



Australian Government

Australian Transport Safety Bureau

Derailment of train 735

Colebrook, Tasmania, 9 November 2014

ATSB Transport Safety Report

Rail Occurrence Investigation

RO-2014-020

Preliminary – 19 January 2015

Released in accordance with section 25 of the *Transport Safety Investigation Act 2003*

Publishing information

Published by: Australian Transport Safety Bureau
Postal address: PO Box 967, Civic Square ACT 2608
Office: 62 Northbourne Avenue Canberra, Australian Capital Territory 2601
Telephone: 1800 020 616, from overseas +61 2 6257 4150 (24 hours)
Accident and incident notification: 1800 011 034 (24 hours)
Facsimile: 02 6247 3117, from overseas +61 2 6247 3117
Email: atsbinfo@atsb.gov.au
Internet: www.atsb.gov.au

© Commonwealth of Australia 2014



Ownership of intellectual property rights in this publication

Unless otherwise noted, copyright (and any other intellectual property rights, if any) in this publication is owned by the Commonwealth of Australia.

Creative Commons licence

With the exception of the Coat of Arms, ATSB logo, and photos and graphics in which a third party holds copyright, this publication is licensed under a Creative Commons Attribution 3.0 Australia licence.

Creative Commons Attribution 3.0 Australia Licence is a standard form license agreement that allows you to copy, distribute, transmit and adapt this publication provided that you attribute the work.

The ATSB's preference is that you attribute this publication (and any material sourced from it) using the following wording: *Source:* Australian Transport Safety Bureau

Copyright in material obtained from other agencies, private individuals or organisations, belongs to those agencies, individuals or organisations. Where you want to use their material you will need to contact them directly.

Addendum

Page	Change	Date

Contents

The occurrence	1
Events post derailment	2
Context	3
Location	3
Train and train crew information	3
Examination of rolling stock	4
Track Information	4
Examination of track post derailment	4
Summary of initial investigation activities	5
Ongoing investigation activities	5
General details	6
Occurrence details	6
Train details	6
Sources and submissions	7
Sources of information	7
References	7
Australian Transport Safety Bureau	8
Purpose of safety investigations	8
Developing safety action	8

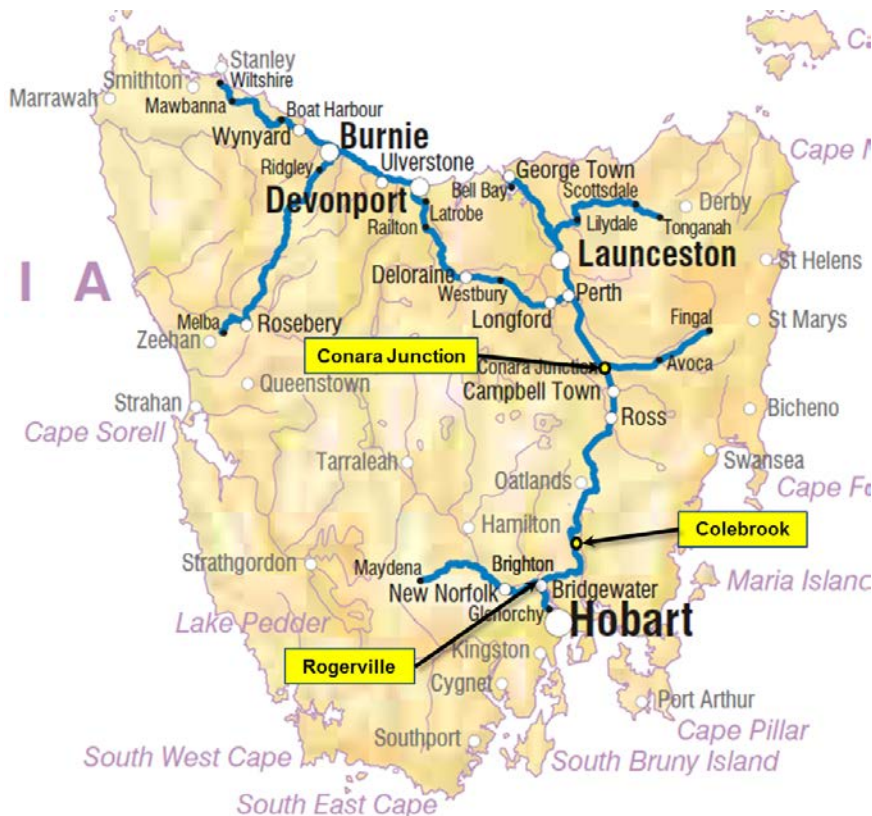
The occurrence

The information contained in this Preliminary report is released in accordance with section 25 of the Transport Safety Investigation Act 2003 and is derived from the ongoing investigation of the occurrence. Readers are cautioned that new evidence will become available as the investigation progresses that will enhance the ATSB's understanding of the accident as outlined in this Preliminary report. As such, no analysis or findings are included in this report.

At 2026¹ on 8 November 2014, train 735, a scheduled intermodal freight service conducted by TasRail as a driver only operation², departed from Burnie, bound for Rogerville (south of Brighton) in Tasmania. At 0300 on 9 November, there was a scheduled change of drivers at Conara Junction, with the new driver to take the train through to Rogerville.

Conara Junction is approximately 140 km from Rogerville by rail. Most of the journey is over rolling tablelands with gentle grades. The last 40 km of the journey includes the 13 km descent through Colebrook, with most of the descent having a posted track speed of 35 km/h due to the steep grades and tight radius curves.

Figure 1: Location map – Tasmania



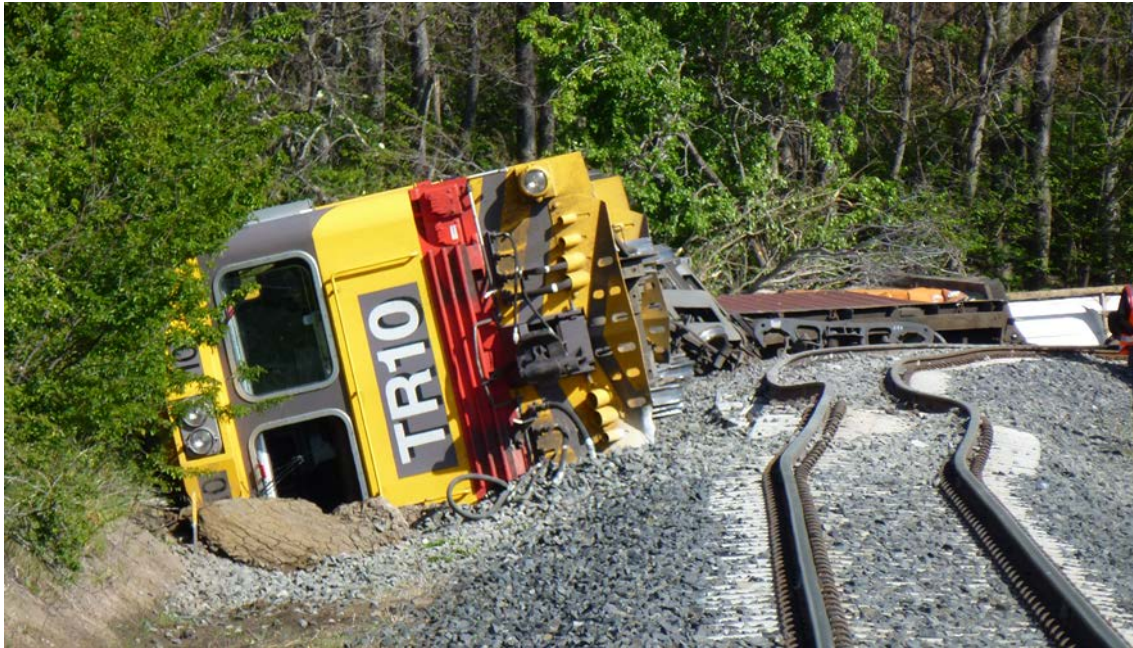
Source: NatMap Railways of Australia

The passage of the train from Conara Junction to Rhyndaston Tunnel at the top of the grade, was uneventful. At 0512, the driver of train 735 called Train Control to report that the train was clear of the Rhyndaston tunnel and commenced descending the grade under dynamic braking³.

¹ The 24-hour clock is used in this report and is referenced from Australian Eastern Daylight Time (EDT).
² Driver only operation means there is only one person in the cab of the locomotive who is responsible for the operation of the train.
³ Use of the locomotive's traction motors to effect braking. The traction motors become generators and the power generated is dissipated as heat through fan cooled resistor grids in the locomotive.

At 0516 the train crossed the level crossing at Mud Walls Rd at 30 km/h. The train's data logger showed that shortly thereafter, the speed had dropped to 20 km/h and the driver disengaged the dynamic brake. As the train gathered speed, the driver then reapplied the dynamic brake, followed by the train [air] brake. The train continued to gather speed, reaching 64 km/h as it approached the curve located at the 65 km post. As the train negotiated the curve, the driver placed the train brake into *emergency*. At the exit of the curve both locomotives left the track and rolled onto their sides into the cess drain (Figure 2). All but the last seven of the train's wagons derailed and most lost their cargo/freight containers.

Figure 2: Locomotive TR10 at the derailment site



Source: ATSB

Events post-derailment

The TR class locomotives include a feature that automatically notifies train control if the driver makes an emergency brake application. Having received an alert that TR10's emergency brake had been applied, the train controller attempted to call the driver of 735. The driver attempted to respond to the train controller's call but was unable to locate the radio microphone in the overturned locomotive cab. The driver subsequently located a mobile phone and contacted the train controller to report the emergency. The driver was coherent but had sustained minor injuries.

The driver located the dangerous goods details for the train and exited the locomotive cab through an emergency exit⁴. The train controller commenced notifying emergency services and TasRail first responders, while the driver checked the train to ascertain the damage and the state of the various dangerous goods being carried as freight.

After it became evident that some dangerous goods liquids had been spilt, the Tasmania Fire Service was notified and dispatched to manage the spill.

⁴ The windscreens of the TR class are designed to be removed as an emergency exit.

Context

Location

The derailment occurred approximately 1 km north of Colebrook – about 40 km north of Hobart, near the 65 km post on the South Line in Tasmania. The South Line through this area runs in a north-south direction, forming a main arterial link between Launceston and Hobart.

Train and train crew information

Train 735 was a regular intermodal freight service that operated between Burnie and Brighton. The train consist comprised two locomotives at the head of the train (TR10 leading and TR07 trailing) followed by 16 loaded container wagons. The train had an overall length of 274.4 m and a gross mass of 1041 t.

Locomotives TR10 and TR07 were each equipped with data loggers and forward facing video cameras. The data logger and camera systems are used for recording train information such as date/time, speed, brake pipe pressure, throttle position, distance travelled and external imagery. Data from the recorders and video imagery were used by the ATSB in examining the sequence of events leading up to the derailment.

The driver at the time of the derailment had about 5 years train driving experience. The driver held the required qualifications to operate the train and had been assessed as competent to drive the route. Examination of the driver's health assessment records confirmed that they met the required *National Standard for Health of Rail Safety Workers*.

Following the derailment the driver was tested for drugs and alcohol and returned zero readings.

Figure 3: Derailed Wagons on the right hand side of the track and wagons behind stacked on the track.



Source: ATSB

Examination of rolling stock

Examination of the derailed wagons and locomotives indicated that none of the derailed rolling stock had travelled far in a derailed state. The locomotive and the first six wagons had been cast to the right of the track and the next three wagons were stacked up on and about the track. Some containers from the train had separated from their wagons and were cast to the right of the track. The last seven wagons of the consist had not derailed and had retained their loads.

Initial on-site inspection of the rolling stock found no obvious defects or mechanical deficiencies that could have been considered contributory to the derailment.

Track Information

The Tasmanian South Line substantially comprised a bidirectional single track with crossing loops strategically located throughout its length.

The track through the derailment site was narrow gauge (1,067 mm) and consisted of 47 kg/m rail, fixed to concrete sleepers with resilient fastenings⁵. The track had been re-layed with new concrete sleepers about 1 year earlier.

The track leading into the derailment site was a set of reverse curves with a short tangent between the curves. The second curve was a left hand compound curve with a tight radius of 190 m, tightening further into a curve of 110 m radius. The grade of the track leading into the derailment site was downgrade about 2.4% (1 in 41) in the direction of travel. The posted track speed through this area was 35 km/h.

Examination of track post-derailment

Examination of the track identified a number of marks on the head of the right hand rail, consistent with wheels moving abruptly across, and running along the rail head. Clusters of sleepers had been damaged and pushed into bunches (Figure 4) adjacent to where the locomotives came to rest.

In the middle of the derailment site was a short transom-top bridge. The western side wing walls of both bridge abutments had impact damage, and apart from damage to the ends of a few bridge transoms, the track over the bridge appeared to be undisturbed.

Undamaged sections of track were measured for gauge, cant and curve radius. There was no evidence of track spread, and gauge widening was considered unlikely to have been a factor in the derailment. There was no evidence of any broken or fractured rail. The track structure surrounding the derailment site appeared to be well maintained and in good condition.

⁵ A fastening that provides a degree of elasticity between the sleeper and rail with the aim of avoiding the loosening of the fastening due to vibration, as well as enhancing the ability of the fastening system to resist longitudinal creep forces and buckling forces associated with continuously welded rail (CWR).

Figure 4: Sleepers pushed into bunches adjacent to locomotive TR10.



Source: ATSB

Summary of initial investigation outcomes

The preliminary evidence available suggests that train 735 entered a 35 km/h speed rated curve, located at the 65 km post, at a speed of about 64 km/h. The train was unable to safely negotiate the curve at this speed. The leading wagons lost their containers to the right, one of which impacted the bridge abutments, before the locomotives and leading wagons overturned, rolling over the right hand rail. The remainder of the train was brought to an abrupt stop; causing further wagons to derail and some containers to be cast to the left of the track.

Ongoing investigation activities

The ATSB investigation is continuing and areas of focus will include:

- The methods adopted for handling trains through the Colebrook area
- Train braking performance
- Factors affecting driver actions and performance
- Effectiveness of driver training and accreditation processes
- The track alignment and inspection requirements

General details

Occurrence details

Date and time:	9 November 2014 – 0521 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Derailment - Running Line	
Location:	South Line near 65.000 km -Colebrook	
	Latitude: 42° 30.98'S	Longitude: 147° 20.992' E

Train details

Train operator:	TasRail	
Registration:	735	
Type of operation:	Freight - Intermodal	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Minor	Passengers – Nil
Damage:	Substantial	

Sources and submissions

Sources of information

The sources of information during the investigation included:

- TasRail staff and operational documentation
- Train driver
- Train data recording systems

References

Bureau of Meteorology - Weather Observations for Tunnack and Campania (9 November 2014)

RISRB Glossary of Railway Terminology – Guideline

Australian Transport Safety Bureau

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

Purpose of safety investigations

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to initiate proactive safety action that addresses safety issues. Nevertheless, the ATSB may use its power to make a formal safety recommendation either during or at the end of an investigation, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation.

When safety recommendations are issued, they focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on a preferred method of corrective action. As with equivalent overseas organisations, the ATSB has no power to enforce the implementation of its recommendations. It is a matter for the body to which an ATSB recommendation is directed to assess the costs and benefits of any particular means of addressing a safety issue.

When the ATSB issues a safety recommendation to a person, organisation or agency, they must provide a written response within 90 days. That response must indicate whether they accept the recommendation, any reasons for not accepting part or all of the recommendation, and details of any proposed safety action to give effect to the recommendation.

The ATSB can also issue safety advisory notices suggesting that an organisation or an industry sector consider a safety issue and take action where it believes it appropriate. There is no requirement for a formal response to an advisory notice, although the ATSB will publish any response it receives.