



**Australian Government**

**Australian Transport Safety Bureau**

# Safeworking irregularity involving Track Work Authority

Blackheath, New South Wales, on 2 September 2018

**ATSB Transport Safety Report**

Rail Occurrence Investigation

RO-2018-016

Final – 25 February 2020

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#### Addendum

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# Safety summary

## What happened

On 2 September 2018, a Sydney Trains workgroup conducting a track inspection had to move to a safe location beside the track as a NSW Trains' passenger train, W532, approached. The incident occurred in a worksite protected by a Track Work Authority, in a section of track between Blackheath and Medlow Bath stations on the Main West line.

The maintenance work group began working on a section of line that passenger train W532 was travelling in. The work group were informed that the section was protected. The driver of W532 travelling on the Up<sup>1</sup> main line sounded the horn when he saw workers on the tracks 40 to 60 metres ahead of the train. The work group, evacuated to a safe place beside the Up main line. The workers had cleared the tracks approximately three to four seconds before W532 passed their location.

There were no injuries to people or damage to property.

## What the ATSB found

The Australian Transport Safety Bureau found that safety critical communication lacked confirmation between the signaller at Mount Victoria (SMV) and the protection officer<sup>2</sup> (PO) for the work group.

The PO became distracted during the establishment of worksite protection while he was attempting to conduct multiple tasks. The PO was communicating with the SMV, his work group and also the hand signaller at Mount Victoria (HSMV). This resulted in him overlooking information regarding the presence of a passenger train within the limits of the worksite and directing his work group to commence work on track.

## What's been done as a result

As a result of this incident and other recent safe working incidents, Sydney Trains launched the safety initiative "*Safety Together: It Starts With Me*". The initiative focussed on ensuring all employees had an adequate understanding of the protection in place prior to the commencement of their work.

## Safety message

Rail operators should remind rail safety workers of the importance of effective communications. All safety critical messages should be repeated by the receiver to confirm the detail of the message. If the sender is unsure that the receiver has understood the message, then the sender should challenge the receiver to repeat the message. This confirmation is especially important with regard to providing detail of train movements in the vicinity of the worksite.

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<sup>1</sup> Trains travelling on the Up line are usually travelling towards Sydney Central Station; trains travelling on the Down line are travelling away.

<sup>2</sup> The Qualified Worker responsible for protection.

# The occurrence

## What happened

On 2 September 2018, Sydney Trains had pre-scheduled track maintenance work (Welded Track Stability Inspection)<sup>3</sup> for both the Up and Down Main West lines between Mount Victoria and Katoomba (see Figure 1).

To facilitate the work, at 0600<sup>4</sup> the PO briefed the work group and deployed hand signallers, one to Mt Victoria station, the second to Katoomba station. The PO then arranged a Track Work Authority<sup>5</sup> (TWA) with the signaller, Katoomba for the Down line at 0714. At 0720, the PO contacted the SMV to establish the TWA on the Up line, however this could not occur, as there was a train in the section at that time. While the PO waited for the train to clear the section, he conducted a final worksite protection pre-work briefing for the work group.

Following the briefing, the PO then arranged a TWA with the SMV on the Up line at 0756. Both of the TWAs were authorised by the train controller on the Southwest Panel prior to the workers entering the rail corridor.

**Figure 1: Location of the Mt Victoria to Katoomba track section.**



Source: Geoscience Australia, annotated by the ATSB

<sup>3</sup> A Welded Track Stability Inspection requires a work group to walk a defined section of track to take detailed geometry measurements at various points.  
<sup>4</sup> All times are in Australian Eastern Standard Time (UTS + 10:00) and in 24-hour format.  
<sup>5</sup> A Track Work Authority allows track work on running lines between rail traffic movements. Protection Officers manage the approach of rail traffic to worksites. Rail traffic may pass through only under controlled conditions (NPR702).

Passenger train W532, an 8-car intercity train known as a V set, was scheduled to depart Mt Victoria station on the Up line at 0802. The PO informed the SMV that he would allow W532 to depart prior to establishing protection. At 0758, the PO radioed the HSMV and communicated the plan to allow W532 to depart prior to implementing the protection. The planned protection consisted of the HSMV clipping and locking 41 points, combined with the SMV blocking signal 78.6 (126.599 km).<sup>6</sup>

At 0802, passenger train W532 departed Mt Victoria on the Up line. At approximately 0803 the HSMV informed the SMV that W532 had passed his location. The SMV then informed the HSMV that he placed the signals to stop and applied a block<sup>7</sup>. The HSMV clipped and locked 41 points, then called the PO on the two way radio informing him that protection was in place and W532 was in the section.

At approximately 0804, the PO received a call from the SMV who communicated the train-running times for the day. This conversation included the information that W532 was currently in the section.

At approximately 0807, the PO advised the work group supervisor that both Up and Down TWA were in place and that both tracks were protected. The PO advised the work group they could commence work and the work group moved on to the tracks.

At 0809, W532 departed Blackheath station (120.622km) on the Up main line towards Sydney. A short while later, the driver of W532 observed a work group on the tracks as the train exited a left hand curve in a cutting between 119.614 km and 119.650 km (see Figures 2 and 3).

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<sup>6</sup> The kilometre distance is given as the distance from Platform 1, Central Station Sydney, New South Wales.

<sup>7</sup> A block is a mechanism of preventing a signaller from accidentally changing a signal. Typically a physical cover is placed over the signal button to prevent it from being pressed.

Figure 2: Location detail



Source: Sydney Trains, annotated by the ATSB

Figure 3: Line of sight between train and workgroup obscured by cutting



Source: Sydney Trains, annotated by the ATSB

At 0811, the driver of W532 rounded the left hand turn and sounded the train’s horn when he sighted workers on both the Up and Down lines in front of the train. The driver did not apply the brakes and continued on his route as scheduled without reporting the incident. At approximately the same time the PO, who was located closer to the train, ran towards the work group shouting a warning that a train was approaching.

The workers on the Up line, realising that W532 was approaching, moved to a safe location beside the tracks (see Figure 4). The workers on the Down line waited for W532 to pass before joining the rest of the work group at the safe location.

**Figure 4: Driver’s view of the incident site**



Source: Sydney Trains, annotated by the ATSB

W532 passed the worksite approximately 3-4 seconds after the workers on the Up main cleared the track and continued on its journey to Sydney. The work group reported no injuries.

The Worksite Supervisor stopped the work and reported the incident to ICON<sup>8</sup> and the PO fulfilled the TWAs on both the Up and Down Main lines. The workgroup then returned to the Lawson network base where they met with the incident rail commander who conducted preliminary interviews and arranged post incident drug and alcohol testing. The results of the testing were negative.

## Network rules and procedures

When planning work in a rail corridor, it is a PO’s responsibility to ensure that all work in the danger zone is carried out according to network rules and procedures. The PO must also ensure that work is planned in accordance with NWT 306 Planning work in the Rail Corridor.

### ***NWT 306 Track Work Authority***

In order to carry out track work under a TWA, a PO must ensure that the TWA is authorised by the network controller. Prior to a network controller issuing a TWA, they must be satisfied that the PO has complied with network rule NWT 306. NWT 306 prescribes items that must be completed before authorising, issuing and using a TWA. The PO must liaise with the signaller responsible for the section about protection arrangements. The PO must ensure that the workers and worksite are protected against the unauthorised entry of rail traffic.

<sup>8</sup> ICON is a multifunction support complex, whose responsibility includes the management and assurance of worksite safety. It is also responsible for the management and rectification of infrastructure problems.

Before workers can enter a worksite, they must be briefed by the PO about the worksite and planned protection. The briefing must identify safe places, safety measures, the extent of the protected area and any changes to the protection. The PO must also ensure that protection is in place prior to any work commencing.

For the duration of the TWA, the PO must manage rail traffic between the limits of the TWA. The PO does this by establishing and maintaining effective communication with local signal boxes and with inner and outer hand signallers.

### ***NPR 702 Using a Track Work Authority***

NPR 702 prescribes the process for obtaining, authorising and establishing a TWA. It also specifies how to manage rail traffic movements through the worksite.

It requires the signaller provide the PO with train running information. Further, the signaller must identify the last rail traffic to enter the worksite and ensure the PO knows its location. The PO is required to confirm understanding of this information.

NPR 702 contains a warning that states:

Workers must be in safe places before rail traffic is allowed to approach beyond the inner Hand signaller or pass through the limits of worksites.

### ***NGE 204 Network communication***

NGE 204 prescribes rules for spoken and written communication on the Sydney Trains Network. The general principles of which are that all communication must be brief, clear, relevant to the task at hand and agreed to its meaning before being acted upon. The receiver must confirm the content of a message by repeating the message back to the sender when the communication is about a work on track authority.

NGE 204 contains a warning:

Qualified Workers must not assume that a receiver has understood a message before the receiver confirms that the message has been understood.

## **The Protection Officer**

At the time of the incident, the PO had over five years' experience as a protection officer. The PO was qualified and worked as a level 2 for almost 5 years and had held his level 3 qualification since February 2018. The level 3 qualification additionally allowed him to implement a TWA and manage rail traffic through worksites.

The PO had worked on the Blue Mountains section of the network for approximately 12 months. Six of these months he had worked as a qualified level 3 PO.



# Safety analysis

A number of safety factors lead to the work group entering the danger zone at the same time as passenger service W532. These factors were found to be related to the implementation of rules and procedures, and serve as a reminder for rail operators and rail safety workers to ensure effective communications when working on the rail network.

## Missed W532 in the Section

At the time the PO delivered the final worksite protection briefing and participated in the worksite supervisor's pre-work briefing, trains W530 and VP02 passed through the worksite. When VP02 exited the worksite, at approximately 0750, the SMV communicated with the train controller and had the TWA on the Up Main authorised at 0756. W532 was scheduled to depart Mt Victoria six minutes later at 0802.

Due to the proximity of W532s scheduled departure, the PO instructed the HSMV to allow W532 to depart Mt Victoria before applying protection. At 0802, W532 departed Mt Victoria station and protection (signal block and clip lock on 41 points) was established. The HSMV then called the PO, at 0803, on the two-way radio and informed him that protection was established and that W532 was in the section.

At 0804, shortly following the radio call, the SMV called the PO to relay expected train schedule times on the Up Main line that day. During this conversation, the SMV informed the PO that W532 was in the section. The PO recorded the up coming train schedule times on the PO log but notably made no record of W532 being in the section (see Figure 5).

Figure 5: Train running schedule from Protection Officer Log

**RailSafe**
**Protection Officer's Log – NRF 016**

02/09/2018

**Protection Officer Details**

**Worksite Location** (if completing this form for an adjacent line, enter the details of the adjacent line, not the line being worked)

On the  line(s)

between  and

completely within

Type of work:

Start km  Finish km

Notes

**Handsignaller Details**

1  @

2

Hand written list of train times. W532 omitted from list

SMV 8:15

with 9:15

09:22

10:18

11:18

12:18

13:18

14:18

Source: Sydney Trains: annotated by the ATSB

At 0807, after receiving and recording the train running schedule the PO informed the work group that protection was established and they could commence work.

The work group moved on to both the Up and Down lines at the agreed location (119.650 km) to commence work. W532 rounded the cutting and approached the work group shortly after at 0811.

At post interview, the PO said that he missed the fact that W532 was in the section.

## **Network Communication**

ATSB reviewed the voice recordings between the PO and SMV during the establishment of the TWA. It was found that the communication of important safety information was informal, conversational and lacked confirmation to ensure messages were understood.

Specifically at 0804, during the communication between the SMV and the PO, train running information was being provided to the PO informing him that W532 was in the section at that time. The PO responded with 'yep'.

The PO did not repeat back the train running information or that W532 was in the section to confirm his understanding. Additionally, the SMV did not challenge the lack of confirmation by the PO, thus missing an opportunity to confirm that the message was understood.

The lack of confirmation of the message, most likely allowed the PO to overlook the fact that W532 was in the section. This oversight led to the PO instructing the work group to enter the rail corridor with a train in the section.

## **Management of tasks**

The process of implementing worksite protection requires the PO to undertake a number of tasks and consider various factors to ensure the success of the worksite protection plan.

At the time of the incident, the PO was managing a number of tasks that each demanded his attention:

- His prime responsibility, according to *NWT 300 Planning work in the Rail Corridor*, was to ensure the safety of the worksite and the workers.
- He was responsible for managing the movement of rail traffic through the worksite to ensure the safety of his work team prior to allowing work to begin in the danger zone.
- He was updating paperwork relevant to the protection officer's diary and log.
- He was communicating with the SMV by mobile phone receiving safety critical information relevant to the worksite protection on the Up Main line.
- He was communicating with the HSMV regarding current rail traffic and status of protection.

Research has shown that attempting to carry out multiple tasks at the same time results in distraction, slower task performance and an increase in errors.<sup>9</sup> Baddeley (1986) argues that individuals have a limited pool of working memory resources available to conduct tasks. When an individual attempts to manage multiple tasks, the divided attention draws from the limited pool and results in a reduction of resources to devote to any one task.

Research by Wickens (1992) proposed that an individual's short term sensory resource is of limited capacity and if overwhelmed by competing stimuli, can become depleted resulting in poor responses or slips of attention.

Staal (2004), argued that this reduction in attentional resources when attempting the management of multiple tasks, 'results in degraded performance on either the primary or secondary task.'

Further Staal argues that:

In such cases when the recall or recognition of information is required, this division often results in a decreased capacity to recall or recognize information.

It is likely that the PO became distracted and missed the information about W532 being in the section, as he attempted to manage the multiple tasks and the high workload.

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<sup>9</sup> C.D.Wickens (1992) *Engineering Psychology and Human Performance*, New York: Harper Collins.  
Mark A. Staal (2004) *Stress, Cognition, and Human Performance: A Literature Review and Conceptual Framework*, Moffett Field, California: Ames Research Centre.

In establishing the TWA, the PO followed the basic principles of network rules 300 and 306. However, safety critical communication when implementing protection on the Up Main line lacked the feedback and confirmation as required by NGE 204. This lack of confirmation combined with attempts to concurrently carry out multiple tasks led to the PO overlooking that W532 was already in the section when he instructed his work group to commence work.

### **ATSB comment**

When establishing worksite protection, the principles of network communication require communication to be clear, brief, unambiguous, relevant and agreed to its meaning before being acted upon. Clear communication is critical to maintaining safety on the rail network.

## Findings

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

- The PO cleared the work group to enter the danger zone and commence work when passenger service W532 was in section.
- The verbal communications between the PO and the SMV lacked the feedback and confirmation required in network communications.
- The PO was working through multiple tasks when implementing the TWA on the Up main line which distracted him from understanding safety critical train schedule information.

## Safety action

The ATSB has been advised of the following proactive safety action in response to this occurrence.

### Sydney Trains

As a result of this occurrence, Sydney Trains has taken the following safety actions:

#### ***Safety Initiative***

As a result, of this incident and other recent safe working incidents, the safety initiative “Safety Together: It Starts With Me” was launched. The initiative focusses on ensuring all employees have an adequate understanding of the protection in place prior to the commencement of their work.

## References

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- C.D.Wickens (1992). *Engineering Psychology and Human Performance*, New York: Harper Collins.

# General details

## Occurrence details

Date and time:	2 September 2018 – 0811 AEST	
Occurrence category:	Incident	
Primary occurrence type:	Rail Safe Working Irregularity	
Location:	Blackheath, New South Wales	
	Latitude: 33° 38.567' S	Longitude: 150° 16.947' E

## Train details

Train operator:	NSW Trains	
Registration:	W532	
Type of operation:	Passenger	
Departure:	Mount Victoria, NSW	
Destination:	Sydney Terminal, NSW	
Injuries:	Crew – 0	Passengers – 0
Damage:	None	

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