



Australian Government  
Australian Transport Safety Bureau

# Incident involving Absolute Signal Blocking

Warnervale, New South Wales | 24 November 2014



Investigation

**ATSB Transport Safety Report**  
Rail Occurrence Investigation  
RO-2014-021  
Final – 17 September 2015

**Cover photo: Worksite location at Warnervale Road level crossing**

**Source: OTSI**

This investigation was conducted under the Transport Safety Investigation Act 2003 (Cth) by the Office of Transport Safety Investigations (NSW) on behalf of the Australian Transport Safety Bureau in accordance with the Collaboration Agreement entered into on 18 January 2013.

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

### **Publishing information**

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### **Addendum**

Page	Change	Date

# Safety summary

## What happened

At 1159 on 24 November 2014, freight service 4190 passed Signal 66.8 while it was displaying a stop aspect and without an authority<sup>1</sup>. Signal 66.8 is located in the section between Wyee and Warnervale on the NSW central coast. The SPAD represented a breach of the Network Rules and Procedures involving the use of Absolute Signal Blocking (ASB) that had been granted as part of worksite protection arrangements for a workgroup conducting electrical maintenance tasks at Warnervale. The Protection Officer for the workgroup was granted ASB shortly after there was a change in the Network Control Officers (NCO) at Morisset, from where the signals protecting the section were controlled. Although assurances were given to the PO that the section was clear, two trains were still travelling between the protecting signals and the worksite at the time ASB was implemented. The first train passed the worksite shortly afterwards without incident. The second, travelling some eight minutes behind, came to a stand approximately 1,300 metres before the worksite after the driver reacted to a signal returning to stop in front of the train. The signal had returned to stop because of electrical testing being conducted as part of the maintenance tasks. Its return to stop also (fortuitously) prevented the train from entering the worksite and potentially injuring the workgroup members.

There were no reported injuries or infrastructure damage as a result of the incident.

## What the ATSB found

The ATSB found that when the NCOs changed over at Morisset, there was a breakdown in the handover process. This breakdown resulted in ASB being granted to the PO at Warnervale without the exact location of trains being established, signals V8 and V6 being set back to stop and blocking facilities applied in accordance with Network Rule NWT 308. At the time of this incident Sydney Trains was trialling a modified ASB methodology to address previously identified safety issues, however this trial had not been extended to Morisset. If it had been, the progress in granting ASB would have been documented and would have assisted the NCOs during the handover process.

## What's been done as a result

Sydney Trains advised that it has expanded its trial of the 'Coded Authorisation Process for Absolute Signal Blocking' to include signal box locations on the Main North Line between Gosford and Broadmeadow. It further advised that, upon completion of the trial, the Network Rule and Procedure for Absolute Signal Blocking will be rewritten to improve its readability and application.

## Safety message

This incident illustrates the criticality of minimising interruptions and distractions that may affect the process for the granting or authorisation of work on track authorities, particularly Absolute Signal Blocking. Similarly, it reinforces the importance of information and situational awareness exchange between personnel during the handover process for the control of dynamic rail network operations.

### NWT 308 Cover Page



Source: OTSI

<sup>1</sup> Signal passed at stop without authority is also referred to as 'Signal Passed at Danger' or 'SPAD'.

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## The occurrence

At 1128 on 24 November 2014, two officers from NSW Police entered the signal box at Morisset unannounced seeking information regarding an incident which occurred on a train at Morisset two nights previously. They engaged with a Duty Manager (DM) who had just arrived to sign on for duty at 1130.

As this was occurring, the Protection Officer (PO) for a workgroup conducting electrical maintenance tasks telephoned the Station Manager (SM) at Morisset, who was also in the signal box working in the role of Network Control Officer (NCO) (Signaller). The PO requested Absolute Signal Blocking (ASB) for protection of a worksite on the Up Main North line at Warnervale (Figure 1).<sup>2</sup> During the discussion, the PO also mentioned he would require ASB for a number of other proposed worksites in the section between Warnervale and Wyee up till 1500. The PO nominated absolute signals V8 and V6, between Morisset and Vales Point, as the protecting signals for the ASB requests. The SM acknowledged the request for ASB telling the PO he would 'get his offside to cut in'.<sup>3</sup>

The SM commenced the process to grant ASB. Significantly, as this was happening (at about 1136), up freight service 4122 passed through Morisset, heading towards the proposed worksite at Warnervale.

At 1139, as part of the ASB process, the SM advised the NCO at Wyong and the Train Controller at Sydney North Control of the intention to switch the interlocking at Vales Point from automatic to local control. This was required in order to place blocking facilities on signals V8 and V6 as requested by the PO. Completing both calls, at 1141, the SM advised the Train Controller of the ASB request and provided all the assurances needed for the Train Controller to compile the ASB checklist. The Train Controller also acknowledged the likelihood of other ASBs being granted during the day and sought an assurance from the SM that they would be managed as required. This was despite its being a circumvention of the ASB process which does not provide for blanket authorisation for multiple ASBs.

In the meantime, the Police requested to view CCTV coverage of the station and surrounds for the purposes of the incident they were investigating. While viewing some CCTV footage in the signal box area, two persons of interest related to the incident were observed to be on station premises as well as an open staff car park gate. Concerned about the presence of these persons on the station premises and the open gate, the DM exited the signal box at 1144 to ascertain the location of the persons and close the gate. After searching various passenger areas around No.2 platform and closing the gate, he re-entered the signal box at 1147. As this was occurring, a second freight service, 4190, arrived at Morisset at 1146. As Signals V8 and V6 had not been set back to stop with blocking facilities applied at the time for ASB, 4190 continued on towards the worksite at Warnervale.

At 1147, the SM informed the NCO at Wyong of the passing of trains 4122 and 4190. Ending the call at 1148, he indicated that he would be handing over to the DM as he was 'going home'.

At 1149, the DM, having assumed the role of NCO, telephoned the PO to advise that ASB had been granted since 1143. This was less than a minute after the SM had concluded the call with the NCO at Wyong and less than two minutes after the DM had re-entered the signal box and concluded with the Police. He gave the PO an assurance that signals V8 and V6 were at stop with blocking facilities applied and that the section was clear as a freight train should have just passed

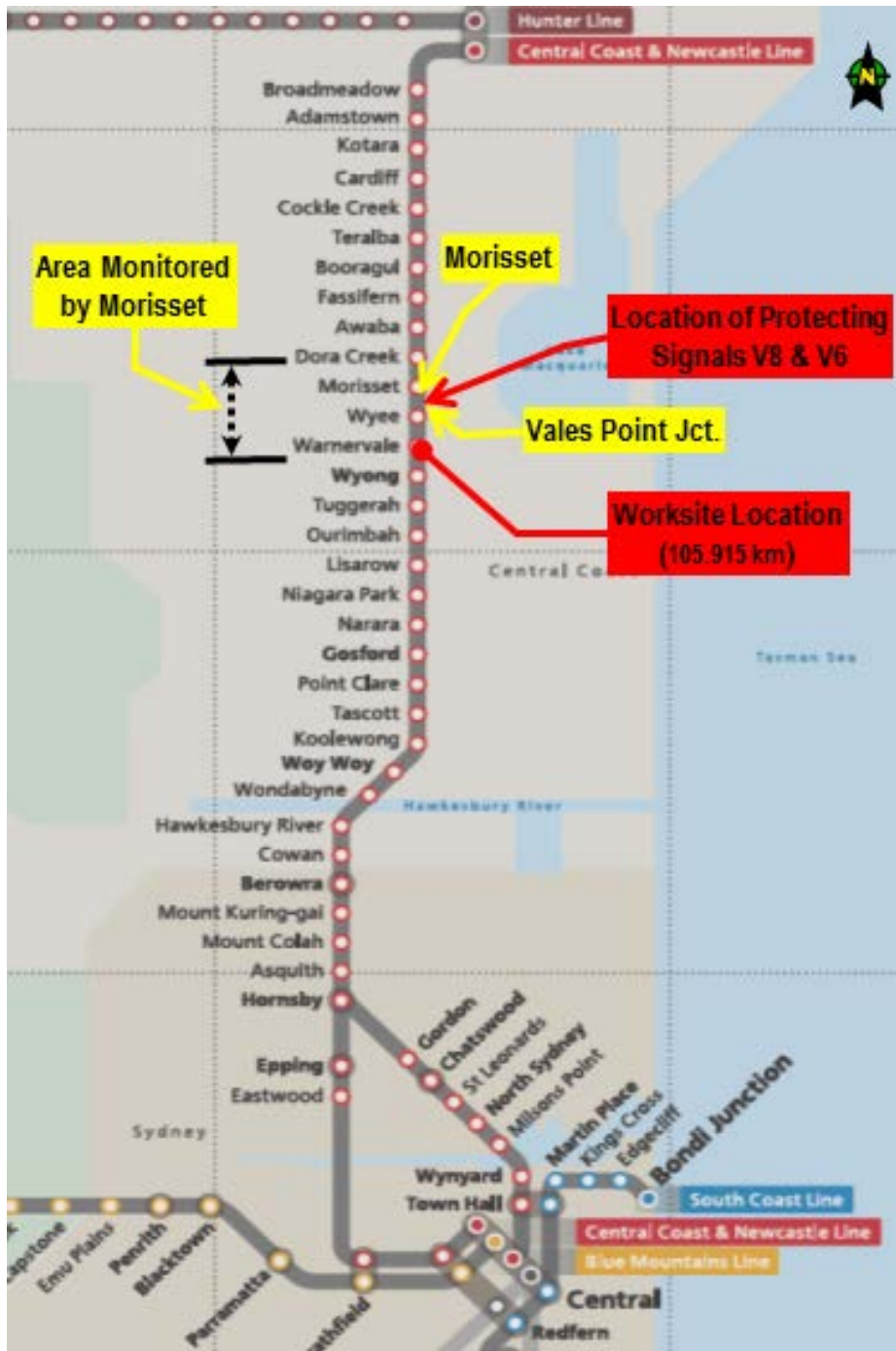
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<sup>2</sup> In accordance with Network Rule NWT 308 Absolute Signal Blocking and Network Procedure NPR 703 Using Absolute Signal Blocking.

<sup>3</sup> This was reference to the switching of all signal and point control at Morisset area of control from automatic control to local control managed by the NCO at Morisset.

their worksite. The PO responded that no freight train had passed. Surprised, instead of immediately cancelling or fulfilling ASB, the DM instructed the PO to call back once it had passed.

**Figure 1: Incident location**



Source: NSW Trains annotated by OTSI

At 1151, the PO telephoned the DM to report that a freight train ‘with leading engine 44202’ had passed clear of the worksite. This engine was later identified as the leading engine on the first freight train, 4122. Although not fulfilled or cancelled, at 1152, after all assurances were given and received, ASB was again granted to the PO. Immediately, the workgroup commenced their maintenance tasks. The maintenance tasks involved the change-out and testing of an electronic control module associated with permissive Signal 66.8 located in the signal hut beside the level crossing at Warnervale. The change out of the module took less than a minute and testing

commenced at 1153. The testing caused the aspect of Signal 66.8 to alternate between stop and proceed a number of times.

At 1155, as testing was continuing, a ‘Signal Passed at Danger’ (SPAD) alarm for Signal 66.8 activated in both Morisset and Wyong Signal Boxes. The alarm at Wyong was also accompanied by a report from the driver of 4190 advising that he had passed Signal 66.8 by approximately 500 metres after it had returned to stop in front of the train.

After receiving advice about the SPAD from the NCO at Wyong, the DM contacted the PO querying whether any of the workgroup’s actions had caused Signal 66.8 to return to stop in front of 4190. The PO responded that the workgroup had been testing the signal when the SPAD had occurred but queried how there was a freight train past the protecting signals (of the ASB). As the conversation continued, it became apparent that the DM had been confused about freight train 4190. Although it should have been visible on the local panel at the time in the vicinity of Wyee, 4190 had gone unnoticed in the approximately 14 kilometre long section between the last protecting signal (V6) and the worksite when the PO was first informed ASB was granted at 1151.

There were no injuries to any persons and no infrastructure damage.

## Resulting safety actions

At 1201, the SM, who was still present in the signal box, resumed the role of NCO. He informed the PO that, because of the incident, ASB was cancelled pending notification and investigation by incident response officers.

Both the DM and the PO underwent post-incident drug and breath testing, subsequently returning negative results. Despite being directly involved parties, the SM, the Train Controller and the crew of 4190 were not assessed or breath tested post incident.

Sydney Trains acknowledged that the crew of freight service 4190 had not contributed to the incident, so were permitted to continue once cancellation of the ASB was completed. The incident caused minimal delay to 4190 and following services.

In response to the incident, instructions were issued that qualified staff from Sydney Trains would monitor the issue of any work on track authorities in the signal boxes operated by NSW Trains staff on the Main North line.

In February 2015, in response to this incident, Sydney Trains expanded a western network region trial of modified ASB procedures to include the signal boxes on the Main North line. The modified procedures, in essence, are designed to formalise the critical ASB details. Both the NCO (Signaller) and the PO are required to include the following on a standardised ‘job aid’:

- the exact worksite location
- the details of the last train to pass through the section and its current location
- an assurance that there are no trains between the protecting signals and the worksite
- an assurance that signals are set to stop with blocking facilities applied.

# Context

## Relevant infrastructure

All the infrastructure relevant to the incident is located on the Main North line between Sydney and Newcastle. The SPAD occurred at Signal 66.8 (107.722 km<sup>4</sup>) between Wye and Warnervale. The worksite was located at the level crossing at Warnervale (105.915 km). Signals V8 and V6, which were being used as protecting signals for the worksite, are located at 119.309 km and 121.359 km respectively. All signals are located in the area monitored or controlled from Morisset Signal Box (123.400 km).

## Morisset Signal Box

Morisset signal box is one of two on the Main North line where NSW Trains staff provide network control officer functions on behalf of Sydney Trains under a services contract. The NSW Trains staff operate under Sydney Trains accreditation using Sydney Trains' Network Rules and Procedures.

The station consists of two platforms with the main office complex and ticket booking office located on No.2 Platform. A combined signal box and meals area is included in the main office complex. There are two access doors into the signal box, one directly from the platform and the other via the Station Manager's office (Figure 2). However, there were no instructions on either door for persons requiring access.

**Figure 2: Platform 2 Morisset**



Source: OTSI

The signal box controls the operation of the interlocking and absolute (controlled) signals at Morisset and Vales Point. The interlocking at Morisset is lever controlled with a track diagram that provides the signaller with information regarding the location of trains and the status of track

<sup>4</sup> Distance in kilometres from Sydney Central Station.



circuits, absolute signals and points. A separate electrical switch panel is used to operate the interlocking at Vales Point when in local control. Panel indicator lights and switch positions provide the signaller with an indication of the location of trains and the status of track circuits, absolute signals and points in the interlocking.

The signal box is also provisioned with the following (Figure 3):

- A Train Location System (TLS) located in the signal box and ticket booking office that provides a graphical representation of the entire Sydney Trains electrified network.
- A non-vital Train Visibility System (TVS) to monitor the permissive signalled “dark territory” between Dora Creek and Wyong<sup>5,6</sup>
- Track diagrams to provide an indication of the location of trains and the status of track circuits, absolute signals and points in Morisset’s area of control.

**Figure 3: Morisset Signal Box**



Source: OTSI

The TLS shows the run numbers of all services and their locations, except for freight services between Broadmeadow and Wyong, which are not visible. The blocks occupied by freight trains appear as a red lines on the diagram, but a run number is not displayed. All services are, however, visible on the TVS which displays services as occupied lines / blocks. While Morisset station is manned continually, the signal box is not. Being a localised signal box, it is cut in or cut out by the Signaller for worksite protection arrangements, when terminating rail traffic at Morisset or when rail traffic is required to enter or exit Vales Point power station. When cut out, all absolute (controlled) signalling in the Morisset area of control operates in automatic mode.

<sup>5</sup> Signalling equipment and circuits are considered non-vital where failure to function correctly would not cause an unsafe outcome of the signalling system. Non-vital equipment and circuits do not affect the safe operation of the signalling system.

<sup>6</sup> The ‘dark territory’ is a section of track where train movements are controlled by permissive (automatic) signals only. The signaller has no control over any of this signalling equipment or its functions. The dark territory is displayed on the TVS display as a straight line graphical representation of the section. Line segments on the screen change from green, when the route is clear, to red as trains occupy the track circuits while progressing through the section.

Train movements through the Morisset area of control are also monitored by the Train Controller at the Rail Management Centre (Sydney) who marks all train movements on a train graph based on the times reported by the signal boxes along the line. The Train Controller also has a TLS to provide oversight of their area of control and the network.

In accordance with current security requirements, all persons entering the station, other than members of the public entering or using public areas, are required to undergo a local safety induction. The induction is a mandatory briefing for all station visitors to make them aware of key safety related issues and requirements. This was not done for the NSW Police officers and their presence in the signal box was not managed during the time safety critical information was being exchanged.

## Applicable Network Rules and Procedure

### ***Network Rule NWT 300 - Planning Work in the Rail Corridor***

NWT 300 prescribes the rules for planning work in the rail corridor and assessing the work for safety. Before any workgroup enters the rail corridor, the PO must plan and document the worksite in accordance with NWT 300. The rule prescribes that work planned in the corridor must be assessed for safety and its potential to intrude on the Danger Zone. Work cannot be carried out unless a safe place can be easily reached and safety measures are in place.

A worksite must have a PO whose primary duty is to keep the worksite and workers safe. POs must be satisfied that other work will not interfere with their primary duty. The PO is responsible for the following:

- conducting the safety assessment of the worksite
- briefing the workers of the protection arrangements
- ensuring the works are conducted in a safe manner
- keeping records of the protection arrangements
- communicating with Network Control about the protection.

When conducting the safety assessment, the PO must consider, amongst other factors, the method of protecting the worksite, the resources required for its protection and the communication requirements. The PO must also ensure that the planning of the worksite is documented and all workers are adequately briefed on the safety requirements.

### ***Network Rule NWT 308 – Absolute Signal Blocking***

ASB is a method of worksite protection used to exclude rail traffic from a worksite. It is intended for use where any required tools can be easily removed from the tracks by a single person. ASB can also be used to allow vehicles to cross the track at network access level crossings.

When requesting ASB, the PO must tell the signaller the location of the worksite and the intended start and finish times. All points of entry must be protected and the PO must arrange for:

- at least two consecutive controlled absolute signals at STOP with blocking facilities applied, or
- manual points control mechanisms to be used to set controlled absolute signals at STOP, or
- at least one controlled absolute signal at STOP with blocking facilities applied, and
  - points secured to prevent access to the tracks, or
  - there must be an easily reached safe place available and a lookout provided.

A signaller may grant the ASB method only for signals in their respective area of control. Before setting controlled signals at Stop, the Signaller must tell the Train Controller about the request to exclude rail traffic. The Signaller must ensure that:

- the protecting controlled absolute signals are at STOP, and
- blocking facilities have been applied, and

- there is no approaching rail traffic between the protecting signals and the proposed worksite, and
- that any rail traffic that has passed complete beyond the worksite will not return.

The PO must confirm these actions with the Signaller as well as the agreed start and finish times.

At the end of the working the PO must tell the Signaller that the work is completed, the workers and equipment are clear of the danger zone, all manual points control mechanisms have been returned to normal and any points that were secured are available for use. After being assured the track is clear by the PO, the signaller may remove the blocking facilities that were applied.

Although there is a requirement that a permanent record of the ASB details be made by the Signaller and the PO, no forms or checklists accompany the rule.

### ***Network Procedure NPR 703 – Using Absolute Signal Blocking***

Network Procedures describe how particular actions are to be done to apply the Network Rules. NPR 703 prescribes the requirements when using ASB in accordance with NWT 308.

As with NWT 308, NPR 703 requires the Signaller to ensure that all absolute signals allowing entry to the worksite are at stop with blocking facilities applied, there is no rail traffic approaching the worksite and all rail traffic that has passed complete beyond the proposed work location will not return.

### ***Interim arrangements for Absolute Signal Blocking***

In 2013, the ATSB investigated three incidents involving the use of ASB as part of Sydney Trains worksite protection arrangements in a combined report RO-2013-018.<sup>7</sup> Immediately following these incidents, Sydney Trains issued a memorandum, 'Application of Absolute Signal Blocking' on 22 July 2013 amending the procedures for the granting of ASB. The amended procedures required the Train Controller to compile a checklist when informed of the ASB request and the PO to deploy lookouts as an additional defence. They were still current at the time of this incident.

Although a Train Controller checklist was compiled at the ASB request, it was only a single checklist but intended for multiple worksites. Further, the PO did not deploy any lookouts. As such, both these situations contravened the memorandum requirements.

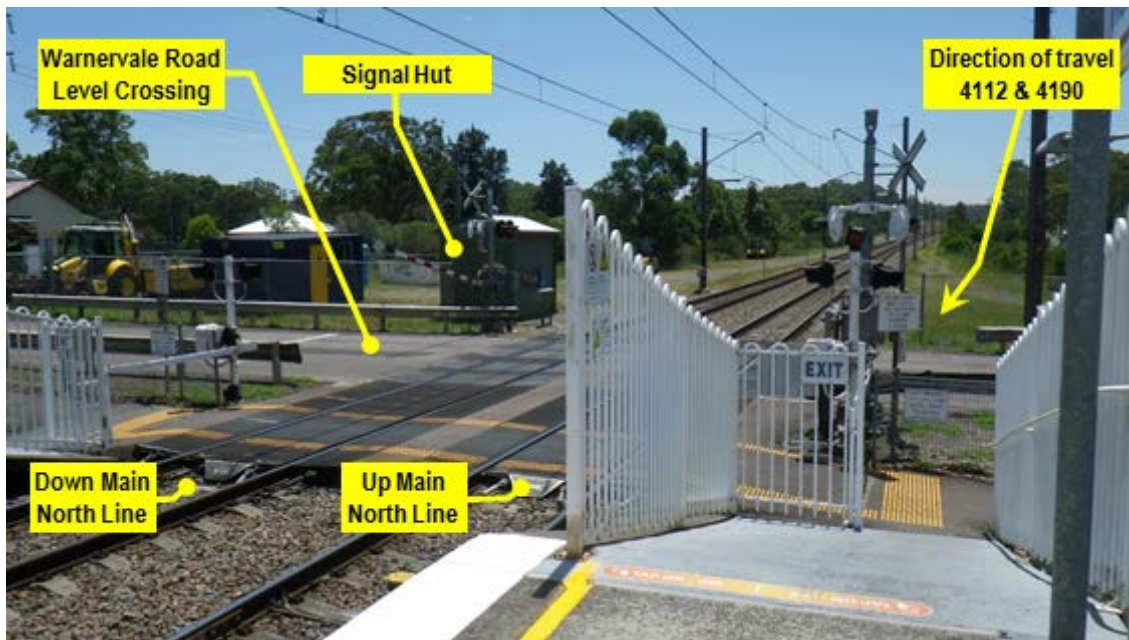
While not deployed, the effectiveness of any lookouts in this incident would have been diminished by the following:

- the occurrence of the SPAD some 1,300 metres in advance of the worksite
- the workgroup conducting its tasks outside the danger zone in a signalling hut
- the available sighting distance at the worksite (See Figure 4)
- the presence of active (automatic) type protection equipment at the level crossing.

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<sup>7</sup> RO-2013-018: Safeworking breaches involving Absolute Signal Blocking Blackheath NSW, 13 June 2013, Newcastle NSW, 13 July 2013 and Wollstonecraft NSW, 17 July 2013 available on the ATSB website at [www.atsb.gov.au](http://www.atsb.gov.au)

**Figure 4: Worksite at Warnervale**



Source: OTSI

In a subsequent internal investigation, Sydney Trains found that not all staff had been aware of the memorandum requirements. Consequently, a safety alert (SD-2014-23) was issued on 28 November 2014 highlighting the requirements of the memorandum.

Taking into account the recommendations from the ATSB investigation and the findings from various internal investigations, Sydney Trains commenced a trial of a modified ASB process called 'Trial of Coded Process for Absolute Signal Blocking'. The key elements of this trial, which override the requirements of the memorandum, include the following:

- Introduction of job aids (forms) for both the PO and the NCO to ensure consistency when requesting and granting ASB.
- Mandating the use of only five main reference points when identifying the proposed worksite location. All of the identifiers are those that will be present on the NCO's track diagram.
- A reinforcement and read back requirement to ensure that there are no trains between the protecting signals and the worksite while ASB is being established.
- A requirement for the NCO to nominate the last train to enter the portion of line where the ASB is being established and its current location, i.e. that it is beyond the worksite.

The trial was introduced during 2014 in the signal boxes located between Blacktown and Springwood. It had not been introduced at Morisset at the time of the incident.

Concurrently, the ASB rule is also undergoing a complete re-write to improve its readability and application.

### Train running time for section

The freight trains were travelling approximately eight minutes apart at the time of the incident. Evidence indicated that both freight trains had been operating at or near to scheduled speeds throughout the 22 kilometre section between Morisset and Wyong and not been delayed prior to the incident.

### Workgroup and tasks

The workgroup, consisting of a PO and two electrical maintainers, signed on for duty at 0700 to conduct electrical maintenance tasks at various signal huts between Wyong and Wye. The tasks

involved the change-out of electronic modules within the signalling system that had been subject to a product recall by the manufacturer.

At 1000, the PO compiled a worksite protection plan for the worksite at Warnervale in accordance with Network Rule NWT 300 Planning Work in the Rail Corridor. He assessed that trains could be excluded and the proposed works could be conducted safely using Absolute Signal Blocking, in accordance with Network Rule NWT 308 Absolute Signal Blocking and Network Procedure NPR 703 Using Absolute Signal Blocking.<sup>8</sup> NWT 308 and NPR 703 principally require that the protecting absolute signal(s) at the beginning of the section to be placed back at stop with blocking facilities applied. Verbal assurances were given to the PO that there were no trains in the section approaching the proposed worksite. In his assessment, the PO nominated that signals V8 and V6 could be used as the protecting signals for the ASB as they provided two signal protection and did not require the use of a lookout.

## Employee Information

The Station Manager was an employee of NSW Trains and a qualified Network Control Officer. He had 29 years rail experience.

The Duty Manager was an employee of NSW Trains and a qualified Network Control Officer. He had 13 years rail experience.

The Protection Officer was an employee of Sydney Trains and had been a qualified and authorised PO Level 2 for approximately six months.

## Weather conditions

Bureau of Meteorology records indicated that the maximum temperature on 24 November 2014 was 26.9°C and no rain had fallen throughout the previous week. Weather conditions were reported as fine and dry at the time and did not contribute to the incident.

## Fatigue

An examination of the rosters for the DM, SM and PO did not identify any evidence of the likelihood that fatigue was a contributing factor in the incident.

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<sup>8</sup> Full details of each Network Rule and Procedure can be found at <http://railsafe.sydneystains.nsw.gov.au/work-on-track>

# Safety analysis

## Introduction

Train-in-section checks had not been performed properly when ASB was granted, resulting in trains going undetected while still in the section. This has been a common contributing factor in a number of recent investigations into worksite protection incidents where ASB has been employed.

In this particular incident, the main contributing factor was a breakdown in the handover process between the SM and the DM during the granting of ASB as two trains were approaching the worksite. There were no actions or omissions by the PO which contributed to the incident.

## Breakdown in the NCO handover process

The breakdown in the handover between the SM and the DM was the result of an interruption mid process and a distraction caused by the presence of the NSW Police officers.

The interruption mid process occurred when the SM handed over to the DM. The change in NCOs, which was intended to occur at the commencement of the DM's shift, was arranged by the SM to increase the DM's experience with the ASB process. Instead, the DM became distracted by the presence of the two NSW Police officers who had entered the signal box. Instead of separating them from the ASB process and conducting the required induction, the DM catered to their information requests while the SM commenced actioning the ASB request.

The SM was still actioning the ASB request when the DM left the signal box. Coincidentally, at 1147, just before the DM returned to the signal box, freight service 4190 passed through Morisset under a full clear proceed signal.

At 1148, after conferring with the NCO at Wyong about the approach of trains 4122 and 4190, the SM handed the ASB request over to the DM. The handover took about a minute to complete and was given in verbal form only. No written details were given about the status of the signals being used for ASB, the application of blocking facilities or the location of trains in the section. The DM recalled the mention of only one freight train, 4190, during the handover.

At 1149, the DM, now in the role of NCO, called the PO to inform him ASB had been granted since 1143; a time shortly after the SM had informed the Sydney North Train Controller of the ASB request. In addition, he mentioned to the PO that a train, which he believed to be 4190, should have just passed his location. The PO challenged the passing of a train but, instead of verifying its exact location, the DM instructed him to call back once a train had passed. The PO called back at 1151, shortly after a train, later identified as earlier train 4122, had passed the worksite.

The call at 1149 highlighted the extent of the breakdown in the handover as follows:

- The communications between the SM and the DM who did not come to clear and concise understanding about the stage of where the granting of ASB was at.
- The lack of knowledge of where or how many trains were in the section. The PO's challenge about a train not passing the worksite went unrecognised as to the probability of a train still within the section. On the basis of this obvious error, ASB should have been fulfilled or cancelled immediately until the location of all trains was properly established. Instead, the time ASB was granted was simply varied by the DM and accepted by the PO to coincide with the eventual passing of a train.
- The ability of 4190 to continue through Morisset at 1147 under a full clear (green) proceed aspect. This indicated that the next two signals, V8 and V6, which were to be used as the protecting signals for ASB, had not been placed back to stop with blocking facilities applied when ASB was granted at 1143 or before the PO was advised at 1149. Signal 76.6, located at the Sydney end of No.1 platform at Morisset, is the preceding signal to V8 and was observed

in CCTV footage to be displaying a full clear (green) proceed aspect at the passing of 4190. The full clear aspect indicated that the next signal, V8, was also displaying either a restricted or full clear proceed aspect and that V6, the following signal to V8, was displaying either a proceed or stop aspect as well. As no SPAD was recorded at either signal, it indicated that the signals had not been set back to stop for ASB, no blocking facilities had been applied and 4190 had continued under proceed indications. Signal logs indicated that blocking facilities were likely to have been applied after 4190 had passed V6, if at all. Critically, the ability of 4190 to continue towards Warnervale under proceed signal aspects and SPAD at Signal 66.8 during testing of the signal controls indicated that no required train in section checks were made before, during or after the handover.

- The minimal length in time of the handover which was concluded within a minute after the SM had finished the call with the NCO at Wyong and less than two minutes after the DM had re-entered the signal box.

In summary, despite the requirements of Network Rule NWT 308, there was a breakdown in the NCO handover process used at Morisset which resulted in:

- ASB being granted to the PO at Warnervale without the exact location of trains being properly established
- Signals V8 and V6 not being set back to stop and blocking facilities not applied.

## Other safety matters

### *Train Identification*

Voice recording evidence indicated that there was confusion between the DM and the PO about the passing freight train when ASB had first been granted. Without details of train numbers from the DM, the PO instead described the passing train by the number of the leading locomotive. However, without having any train consist details or engine numbers, and in the absence of freight trains being numbered on the TVS, the DM assumed that the PO was referring to the second train, 4190, and continued with granting ASB. Once granted ASB, the workgroup then had unrestricted track access to the Up North Main line despite 4190 still approaching. Fortunately, the testing of the signalling system caused Signal 66.8 to return to stop in front of 4190 and prevented it from reaching the worksite.

## Summary

The SM and the DM did not conduct the handover at an optimal time. It was undertaken while granting ASB was still in progress. As a result, the setting of signals V8 and V6 back at stop, the application of blocking facilities and the determination of precise locations for trains approaching the proposed worksite were overlooked.

A more considered option for the handover would have been at the time either when the PO first called requesting ASB or after ASB had been granted.

The presence of NSW Police officers in the signal box at the time and the activity to meet their needs served as a distraction during the process.

# Findings

From the evidence available, the following findings are made with respect to the incident involving the granting of Absolute Signal Blocking culminating in the passing of Signal 66.8 by freight service 4190 at stop without authority. These findings should not be read as apportioning blame or liability to any particular organisation or individual.

**Safety issues, or system problems, are highlighted in bold to emphasise their importance.**

A safety issue is an event or condition that increases safety risk and (a) can reasonably be regarded as having the potential to adversely affect the safety of future operations, and (b) is a characteristic of an organisation or a system, rather than a characteristic of a specific individual, or characteristic of an operating environment at a specific point in time.

## Contributing factors

- **There was a breakdown in the NCO handover process used at Morisset which resulted in ASB being granted to the Protection Officer at Warnervale without the exact location of trains being properly established, signals V8 and V6 being set back to stop and blocking facilities applied in accordance with Network Rule NWT 308. [Safety issue]**

## Other findings that increased risk

- Additional interim arrangements for Absolute Signal Blocking were not implemented at the time of the incident as the requirements listed in the memorandum of July 2013 had not been promulgated to all staff.

## Other findings

- The documented process, as recommended in RO-2013-018 and currently being trialled in the modified ASB process, was not implemented at Morisset at the time but could have assisted during the NCO handover in determining where the granting of ASB had progressed.



# Safety issues and actions

The safety issues identified during this investigation are listed in the Findings and Safety issues and actions sections of this report. The Australian Transport Safety Bureau (ATSB) expects that all safety issues identified by the investigation should be addressed by the relevant organisation(s). In addressing those issues, the ATSB prefers to encourage relevant organisation(s) to proactively initiate safety action, rather than to issue formal safety recommendations or safety advisory notices.

Depending on the level of risk of the safety issue, the extent of corrective action taken by the relevant organisation, or the desirability of directing a broad safety message to the [aviation, marine, rail - as applicable] industry, the ATSB may issue safety recommendations or safety advisory notices as part of the final report. Where relevant, safety issues and actions will be updated on the ATSB website as information comes to hand. The initial public version of these safety issues and actions are in PDF on the ATSB website.

## Deficient handover process

Number:	RO-2014-021-SI-01
Issue owner:	Sydney Trains
Operation affected:	Rail: Infrastructure
Who it affects:	Users the Sydney Trains Network Rules and Procedures

### **Safety issue description:**

There was a breakdown in the NCO handover process used at Morisset which resulted in ASB being granted to the Protection Officer at Warnervale without the exact location of trains being properly established, signals V8 and V6 being set back to stop and blocking facilities applied in accordance with Network Rule NWT 308.

### **Proactive safety actions taken by Sydney Trains**

Action number: RO-2014-021-NSA-022

As a result of this occurrence, Sydney Trains advised that the following safety actions have been implemented:

- Consider the deployment of Network Operations personnel to oversee the implementation of any required worksite protection controlled by Morisset.
- Review the current ergonomics of the signal box and station facilities to minimise the potential for distraction of the signaller, from a Human Factors perspective.
- Consider the possibility of relocating the signalling operations currently carried out at Morisset to a dedicated signal complex.
- Consider the possibilities of providing a program of maintenance activities to Network Operations to facilitate the deployment of Network Operations personnel to oversee the implementation of any required worksite protection controlled by Morisset.

Concurrently, the ASB rule is also undergoing a complete re-write to improve its readability and application.

### **ATSB comment/action in response:**

While the Australian Transport Safety Bureau is satisfied that the 'Coded Absolute Signal Blocking (ASB) process' will improve the identification of completed steps in the process and the accuracy of information exchanged between parties when granting ASB, these improvements will only be

fully realised if the process is fully implemented across the network. Accordingly therefore, the ATSB issues the following safety recommendation:

***ATSB safety recommendation to Sydney Trains***

Action number: RO-2014-021-SR-021

Action status: Monitor

The Australian Transport Safety Bureau recommends that Sydney Trains takes further action to expedite the implementation of safeguards and procedural safety enhancements where Absolute Signal Blocking is to be used for worksite protection.

***Current status of the safety issue:***

Issue status: Safety action pending

Justification: At the time this report was issued, the coded ASB process was still being trialled, with the decision to broadly implement the new requirements pending the full assessment of the trial outcomes.

# General details

## Occurrence details

Date and time:	24 November 2014 – 1159 EST	
Occurrence category:	Incident	
Primary occurrence type:	Safeworking Breach – Worksite Protection	
Location:	107.722 km on Up Main Line, Warnervale, New South Wales	
	Latitude: e.g. 33° 14.828' S	Longitude: e.g. 151° 26.945' E

# Sources and submissions

## Sources of information

The sources of information during the investigation included:

- NSW Trains
- Sydney Rail Services Pty Ltd
- Sydney Trains
- The Bureau of Meteorology
- The Duty Manager, Morisset
- The Station Manager, Morisset
- Transport for New South Wales

## Submissions

Under Part 4, Division 2 (Investigation Reports), Section 26 of the *Transport Safety Investigation Act 2003* (the Act), the Australian Transport Safety Bureau (ATSB) may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. Section 26 (1) (a) of the Act 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:

- NSW Trains
- Office of the National Rail Safety Regulator
- Sydney Rail Services Pty Ltd
- Sydney Trains
- The Duty Manager, Morisset
- The Station Manager, Morisset
- The Sydney Trains Protection Officer
- The train crew of 4190
- Transport for New South Wales

Submissions were received from all parties with the exception of the train crew of 4190. The submissions were reviewed and where considered appropriate, the text of the draft report was amended accordingly.

# 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 'operations involving the travelling public'.

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.

## Australian Transport Safety Bureau

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## Investigation

### **ATSB Transport Safety Report** Rail Occurrence Investigation

Incident involving Absolute Signal Blocking  
Warnervale, New South Wales, 24 November 2014

RO-2014-021

Final – 17 September 2015