i>	<u>Sensory Error:</u> <i>Situational awareness / Risk perception</i> <i>Expectation / Anticipation / Assumption</i> <i>Confusion</i> <i>Distraction / Preoccupation</i> <i>Information overload</i>	<u>Action Error:</u> <i>Confusion</i> <i>Work method error</i> <i>Operating authority error</i>
<u>Decision Error:</u> <i>Interpretation of instructions</i> <i>Mindset</i> <i>Multitasking</i> <i>Insufficient knowledge / learning</i> <i>Effectiveness of decision making</i>	<u>Additional:</u> <div> <i>Intrusive thoughts</i> <i>Unintentional behaviour</i> <i>Completely missed in running</i> </div>	

Other (explain): 

Influence of Other Actor(s), the Organisation, or the Operation on the Driver

Immediate Cause

<p><u>Team Actions:</u></p> <p><i>Supervisory error</i></p> <p><i>Work method error</i></p> <p><i>Confusion</i></p> <p><i>Miscommunication with the driver</i></p>
<p><u>Additional:</u></p> <p>Outside factor</p> <p>Peer pressure / Poor supervisory example</p> <p>Signal sighting issue</p>

Other (explain): 

8 Contributory Factors - Underlying


Organisational / Operational Factors

<u>Management:</u> <i>Management of change / Abnormal situations</i> <i>Compliance management</i> <i>Workload / Shift management</i> <i>Vehicle faults management</i>	<u>Failures:</u> <i>Infrastructure failures</i> <i>Ongoing network failures</i> <i>Equipment failures</i> <i>Signal failures</i> <i>Safety control failures</i> <i>Hardware failures</i>	<u>Culture / Normalised Deviance:</u> <i>Perceived license to bend rules</i> <i>Passive tolerance of violation</i>
		<u>Additional:</u> <i>Communication</i> <i>Perceived pressure from other actor(s)</i> <i>Organisational learning</i>

Other (explain): 

Describe Underlying **Organisational / Operational** Factors

Workload Factors

<u>Mental:</u> <i>Mental stress</i>	<u>Task Demands:</u> <i>Emergency / Degraded / Abnormal conditions</i> <i>Demands due to high risk</i> <i>Undemanding</i> <i>Insufficient resources</i> <i>Improper supervision</i>	<u>Other (explain):</u> 
<u>Physical:</u> <i>Physical stress</i>		
<u>Task:</u> <i>Time / Productivity / Pressure</i> <i>Monotonous / Boring</i>		

Describe Underlying **Workload** Factors


Absent / Failed Defences

<u>Awareness:</u>	<u>Detection:</u>	<u>Additional:</u>
<i>Awareness of supervision</i>	<i>of speed and movement</i>	<i>Controls / Recovery</i>
<i>Hazard awareness</i>	<i>of Vigilance / Fatigue</i>	<i>Emergency communication</i>
<i>Awareness of communication</i>	<i>of Visual / Aural warnings</i>	
<i>Awareness of knowledge, skills and experience</i>		
<i>Awareness of procedures</i>		

Other (explain): 

Describe Underlying **Absent / Failed Defences** Factors

Workplace Factors

<u>Design (Visibility):</u>	<u>Environmental:</u>	<u>Other (explain):</u> 
<i>Viewing / Sighting distance</i>		
<i>Obstructed by structure / Sunlight / Glare</i>		
<u>Design (Condition):</u>		
<i>Housekeeping</i>		

Describe Underlying **Workplace** Factors

Outside Regulatory / Road Authority Influences

Procedural Factors

<u>Procedure Misuse (Nature of):</u>	<u>Procedure Misuse (Reason for):</u>	<u>Documentation:</u>
<i>Wrong sequence</i> <i>Complete disregard of procedure</i> <i>Procedure not followed</i> <i>Procedure implementation delay</i> <i>Use of unauthorised procedure</i>	<i>Conflicting activities</i> <i>Procedure not applicable</i> <i>Inadequate supervision</i> <i>Inattention</i> <i>Misunderstanding</i> <i>Procedure too complex</i> <i>Insufficient briefing</i> <i>Insufficient training initial / refresher</i> <i>Task familiarity (over/under)</i>	<i>Ambiguous unclear</i> <i>Not complete / Not available</i> <i>Too little information</i> <i>Not accurate</i> <i>Difficult to read</i> <i>Out of date</i>
		<u>Additional:</u> <i>Compliance</i>

Other (explain): ▾

Describe Underlying **Procedural** Factors

Knowledge, Skills and Experience Factors

<u>Driver Competence:</u>	<u>Driver Knowledge, Skills / Exp.:</u>	<u>Additional:</u>
<i>Briefing of driver</i> <i>Driver experience</i> <i>Driver assessment</i> <i>Driver training</i> <i>Driver reliance on undocumented learning</i>	<i>Task familiarity</i> <i>Change of routine / Non-routine tasks</i>	<i>Controller</i>
	<u>Other (explain):</u> ▾	

Describe Underlying **Knowledge, Skills and Experience** Factors

Supervision Factors

Inadequate skills, knowledge and experience Poor example	<u>Other (explain):</u> ▾
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Describe Underlying **Supervision** Factors

Personal Factors

<u>Communication (Receiving):</u> <i>Checking understanding</i> <i>Complex message received</i> <i>Repeating back</i> <i>Identifying person / location</i>	<u>Communication (Sending):</u> <i>Checking understanding</i> <i>Repeating back</i> <i>Inadequate communication equipment</i> <i>Poor communication skills</i>	<u>Attention:</u> <i>Anticipation</i> <i>Autopilot</i> <i>Preoccupation with personal issues</i> <i>Preoccupation with work duties/workplace</i> <i>Preoccupation with work problems</i> <i>Attention to detail</i>
<u>Lifestyle:</u> <i>Illness / Temporary disability</i> <i>Personal issue</i> <i>Influence of drugs / alcohol / medication</i> <i>Fatigue / Fatigue management</i> <i>Physical / Mental health</i>	<u>Complacency / Motivation:</u> <i>Improper incentives</i> <i>Morale</i> <i>Risk management</i> <i>Inappropriate supervision / Management</i>	<u>Additional:</u> <i>Confidence</i> <i>Self-management</i> <i>Attitude to safety</i>

Other (explain): ▾

Describe Underlying **Personal** Factors

Describe Underlying Causal Factors

9 Incident Timeline

Sequence of Events


10 Conclusions and Recommendations

Are the following changes to procedure required?


Change to Working Practices

Change to Incident Management

Safety Management Plan / System


 Give details

Just Culture Assessment

 Give details

Recommendations

Lessons Learnt

 Give details

CORRECTIVE ACTIONS	FOLLOW-UP ASSIGNEES	DATE

Investigator Sign Off

Full Name	Mobile Number
Job Title	Location
Signature	Date

Reviewed By (if applicable)

Full Name	Mobile Number
Job Title	Location
Signature	Date

Additional Information

Terms / Acronyms

TERM / ACRONYM	DEFINITION - EXPLANATION

How you use this LRTAE Investigation Pro Forma

This pro forma is a tool designed to help and guide LRTAE investigators into gathering and arranging the information they may need to draw evidence-based conclusions and recommendations for their investigation. Depending on the existing processes of a light rail operator and their requirements, this pro forma may be used to replace equivalent pro formas, or to supplement them. It is additive to any and all tools a light rail operator currently uses. The pro forma intentionally omits information on how to analyse LRTAE incidents, but contains sections that support such analyses.

Open fields and checkboxes have been featured to afford the user with flexibility. While many of these are self-explanatory, "tooltips" have been used all the way through in the most pertinent places to guide the investigator. Where available, these appear when the mouse cursor is hovered above a title or label. The pro forma is structured in a way that can facilitate a deeper understanding of the causes of a LRTAE, and encourage the investigator to think more about factors and influences higher up in the system.

How this LRTAE Investigation Pro Forma was developed

This pro forma was developed using principles of design from participatory ergonomics. Its content was developed by evaluating the pro formas of more than 10 rail organisations, and seeking consensus through a structured communication process designed to obtain agreement (the Delphi method). Its development was driven with the aim to capture the "right" information, ensuring involvement of end-users, achieving desirable goals, and attaining consensus.

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