



Australian Government

Australian Transport Safety Bureau

Runaway of freight train wagons

Bordertown, South Australia, on 23 November 2019

ATSB Transport Safety Report

Rail Occurrence Investigation

RO-2019-020

Final – 23 September 2020

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Addendum

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Safety summary

What happened

At about 1600 on 23 November 2019, three locomotive drivers signed on at the Bordertown siding, to prepare train 2122S for a journey to Adelaide, South Australia. Train 2122S moved out from the siding and onto the Bordertown crossing loop, where a driver detached the two locomotives so they could conduct a run-around movement and reattached the locomotives to the other end of the train consist.

As the locomotives started the run-around movement, the unattended wagons started to roll back towards the siding. The wagons rolled over a level crossing (which operated automatically as designed), bounced over a derailer (signalling infrastructure on the rail) and continued back into the Bordertown siding.

A driver who was still in the siding, observed the unattended rolling freight wagons, so ran alongside and commenced applying the handbrake on one of the wagons. The runaway wagons slowed and came to a stop, having rolled unattended for about 1,425 m. The wagons stopped about 47 m from the end of the siding, a road and level crossing.

There was only minor damage to the derailer, associated rodding and slight misalignment of sleepers.

What the ATSB found

The ATSB found that while detaching the locomotives, the brake pipe air taps were closed by the driver on ground uncoupling the wagons before a full application of the train air brakes by the driver in the lead locomotive. This prevented further reduction of brake pipe air pressure, so the wagon brakes did not fully apply. In addition, handbrakes were not applied to any wagons. Once the locomotives were detached, the lack of air brakes and handbrakes allowed the wagons to roll away on the descending grade.

While not contributing to the incident, the ATSB also found that the device (a baulk) installed at the siding for restraining runaway wagons was likely insufficient to restrain runaway wagons under some conditions.

What has been done as a result

Bowmans Rail issued a safety alert requiring uncoupled wagons to have all air exhausted and handbrakes applied when left unattended. The alert also reinforced that all procedures must be adhered to when coupling and uncoupling rollingstock. Additionally, Bowmans Rail have communicated the findings of their investigation and their expectations to train crew, as well as consulted on improvements planned for its Bordertown shunting processes.

The Australian Rail Track Corporation (ARTC) has installed an arrestor bed on the track at the Bordertown dead end, with further works to the arrestor bed planned in October 2020.

Safety message

This incident highlights how omitting a procedural step may result in over-reliance on remaining protective measures. In this case, the non-application of handbrakes increased reliance on the full application of wagon air brakes to prevent a runaway. However, a slight out of sequence implementation of the air brake process resulted in only partial application of the wagon air brakes and the subsequent runaway of unattended wagons. It is essential that all procedural steps are undertaken when uncoupling wagons for run-around movements.

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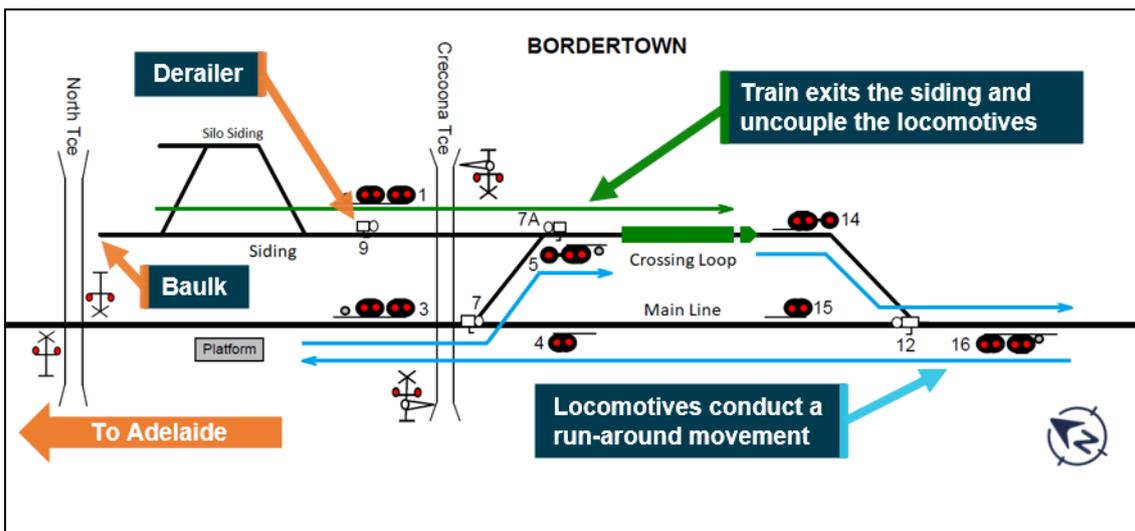
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The occurrence

At about 1600¹ on 23 November 2019, three locomotive drivers signed on for work at Bordertown, South Australia and proceeded to the Bordertown rail siding to prepare and operate train 2122S to Adelaide, South Australia.

To prepare for the journey to Adelaide, the crew needed to pull the train (two locomotives and 30 wagons) from the siding and onto the Bordertown crossing loop (Figure 1, green arrow). They then needed to detach the two locomotives and conduct a run-around movement (Figure 1, blue arrows), so the locomotives could be reattach to the other end of the train consist.

Figure 1: Intended train movement



Train 2122S moved out of siding and onto the crossing loop (green arrow). Locomotives detached for a run-around movement so they could be attached to the other end of the train consist (blue arrows). Source: ARTC, modified and annotated by ATSB for clarity.

Driver 1, at the controls of the lead locomotive, contacted Australian Rail Track Corporation (ARTC) network control and obtained authority to enter the interstate rail network at the Bordertown crossing loop. Driver 2 was positioned in the cab of the trailing locomotive. Driver 3 took the siding motor vehicle, drove out to Crecoona Terrace and manually activated the level crossing equipment as train 2122S exited the siding and moved towards the loop track.

Driver 3 observed train 2122S as it exited the siding (green arrow in Figure 1) and deactivated the level crossing equipment as the train cleared the level crossing, then advised Driver 1 when the train was on the crossing loop and entirely past Signal 5. After the train stopped (green train symbol in Figure 1), Driver 3 travelled back to the siding to return the motor vehicle.

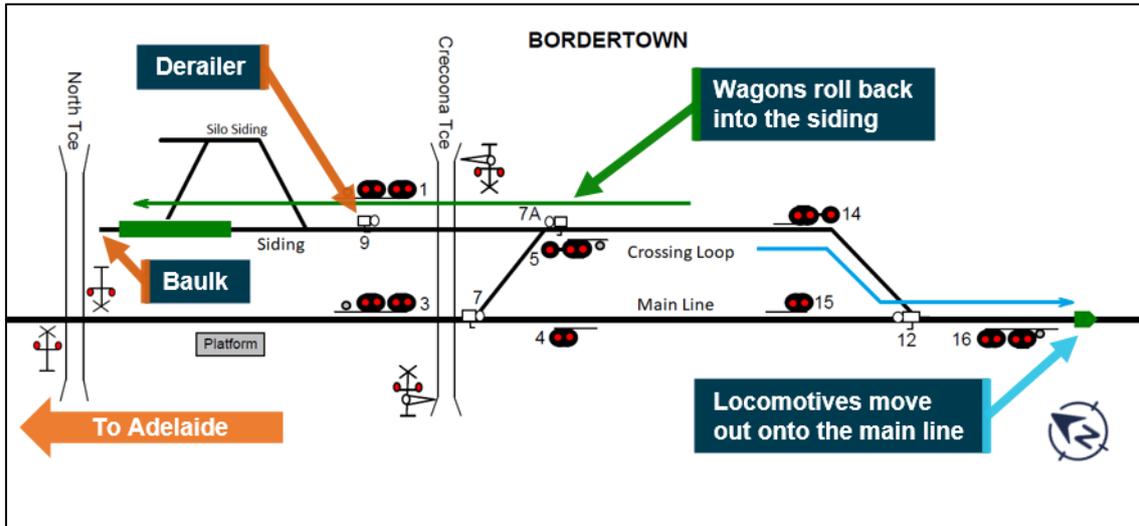
Driver 2 alighted from the cab of the trailing locomotive to uncouple the wagons from the locomotives. Driver 2 contacted Driver 1 by radio to verify that the train brakes had been applied. Driver 1 confirmed this action, so Driver 2 shut the brake pipe air taps between the trailing locomotive and the lead wagon, uncoupled the locomotive from this wagon, and then climbed back into the cab of the trailing locomotive. Driver 1 recalled that an initial brake application had been made to stop the train before being contacted by Driver 2, before moving the brake into a full service position just after responding to Driver 2.

At about 1620, the ARTC network controller cleared Signal 14 and Driver 1 commenced the run-around sequence by moving the locomotives towards Signal 14 and then out onto the main line (Figure 2, blue arrow). At about the same time, the unattended wagons had begun rolling back towards the siding. As the wagons rolled past Signal 5, the network controller received a signal passed at danger (SPAD) alarm. The wagons continued to roll, passing over the Crecoona

¹ The 24-hour clock used in this report is referenced to Central Daylight Time (CDT).

Terrace level crossing (which operated automatically as designed). The ATSB calculated the runaway speed as having increased from about 12 km/h to about 18 km/h as the lead wagon traversed the track circuits between Signal 5 and Signal 1 (Figure 2), a distance of about 257 m (refer to Appendix A). The wagons then bounced over the derailer² and continued back into the Bordertown siding (Figure 2, green arrow). Note: Derailers are usually directional. That is, they are designed to protect the main line by derailing a runaway vehicle exiting a siding. In this case, the wagons were moving away from the main line, so were travelling in the opposite direction for which the derailer was designed and was therefore ineffective at derailing the wagons.

Figure 2: Unattended wagons roll back into the siding



The locomotives start the run-around movement by moving out onto the main line (blue arrow). The unattended wagons roll back, pass over the level crossing, bounce over the derailer and continue back into the siding (green arrow). Source: ARTC, modified and annotated by ATSB for clarity.

Driver 3 had returned the motor vehicle to the siding and was walking towards the station platform to wait for train 2122S to collect him when it departed for Adelaide. The driver observed the unattended freight wagons rolling towards him. As the wagons reached him, the driver ran alongside and commenced applying the handbrake on one of the wagons. The runaway wagons slowed and came to a stop as the handbrake was being applied to this wagon. This driver then exhausted the brake pipe air at the last wagon, which applied the brakes to the remainder of the runaway wagons.

At about the same time, the ARTC network controller had contacted Driver 1 and queried the status of train 2122S, noting that it appeared that the wagons had rolled back into the siding. Driver 1 contacted Driver 3 who advised the loaded freight wagons had rolled into the siding and come to a stop before the baulk³ at the end of the siding (Figure 2).

In total, the wagons of train 2122S had rolled unattended for about 1,425 m, stopping about 47 m from the end of the siding, immediately before the North Terrace level crossing.

There was only minor damage to the derailer, associated rodding and slight misalignment of sleepers.

² Derailer – A specially shaped block placed over one rail of a siding to protect main line traffic from any runaway vehicles or unauthorised moves. This protection is achieved by derailing any locomotive or wagon that comes in contact with the derailer. Source: RISSB Glossary of Railway Terminology.

³ Baulk – A device placed across the rails and anchored to the track to stop vehicles should they begin to roll away. Source: RISSB Glossary of Railway Terminology.

Context

Location

Bordertown is located on the interstate rail network about 250 km south-east of Adelaide (Figure 3). The track consisted of a bi-directional main line and crossing loop, with a dead end siding extending from the crossing loop. The main line, crossing loop and dead end siding was owned and operated by the Australian Rail Track Corporation (ARTC).

Figure 3: Location



Image shows the rail corridors within South Australia with the location of Bordertown in relation to Adelaide. Source: Geoscience Australia, Crown Copyright ©

Track gradient

The Bordertown crossing loop sits on a gradient of about 1 in 100 (1per cent). The siding track (about 1,460 m in length) continues at this gradient for about 500 m before gradually transitioning to level track for the final 500 m.

Train and rollingstock

Bowmans Rail was the owner and operator of freight train 2122S. The train consisted of two locomotives (GL111 leading and EL63 trailing) hauling 30 wagons. The total train length was about 502 m, and weighed about 1,488 tonnes. There was no evidence to suggest any fault or deficiency in rolling stock condition.

Train crew

Three Bowmans Rail locomotive drivers were crewing train 2122S. All drivers were requested to undertake a breath and drug test following the accident. The tests returned a negative result for each driver.

Driver 1 was an advanced trainee with about 5 years' experience. Driver 2 had about 16 years' experience and Driver 3 had about 11 years' experience. All drivers held current driver and shunt competencies, and medical assessments.

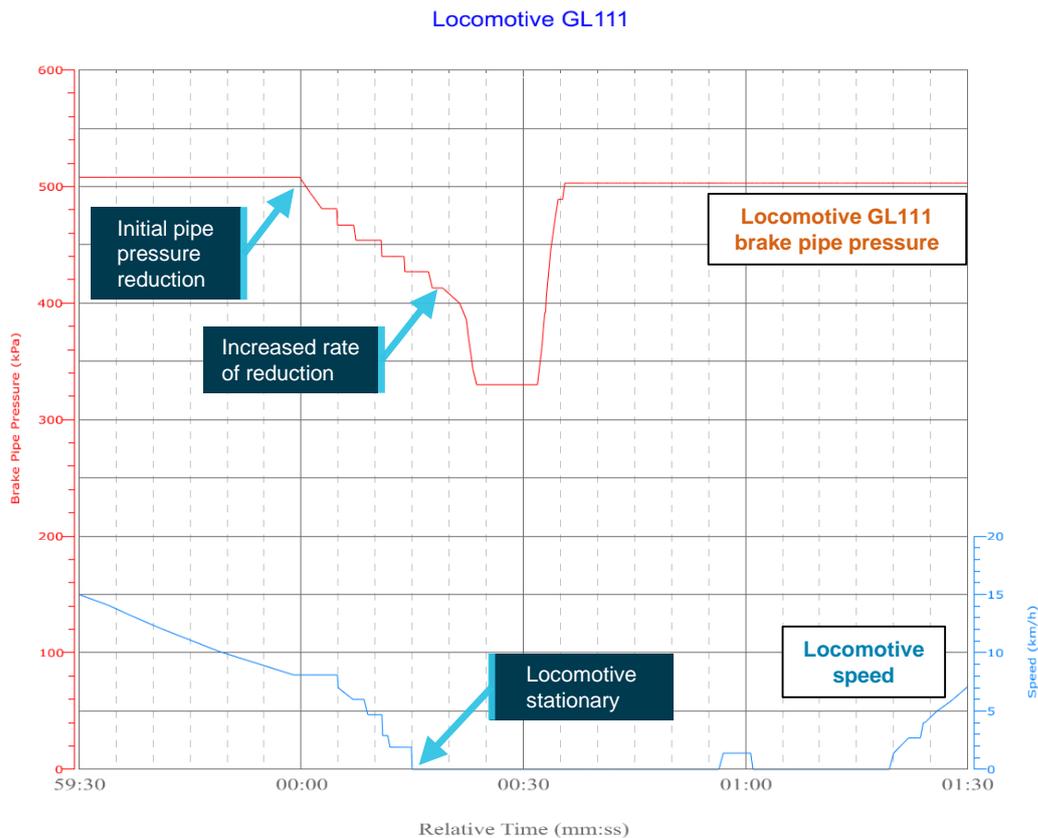
Driver 1 had worked the Bordertown shunt movement a number of times previously as the ground person, however, this was the first time working the shunt at the controls of the lead locomotive.

Recorded data

Wagon brakes apply as brake pipe pressure is reduced. For a full brake pipe application, brake pipe air pressure typically needs to reduce to about 350 kPa throughout the entire train.

In this case, the locomotive data log⁴ shows that when bringing train 2122S to a stop in the crossing loop, the brake pipe pressure started to reduce (aligning to time zero in Figure 4) at a constant rate for about 19 seconds (from 508 kPa to 413 kPa), until about 4 seconds after the lead locomotive had stopped (Figure 4). After this time, brake pipe pressure reduced rapidly over about 5 seconds to 330 kPa. Brake pipe pressure remained at 330 kPa for about 8 seconds before brake pipe pressure was restored to about 503 kPa (Figure 4).

Figure 4: Locomotive data



Locomotive data showing initial brake application as train 2122S came to a stop. Brake pipe pressure reduces further before full pipe pressure is restored. Note that time scale is relative time from initial brake application. Source: ATSB

Bordertown operational procedures

A basic shunting principle is to ensure unattended wagons are secured and brakes applied, so as to prevent any unintended movement. Bowmans Rail procedure OP 2.56 - *Shunting at Bordertown* (dated 16th May 2018) stated the following:

Once the Train crew has stopped the movement on the crossing loop, a full brake pipe application is made and the locomotive is detached from the train consist. The approved ETM [end-of train marker] is placed into the rear knuckle pin, and the train pipe hose hung up on the receptacle provided. Sufficient handbrakes shall also be applied to prevent wagon movement.

Both Driver 1 and Driver 2 reported that they were aware of this procedure and made correct communication with respect to this requirement.

⁴ Data from lead locomotive GL111 is illustrated. Data from the trailing locomotive (EL63) showed similar information.

In this case, as the train slowed to a stop in the crossing loop, Driver 2 alighted from the trailing locomotive to uncouple the wagons. The two drivers recalled at interview that Driver 2 had sought verification that a full service application had been made of the train air brakes and Driver 1 had provided an affirmative response. Driver 2 then closed both brake pipe air taps between the trailing locomotive and the wagons, disconnected the brake pipe hoses, and uncoupled the wagons. The wagon air taps then remained closed, so any remaining air in the wagon brake pipe would have been sustained (referred to as having *bottled* the brake pipe air).

Driver 2 did not apply any handbrakes to the front wagons before boarding the locomotive for the run-around movement. Post-incident interviews suggested that it had become a practice for this crew to omit the step of applying handbrakes when undertaking a run-around movement at Bordertown. The reason provided was that if the ground person applied handbrakes at the uncoupled end, then they would be required to walk the length of the train to release the handbrakes once the locomotives had been coupled at the other end. Experience had shown that the wagons would remain stationary under full application of the train brake without the need to apply handbrakes. Not applying handbrakes saved time and expedited the run-around process in preparation for the journey to Adelaide.

Bowmans Rail provided a third driver for their Bordertown operations. This was primarily to assist with shunting movements and the manual operation of the level crossing. Post-incident interviews suggested that in the past, after reinstating the level crossing, the third driver would walk to the rear of the train and prepare it for reattaching the locomotives. For some drivers, this would include opening the brake pipe air tap. While the intention may have been to expedite reconnection, the act of opening the brake pipe air tap also exhausted the brake pipe, ensuring all wagon brakes were applied.

A recent addition to the Bordertown siding was the provision of a road vehicle. Bowmans Rail advised that the intent was for drivers to use the vehicle for transport to and from their accommodation (for recovery rest). It was not intended for the vehicle to be used while undertaking shunting or the run-around movement at Bordertown. In this case, the train crew used the vehicle while facilitating the run-around movement. After reinstating the level crossing, Driver 3 returned the road vehicle to the siding rather than attending the rear of the train in preparation for reconnecting the locomotives. Consequently, there was no opportunity to apply handbrakes or to exhaust the brake pipe at the rear of the train.

Runaway protection

ARTC guideline ETH-00-01 - *Buffer Stops and Restraining Devices for Dead End Tracks* outlined a range of restraining devices intended to protect people and property from an over-run at a dead end track. Where an over-run has the potential to cause significant damage or injury, then the restraining device must have the capacity to stop the rail vehicle/s. For example, at Bordertown, the dead end track was immediately adjacent a road and level crossing. An over-run at this location has the potential to injure people, so a restraining device is required to stop a runaway vehicle such as occurred on 23 November 2019.

The guideline used gradient and distance of a potential runaway to determine the approximate speed that the restraining device may need to contain. In this case, the track gradient was about 1 in 100 (1 per cent) for about 500 m before levelling out over about 500 m with the final 500 m being level grade. The guideline suggest that a runaway wagon might reach in excess of 26 km/h due to a 1 per cent grade in excess of 300 m. However, a runaway wagon at this location would likely slow to some extent on the level section of track before reaching the dead end.

The restraining device installed at Bordertown was a *Baulk*, defined in the guideline as a rectangular piece of hardwood timber of approximately 300 by 200 mm, bolted to the track (Figure 5). The guideline stated that a baulk is suitable for runaway speeds up to 1.5 km/h, is primarily just a marker that provides little resistance, and would probably require further devices to arrest a runaway.

Figure 5: Bordertown siding runaway protection



Restraining device installed at Bordertown. A rectangular piece of hardwood timber of approximately 300 by 200 mm, bolted to the track, known as a baulk. Source: ATSB

Safety analysis

Bordertown operational procedures

Bowmans Rail procedure *Shunting at Bordertown* required a full brake pipe application and the application of handbrakes to prevent movement of unattended wagons.

In this case, the locomotive data log shows that brake pipe air pressure did not reduce below 350 kPa (full brake pipe application) until about 8 seconds after the train had stopped in the crossing loop. However, 4 seconds after the lead locomotive stopped, there was a rapid reduction of pipe pressure from 413 to 330 kPa over about 5 seconds. It is possible that this was due the pipe pressure reduction being applied to a smaller volume of air, suggesting that Driver 2 had isolated the brake pipes at this point. As such, it is likely that while Driver 1 and 2 communicated with respect to verifying a full brake pipe application, Driver 2 closed the brake pipe air taps before the full service application of the train brake had propagated through to the rake of wagons. The bottled brake pipe air meant that the brake pipe air pressure was maintained at the level existing at the time the taps were closed, which was above 350 kPa. Since full service pressure had not been achieved, the wagon brakes had not fully applied.

Both Driver 1 and Driver 2 were aware of the procedure requiring full brake pipe application prior to detaching the locomotives and communication was made with respect to this requirement, but their action implementing the requirement occurred out of sequence. That is, Driver 1 confirmed full brake application while in the process of moving the brake handle, rather than at the completion of the full brake application. Driver 2 interpreted the response as having completed the full brake application, so closed the taps and detached the locomotives. The consequence was a partial application of the train brakes within the wagons rather than a full application.

As it was Driver 1's first time working the Bordertown shunt at the controls of the lead locomotive, it is likely that the miscommunication between the two drivers was a result of the changed work dynamic, rather than a lack of training.

In addition, handbrakes were not applied to any wagons. With only partial application of the wagon air brakes and no handbrakes applied, there was insufficient braking force to prevent the wagons from rolling away on the descending grade.

Although handbrakes were a known part of the procedure, not applying handbrakes during the run-around at Bordertown had become a common practice for this crew, as it saved time and had not caused any issues in the past. Further, since Driver 3 needed to return the siding motor vehicle used to position at the level crossing as the train entered and stopped on the loop track, the driver was not in a position to apply handbrakes to the rear wagons. In addition, while not part of the procedure, the use of the motor vehicle meant that the driver was also not available to apply wagon brakes by opening the air tap and exhausting brake pipe air from the rear of the train.

Runaway protection

The restraining device installed at Bordertown was a *Baulk*, specified as suitable for runaway speeds up to 1.5 km/h (ARTC guideline).

In this case, the runaway speed was calculated as having increased to about 18 km/h before the wagons bounced over the derailer and continued rolling down to the level section of the siding track. The level grade, the likely partial application of wagon brakes and Driver 3's application of a handbrake, stopped the wagons about 47 m from the baulk (Figure 6). With less braking applied, it is likely that the free-rolling wagons would have travelled further, reaching the Baulk at a speed faster than 1.5 km/h.

The Australian Rail Track Corporation (ARTC) guideline states that a baulk is primarily just a marker that provides little resistance, and would probably require further devices to arrest a runaway. The configuration at Bordertown was likely insufficient for restraining the potential speed

and momentum of runaway wagons, which may subsequently encroach on a road and level crossing.

Figure 6: Bordertown siding – runaway wagons, runaway protection and level crossing



Runaway wagons stopped about 40 m from the baulk. The image illustrates how wagons that might roll to the end of the track may encroach on the road and level crossing. Source: ATSB

Findings

ATSB investigation report findings focus on safety factors (that is, events and conditions that increase risk). Safety factors include 'contributing factors' and 'other factors that increased risk' (that is, factors that did not meet the definition of a contributing factor for this occurrence but were still considered important to include in the report for the purpose of increasing awareness and enhancing safety). In addition 'other findings' may be included to provide important information about topics other than safety factors.

These findings should not be read as apportioning blame or liability to any particular organisation or individual.

From the evidence available, the following findings are made with respect to the runaway of wagons on the descending grade after disconnecting the locomotives to conduct a run-around movement at the Bordertown siding on 23 November 2019.

Contributing factors

- The locomotive driver confirmed a full brake pipe application, via radio communication, while moving the brake handle rather than after the full application had been made. This resulted in the ground person closing the brake pipe air taps prematurely, preventing further reduction of brake pipe air pressure. Consequently, the wagon brakes did not fully apply.
- Handbrakes had not been applied to any wagons before detaching the locomotives. The non-application of handbrakes had become a practice when undertaking run-around movements at Bordertown. With the insufficient air brake application, the lack of handbrakes resulted in the wagons rolling away on the descending grade.

Other factors that increased risk

- The restraining device installed on the Bordertown siding track prior to the road and level crossing, was likely insufficient under some conditions, for restraining the speed and momentum of runaway wagons.

Safety actions

Safety action not associated with an identified safety issue

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. All of the directly involved parties are invited to provide submissions to this draft report. As part of that process, each organisation is asked to communicate what safety actions, if any, they have carried out to reduce the risk associated with this type of occurrences in the future. The ATSB has so far been advised of the following proactive safety action in response to this occurrence.

Safety action by Bowmans Rail

Bowmans Rail issued a safety alert on 24 November 2019, advising of the incident that had occurred at Bordertown on 23 November 2019. The alert stated that the following action was to be undertaken:

- All unattended wagons are to have all air exhausted from them when uncoupled
- The appropriate amount of hand brakes are to be applied to wagons when required
- Three step protection procedures are to be adhered to when coupling and uncoupling rollingstock.
- Air taps on unattended wagons are not to be left closed until all air has been exhausted from wagons.

Since the initial safety alert, Bowmans Rail has taken the following additional proactive safety actions:

- The completion of staff toolbox briefings on the findings and outcomes of its internal investigation.
- The provision of additional staff briefings on its expectations and processes with respect to securing rollingstock and locomotives.

The completion of a review triggered by the incident, of its operational risk assessment for Bordertown operations. This review identified a need to evaluate and amend, in consultation with train crews, the processes within the Bowmans Rail procedure OP 2.56 - *Shunting at Bordertown*. The outcome of the review was planned for incorporation into a revised version of the OP 2.56 - *Shunting at Bordertown* procedure prior to the resumption of its Bordertown operations in mid-late 2020.

Safety action by the Australian Rail Track Corporation

The Australian Rail Track Corporation has installed an arrestor bed on the track at the Bordertown dead end. ARTC has further works planned in October 2020 to complete the arrestor bed with a graded slope as per *ARTC ETH-00-01 Buffer Stops and Restraining Devices for Dead End Tracks – Appendix C*.

General details

Occurrence details

Date and time:	23 November 2019 – 1620 CDT	
Occurrence category:	Incident	
Primary occurrence type:	Runaway	
Location:	Bordertown, South Australia	
	Latitude: 36° 18.598' S	Longitude: 140° 47.357' E

Train details

Track operator:	ARTC	
Train operator:	Bowmans Rail	
Train number:	2122S	
Type of operation:	Freight	
Departure:	Bordertown	
Destination:	Adelaide	
Persons on board:	Crew – 3	Passengers – None
Injuries:	Crew – None	Passengers – None
Damage:	None	

Sources and submissions

Sources of information

The sources of information during the investigation included the:

- Bowmans Rail
- Australian Rail Track Corporation
- Train crew
- recorded data from the locomotive data log.

References

- ARTC guideline ETH-00-01 - *Buffer Stops and Restraining Devices for Dead End Tracks* (dated 2 July 2012)
- Bowmans Rail procedure OP 2.56 - *Shunting at Bordertown* (dated 16th May 2018)
- RISSB Glossary of Railway Terminology

Submissions

Under section 26 of the *Transport Safety Investigation Act 2003*, the ATSB may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. That section allows a person receiving a draft report to make submissions to the ATSB about the draft report.

A draft of this report was provided to the following directly involved parties:

- Bowmans Rail
- Australian Rail Track Corporation
- Office of the National Rail Safety Regulator
- the train crew.

Submissions were received from:

- Australian Rail Track Corporation.
- Office of the National Rail Safety Regulator

The submissions were reviewed and, where considered appropriate, the text of the report was amended accordingly.

Appendices

Appendix A – Speed calculations

The signalling infrastructure at Bordertown utilises track circuits to detect rail vehicles as they occupy defined sections of track. The wagons from train 2122S were uncoupled while occupying track A5T (Figure 7). As the unattended wagons rolled back into the siding (Figure 7, green arrow), the lead axle of the lead wagon sequentially occupied tracks 7AT, 296T, 9T and A1T.

Figure 7: Bordertown track numbers

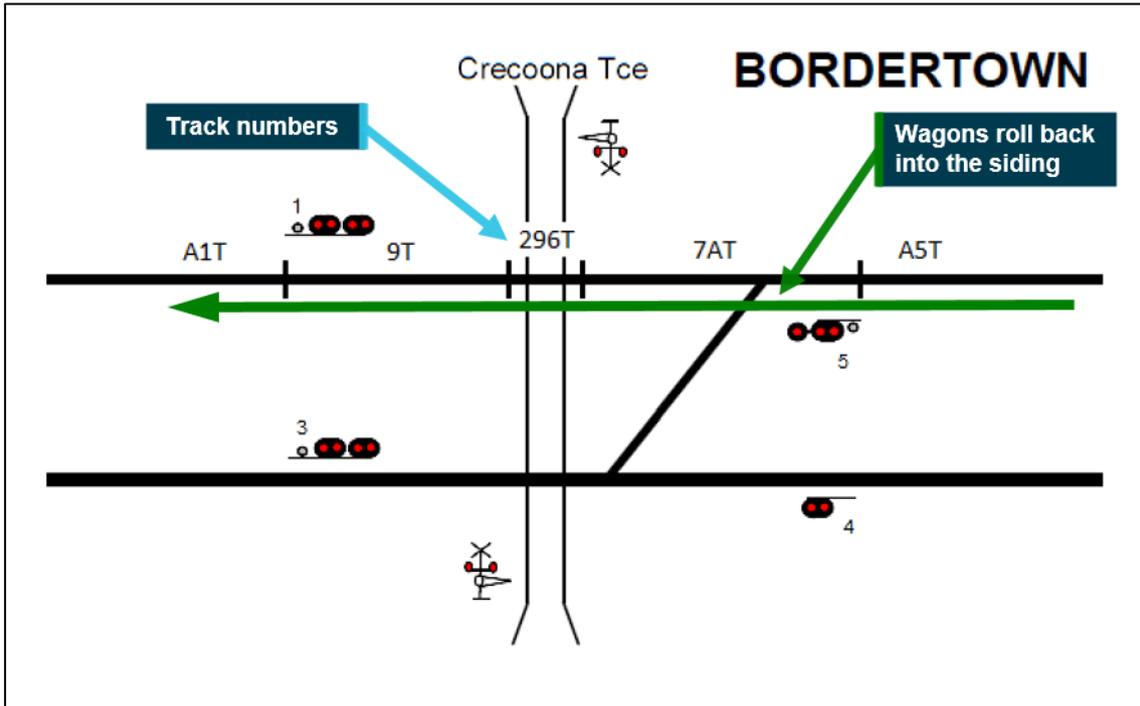


Illustration showing track circuit numbers occupied as the unattended wagons rolled back into the siding. Source: ATSB

A signalling event logger recorded the times at which each track was detected as occupied. This time coincided with the wagon’s lead axle transitioning the junction between two track circuits, providing the time duration that the lead axle had occupied a specific track. Knowing the duration the lead axle occupied the track and the length of the track (measured onsite) allowed for calculating the average speed the lead axle travelled as it traversed each track circuit.

Table 1: Calculated speed as lead wagon passed between Signal 5 and Signal 1

Track circuit	Track length (m)	Duration (sec)	Calculated speed (km/h)
7AT	125.0 m	37.1 sec	12.1 km/h
296T	27.0 m	7.0 sec	13.9 km/h
9T	105.7 m	20.1 sec	18.9 km/h

Australian Transport Safety Bureau

About the ATSB

The ATSB is an independent Commonwealth Government statutory agency. It is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers.

The ATSB's purpose is to improve the safety of, and public confidence in, aviation, rail and marine transport through:

- 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, as well as participating in overseas investigations involving Australian-registered aircraft and ships. It prioritises investigations that have the potential to deliver the greatest public benefit through improvements to transport safety.

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

Purpose of safety investigations

The objective of a safety investigation is to enhance transport safety. This is done through:

- identifying safety issues and facilitating safety action to address those issues
- providing information about occurrences and their associated safety factors to facilitate learning within the transport industry.

It is not a function of the ATSB to apportion blame or provide a means for determining 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. The ATSB does not investigate for the purpose of taking administrative, regulatory or criminal action.

Terminology

An explanation of terminology used in ATSB investigation reports is available on the ATSB website. This includes terms such as occurrence, contributing factor, other factor that increased risk, and safety issue.