Australian Government
Australian Transport Safety Bureau

Near hit with rail worker by passenger train 283D

Dora Creek, New South Wales on 9 May 2020

ATSB Transport Safety Report
Rail Occurrence Investigation
RO-2020-006
Final – 20 May 2021

Cover photo : Main North line at Dora Creek
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Addendum

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Safety summary

What happened

On Saturday 9 May 2020, NSW TrainLink passenger service 283D, an 8-car H OSCar set, travelling from Newcastle to Sydney, encountered a rail worker on the Up Main track at approximately 130.500 km. The worker saw and heard the approaching train and removed themselves from the track and out of the danger zone.

The train stopped past the location where the worker was situated, and the driver spoke with the worker to understand what had happened. The driver learned that the worker was an outer handsignaller (OHS) for a Track Work Authority (TWA) worksite at Dora Creek bridge at 127.100 km.

The OHS had been instructed by the protection officer (PO) for the worksite to remove the railway track signals[1] (RTS) being used for protection for the TWA. This instruction was made in the knowledge there was a train approaching the OHS location, but no warning or other information was relayed to the worker in relation to the proximity of the train.

What the ATSB found

An unapproved practice occurred during the application of the approved method of protection of TWA. This practice involved the person managing the safeworking, the PO, instructing workers to remove the RTS used to protect the worksite while trains were closely approaching. This was for the purpose of improving train operations. This practice put the track worker involved at risk as there was no defined process or method for protecting this worker. This practice was not part of the recognised methodology of using a TWA as published by the Rail Infrastructure Manager, Sydney Trains.

What has been done as a result

Sydney Trains acknowledged an unapproved practice occurred during the TWA whereby workers were directed to remove RTS while the train was closely approaching its location. Sydney Trains have included this issue in their change request process for Network Rules. The amendment will reinforce the existing requirement in step 12 of NPR 702 as it relates to a TWA using an inner and outer handsignaller protection, in that both the inner and outer protection must be replaced immediately after the passage of each rail traffic movement.

Safety message

Network Rules and Procedures for safeworking on railways have been developed to give direction and instruction to workers in how to safely manage work on track. When practices develop that deviate from the established procedures, care needs to be exercised to ensure these practices do not introduce unintended risk. Rail safeworking practices should only be implemented as approved by the Rail Infrastructure Manager.

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[1] Railway track signal: A device attached to a rail that explodes on impact, used to attract attention of drivers and track vehicle operators.

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The occurrence

Overview

Sydney Trains Major Works Branch commissioned John Holland Group (JHG) to conduct repairs and maintenance to the Dora Creek rail bridge on the main north rail line between Sydney and Newcastle (Figure 1). JHG used a PO from within their own workforce to supervise the safeworking for the job. The method of protection chosen by the JHG PO was a TWA.

As the OHS approached the RTS to remove it from the rail line, they heard the sound of the train whistle of 283D and moved off the Up Main line to the safety of the Up Cess area. The train ran over the RTS and the driver applied the emergency brakes. The train came to a stand around 60 m past the OHS.

Figure 1: Location Map

Source: Geoscience Australia, annotated by the ATSB

Preparation activities for the work

JHG and Sydney Trains Major Works Branch engineers and workers collaborated about the preparatory activity for the bridge works at Dora Creek. This involved submission of various plans for engineering and safeworking activity.

The JHG PO was provided with a scope of information on Sunday 3 May 2020 about the upcoming work and was tasked with planning the worksite protection arrangements. The proposed worksite protection plan (WPP) for the work on the bridge was submitted to both a JHG safety advisor and Sydney Trains for review.

The plan included use of a TWA to protect work on the Up Main line, and the use of Lookout Working to protect work on the adjacent Down Main line[2]. This plan was approved by Sydney Trains Major Works Branch for use.

[2] Trains travelling on the Up line are travelling towards Sydney Central Station; trains travelling on the Down line are travelling away.

The work before the incident

The planned work for Dora Creek Bridge was due to start at 0700[3] on Saturday 9 May 2020. The JHG PO arrived on site at 0530 and commenced a review of the safeworking arrangements. The handsignallers for the TWA arrived on site at 0620 and were briefed by the PO on the safeworking arrangements, including the instruction that the preferred approach would be for the handsignallers to remove the RTS as trains approached. No one in the work group questioned or challenged this proposed method of working.

The handsignallers made their way to their designated locations and placed the protection in the form of RTS when requested by the PO. The TWA was authorised at 0650 and work commenced on the bridge. As per the approved safeworking arrangements, there was also Lookout Working in place for the adjacent Down Main line.

At 0945, a Sydney Trains Major Works Branch employee attended the site and asked for work to be stopped. The reason given was Sydney Trains Major Works Branch do not permit Lookout Working on their worksites unless specific approval is provided prior to the work commencing. The work was stopped, and the PO supervising the Lookout Working attempted to obtain an Absolute Signal Block (ASB) for the Down Main. The ASB could not be established due to the lack of a second person in the signal box at Wyong to conduct a peer review of the proposed working.

Given the unavailability of ASB, the next option chosen was for a Track Occupancy Authority (TOA) to be used, and a TOA was granted at 1130 for the Down Main, while the TWA continued to be used on the Up Main.

The TOA on the Down Main was fulfilled at 1209, while the TWA remained on the Up Main. The PO protecting the Down Main arranged for TWA protection to be provided for the Down Main, with inner and outer handsignallers only, that is, without the use of fixed signals. The work continued in this fashion for the remainder of the afternoon.

The incident

At around 1525, the OHS for the TWA on the Up Main was asked by the PO, via radio, to remove the RTS to allow the next train to run unimpeded through the worksite. At the time of this request, NSW TrainLink service 283D, the 1453 Newcastle to Sydney passenger service, was heading towards the location where the OHS was stationed.

The OHS accessed the Up Main track adjacent to the location of the RTS closest to the worksite at approximately 130.381 km, removed the RTS and proceeded to walk along the Up Main line towards the second RTS located 20 m away in the down direction. The OHS was at this point walking towards the approaching train 283D. As the OHS approached the second RTS, they heard the sound of the train whistle of 283D and immediately moved off the Up Main line to the safety of the Up Cess area. The train ran over the remaining RTS and the driver applied the emergency brakes and the train came to a stand around 60 m past the OHS.

The driver and the OHS briefly spoke to each other to understand what had occurred, and the driver reported the incident to the Network Control Officer at Broadmeadow signal box, who then reported the matter to the Rail Operations Centre (ROC). The Network Incident Manager in the ROC made enquiries and determined that work should cease and the incident be investigated. A Sydney Trains Incident Rail Commander was despatched to the site to commence investigations and drug and alcohol testing was organised.

The TWA on the Up Main was fulfilled at 1556 and all personnel requested to return to the site office for initial interview and commencement of the investigation.

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[3] All times are in Australian Eastern Standard Time (UTS + 10:00) and in 24-hour format.

Context

The location, signalling system and infrastructure

Dora Creek is located on the main northern rail line from Sydney to Newcastle, with the Dora Creek bridge located at 126.900 to 127.100 km and Dora Creek station platforms located at 127.140 km.

The rail line consists of an Up and Down Main line, with the signalling system being double line unidirectional rail vehicle detection. Dora Creek station is located in the automatic signalling section between Morisset and Eraring.

The signalling system is overseen by the Network Control Officer at Broadmeadow signalbox. Morisset has a local signalbox on the station that can be switched in and out as required. Eraring Power Station siding is controlled by the NCO at Broadmeadow signalbox, and it also has a local control panel that may be switched in and out as required.

All the main line rail assets and infrastructure are managed by Sydney Trains, who is the Rail Infrastructure Manager (RIM) for this part of the NSW rail network. The area has a number of private sidings that branch off the main line, including Vales Point Colliery and the Eraring Power Station.

The train involved

Train 283D was an 8-car H (OSCar) outer suburban and intercity set, performing the route from Newcastle Interchange to Sydney Terminal. The timetable for the train was a 1453 departure, due for arrival in Sydney at 1729.

The train was operated by NSW TrainLink, the NSW Government transport agency for above rail operation for intercity and regional passenger trains. The train was crewed by a driver and guard. Sydney Trains is the maintainer of the rolling stock.

The train was being driven as per operational requirements, with the headlights and fog lights switched on. The train was within the required speed limits for the section of track, according to the data logger report provided by Sydney Trains Engineering and System Integrity Branch. The speed of the train when it encountered the OHS was recorded as travelling at 94 km/h; the maximum permitted track speed was 95 km/h.

No defects or abnormal operation of the train was noted by Sydney Trains, and the train responded to the inputs of the driver within the normal operational parameters and requirements. The operation of the train was not considered to be a factor in relation to this incident.

The people involved

The Protection Officer

The Protection Officer (PO) was employed by JHG.

The PO was rostered on for weekend track work on the Sydney Harbour Bridge on Sunday 3 May 1400 – 2400 hours, then the afternoon shift at Dora Creek from 1400 – 0200 each night, Monday to Thursday. Fatigue was not considered to be a factor in this incident.

The PO was qualified as a Protection Officer Level 4, and also as a Handsignaller level 2. The PO had 11 years of rail industry experience and held the PO4 qualification since 2013 and had been recertified in August 2018 by Transport for NSW. The PO was also qualified as a Handsignaller Level 2 and held that certification since May 2013, and was recertified by TfNSW in August 2018.

The Outer Hand signaller

The OHS was employed by Swetha International as a casual rail safety worker.

The OHS worked in a job outside the rail industry from Monday to Friday 1300 – 1800 on each of the two previous weeks prior to the incident. The shift at Dora Creek on Saturday 9 May was the only rail work performed in the previous two weeks. Fatigue was not considered to be a factor in this incident.

The OHS was qualified as a Handsignaller Class 2, and was certified in August 2018. The OHS had previously been employed in the rail industry as an infrastructure worker.

Network Rules and Procedures

Sydney Trains administer the RailSafe Network Rules and Procedures for work on the Sydney Trains network. These rules and procedures are published on the RailSafe website and are publicly available.

There are a range of Network Rules and Procedures that may apply to any particular worksite, The following Network Rules and Procedures were applicable in this incident.

NWT 300 Planning work in the rail corridor

This rule prescribes the rules for planning work within the rail corridor and assessing the work for safety. In general;

> Work planned for the Rail Corridor must be assessed for safety and its potential to intrude on the Danger Zone.
> Work in the Danger Zone must:
> - be carried out in accordance with the Network Rules and Network Procedures
> - not begin until the required safety measures are in place.
> The level of safety must not be reduced:
> - to allow rail traffic movements, or
> - because of a lack of Qualified Workers.

The work at Dora Creek was required to be planned in accordance with this rule. As required by this rule, work in the danger zone may be carried out by using one of the permitted forms of work on track authorities. In this case, the work on track authority implemented was NWT 306 Track Work Authority.

NWT 306 Track Work Authority

This rule prescribes the rules for authorising, issuing and using a Track Work Authority (TWA). In general:

> A TWA:
> - authorises occupancy of a defined portion of track between rail traffic movements
> - does not give exclusive occupancy of the defined portion of track
> - is requested by and issued to the Protection Officer
> - may include multiple worksites
> - allows work that breaks or obstructs the track or alters track geometry or structure.
> Drivers and Track Vehicle Operators must follow instructions given by Handsignallers and the Protection Officer.

The TWA entailed use of outer and inner handsignallers only, not using signals, in order to manage the approach of rail traffic to and through the worksite.

The role of handsignallers in TWA

The role of handsignallers during a TWA is to provide direction to drivers and track vehicle operators about the approach to, and transit through, the worksite. The PO for the work provides instructions to the handsignallers about when and how rail traffic can proceed, or not, through the worksite. The handsignallers then relay that information to rail traffic through a combination of handsignals, placement or removal of RTS, and other instructions.

TWA is a form of protection that has a number of possible combinations, depending on the available signalling infrastructure, the location of the worksite, what conditions exist and other factors.

In the case of the TWA in use at Dora Creek on this day, the PO had chosen to use the handsignallers only method, not placed at signals. The version of TWA contained specific instructions on how the OHS interacts with rail traffic.

NPR 702 Using a Track Work Authority

In this situation NPR 702, page 11, contained the following instructions:

'Protecting Worksites using Handsignallers only

Protection Officer

1. Place an outer handsignaller and two railway track signals 2500 m from where the inner handsignaller will be positioned in the direction of approaching rail traffic.
2. Tell the outer handsignaller to display a CAUTION handsignal to approaching rail traffic.'

NPR 702, page 18, also contained a further instruction about what an outer handsignaller must do when not at a signal.

'Managing rail traffic transits through worksites

Protection Officer

10. If it is safe for rail traffic to pass the outer Handsignaller not at a signal, tell the Handsignaller to take the following actions:

Movement allowed	Outer handsignaller action
Rail traffic is to proceed at caution	(a) Signal PROCEED AT CAUTION to the Driver or Track Vehicle Operator

NGE 202 Handsignals

Network Rule NGE 202 Handsignals described a proceed at caution handsignal as (during daylight) a green flag waved slowly from side to side or (during darkness) a green light waved slowly from side to side or an outstretched arm waved slowly.

This was the only described and approved action for an OHS, not at a signal, working under a TWA in relation to rail traffic transit through the worksite.

The RailSafe Network Rules and Procedures did not provide permission or instructions for OHS to remove RTS during a TWA while a train is approaching. It was not an approved activity under a TWA.

NWT 308 Absolute Signal Blocking

Absolute Signal Blocking is used to exclude rail traffic from a defined portion of track for a specified period. Its effectiveness depends on the Protection Officer correctly nominating the worksite location and the Signaller correctly identifying all protecting signals and points to exclude rail traffic from the nominated worksite location.

Peer review of Absolute Signal Blocking

The peer review process came into effect in February 2020 and was implemented by Special Instruction No. 02/20 to signallers. The peer review was conducted in larger signalling locations such as the Rail Operations Centre and at Granville, Blacktown, Broadmeadow and Wollongong signal boxes. Smaller signalboxes were not permitted to issue ASB unless there is another person, qualified as a signaller, present to conduct the peer review.

This process effectively ruled out the use of ASB for a large part of the Sydney Trains network. This restriction was brought about in response to a series of incidents involving ASB in the Sydney Trains network.

The peer review process did not appear in any training or competence management material provided to POs. The Special Instruction was published on the Sydney Trains Intranet and was not available to workers not directly employed by Sydney Trains.

NGE 200 Walking in the Danger Zone

The two key requirements from NGE 200 that relate to this investigation are:

'Walking in the Danger Zone is:

- Doing no other work than placing or removing protection.

Placing or removing protection

If placing or removing protection, workers must stay alert for approaching rail traffic.'

A limited number of activities are permitted under NGE 200, and when placing or removing protection, workers are responsible for their own safety. Therefore the circumstances when an OHS is required to access the Danger Zone must be managed carefully.

NPR 709 Using Railway Track Signals

This procedure described the specific requirements necessary when placing or removing protection in the form of RTS. An OHS in this case needed to place two RTS on the right hand rail in the direction of travel 20 m apart.

The requirement to use the right hand rail places the RTS on the opposite side to where the driving station is in the cab on most rail traffic, where the driver is located on the left hand side.

This requirement was in place for many years, and was designed to reduce the noise impact of the explosion of the RTS on the driver.

The effect this requirement has on the worker placing the protection is that the worker is most often further away from a safe place, as the right hand rail in the direction of travel in a double track unidirectional environment is in the middle of the corridor. A worker bending down to place or remove RTS will be likely intruding into the Danger Zone of the adjacent track as well as the track on which the protection is required.

NWT 310 Lookout Working

This rule prescribes the rules for working in the Danger Zone without a work on track authority using Lookouts or an approved Automatic Track Warning System (ATWS) as the safety measure.

If the safety assessment shows that it is safe then some kinds of work may be done in the Danger Zone without a work on track authority.

NGE 204 Network Communication

This rule prescribes the rules for spoken and written communication in the Network. In principle;

Communication in the Network must be:
- clear, brief and unambiguous
- relevant to the task at hand
- agreed to its meaning before being acted upon.

Safeworking communication must use:
- the 24-hour clock to give the time of day
- the phonetic alphabet and spoken numbers to identify:
    - train numbers and track vehicle numbers
    - signal numbers

> Communication equipment used for rail traffic operation or work on track must be tested and checked for its intended operation.

NPR 721 Spoken and written communication

This procedure provides specifics on how the rail safety worker can be effective with their written, radio and telephone communications in the Network. How to pronounce spoken numbers, to use the phonetic alphabet to spell words, standard terms, open channel and emergency radio communication protocols and written communication abbreviations.

Worksite Protection Plan (WPP) review processes

The JHG PO prepared a draft WPP for the work on Dora Creek Bridge that was to occur on Saturday 9 May 2020. Planning work was a requirement of Sydney Trains that was mandated in the Network Rule NWT 300 Planning Work in the Rail Corridor. The PO records those details by completing a WPP which was a requirement contained in the form NRF 015 Worksite Protection Plan.

The WPP identified that the worksite on the Up Main would be protected by a TWA and adjacent line protection for the Down Main would be by the use of a lookout under Lookout Working.

Both forms of protection were suitable for the task and were available to be used based on the required considerations for each. Issues such as sighting distance on the Down Main were appropriate for Lookout Working, and the nature of the bridge work on the Up Main required that a level of protection above ASB was required. A TWA was therefore a suitable method of protection.

JHG and Sydney Trains both required that the PO submit the plan for review through various channels. There were four separate processes that needed to be undertaken before the work could commence using the proposed method of protection; none of these processes detected deficiencies with the plan.

Both organisations approved the plan and it was then put into practice in terms of organising labour and other supporting activities, ready to be implemented on the day.

The John Holland review process

The JHG review process involved an assessment of the WPP by an internal safety advisor. According to JHG, this person was part of their safety team and was in place to provide support and advice to project teams and workers. The review process did not extend to testing or validating the safety assessment made by the PO in relation to the suitability of the sites chosen for the handsignallers.

JHG were not aware of the Sydney Trains Major Works Branch pre-approval process for the use of Lookout Working.

The Sydney Trains Access Pre-Advice System process

The Sydney Trains Access Pre-Advice System (APS) review process is a planning tool rather than an endorsement or approval system. Sydney Trains implemented this new system on 1 May 2020.

APS was advertised as a resource planning system not as a safety system. This system did not endorse or approve the method of protection, it recorded and registered the presence of the workgroup.

If a PO wanted to use a TWA on the Sydney Trains Network, then the PO must submit a WPP no less than 4 days prior to the work commencing.

The Sydney Trains Major Works Branch review process

There was an additional review process that Sydney Trains Major Works Branch required for work that was undertaken either directly by its own staff or indirectly by contractors, as was the case for the works on Dora Creek Bridge.

This review process required a special pre-approval for the use of Lookout Working and was implemented in August 2018. It was a branch only process, and was not documented or recognised outside of the Major Works Branch of Sydney Trains.

The WPP was submitted by the PO as required for registration in the Sydney Trains APS. This included reference to the use of a lookout for the Down Main, however no one in Sydney Trains had apparently linked the Major Works Branch pre-approval process to this WPP, so it was approved for use.

The detection of the unapproved use of Lookout Working was made when a Sydney Trains Major Work Branch manager attended the site around 0945 and requested the work be stopped while another form of protection be implemented for the Down Main.

This incurred delays to the work and resulted in additional workload for the PO, who now had to organise a new form of protection for the Down Main line, whilst still supervising the TWA for the Up Main line.

The Sydney Trains Corridor Safety Centre

There was another review process employed by Sydney Trains to review and approve work on the network. The Corridor Safety Centre (CSC) was established to help identify any deficiencies with the WPP of POs. The PO for the Dora Creek work called the CSC prior to starting work and the operator at the CSC identified a deficiency with the WPP.

The CSC operator asks the PO a series of pre-determined questions, and there are a range of possible combinations of how the conversation will develop, depending on the answers given by the PO. The question sets are configured to try and capture essential information from the PO in order to determine if the safeworking arrangements are suitable.

While it is not feasible to address each and every factor or consideration in these question sets, there are some basic requirements that could be considered. In the case of the work at Dora Creek, the operator detected an error in the way the work location was classified.

The location of work was listed as between Dora Creek platform 1 and 78.8 signal. However the Network Rule NWT306 required the PO to identify the work as being between:

- two signals, or
- a signal and a set of points, or
- a signal and the end of a terminal line, or
- a set of points and the end of a terminal line.

The error was minor in nature but identified by the operator and noted to the PO, who did not realise the requirement. The CSC operator quoted the requirements of the rule to the PO, who then corrected this detail and noted the location of the work was between signals 88.0 and 78.8.

Correction of the work location was made and the worksite was approved and an approval number was issued.

The PO did not know who the Network Control Officer was for the work location in the Up direction. The PO asked the operator at the CSC who was the responsible signaller for the worksite in order to obtain the TWA. The CSC incorrectly identified Wyong as the controlling signalbox and the PO asked for and received the phone number for Wyong signalbox.

Safety analysis

Removing railway track signals during a TWA

Overview

In relation to TWA, the practices described in NWT 306 and NPR 702 were designed to deliver the safest possible outcomes for workers performing work on or around the track, and for train crew and passengers. In particular, the role of the OHS includes some inherent risks that require careful management given they often work alone when performing their duties.

The two main tasks performed by an OHS are:

- Placing and replacing RTS
- Displaying a caution handsignal to the drivers of approaching rail traffic.

Displaying the caution handsignal is performed from a safe place outside of the Danger Zone, most of time in the cess next to the track associated with the TWA. TWA as a method of protection was most widely used in the Sydney Trains Network in the dual track outer suburban and inter-city areas, as multiple track locations such as found in inner suburban areas provide limited safe places for handsignallers to operate.

The placement and replacement of RTS is therefore the task that involves the most risk for the OHS, as that task entails entering the Danger Zone alone, and bending down to affix the RTS to the head of the rail.

The permission to place and replace RTS was not in the rules and procedures for TWA. The permission for such activity is in rule NGE 200 Walking in the Danger Zone.

Placing or removing protection

The requirements for an OHS, not at a signal, to place or remove protection is not defined in the RailSafe Network Rules and Procedures. The established practice for an OHS to replace RTS after a train has run over them is to do so as soon as practicable after the train has passed.

The training material provided to handsignallers instructs them to:

- ‘Advise the inner handsignaller when the train or track vehicle has passed you.
- Replace the Railway Track Signals.’

The rationale behind this is to permit the OHS access to the Danger Zone relatively soon after the train has passed. The proximity of the previous train prevents another train from closely approaching at track speed, because of the reduced proceed indications of the signalling system that will be displayed to any following rail traffic. This is therefore the safest time for a handsignaller, operating on their own, to be in the Danger Zone and replacing RTS protection.

Removing protection while a train is heading towards the OHS at track speed is not stated in the TWA Rule and Procedure but this practice occurred during this TWA, numerous times in the incident under investigation.

Placing and removing Railway Track Signals by the outer handsignaller

The practice of placing and removing RTS is approved under NGE 200 Walking in the Danger Zone which covers a range of work on track rules where placement or removal of RTS protection is required. Placing and removing protection are the only types of work approved under this rule. It also requires workers to stay alert for the approach of rail traffic under their own watchfulness.

There are no specified warning times applied to this type of work which is in contrast to Network Rule NWT 310 Lookout Working, where there is a defined formula for see time, move time and safe time to allow workers to move to a safe place and to be there for 10 seconds prior to the arrival of a train.

In a TWA, the approved practice for the OHS, not at a signal, is:

- the OHS gives the driver a caution handsignal (which means the train slows down on the journey to the inner handsignaller)
- the OHS replaces the RTS *after* the train has passed their location and exploded them.

This practice means that the worker is protected because a train has just passed and another train cannot enter the area as the signalling system holds the preceding signals to stop until the previous train has passed beyond the signalling system safety overlap. This is a deliberate and considered practice and is what the OHS is required to do during a TWA using handsignallers only. However, it was not applied in this instance.

The actions of the JHG PO in directing the OHS to retrieve the RTS before the arrival of train, with no indication of the train's whereabouts, placed that worker in direct risk of being struck. It was also not an approved action under the Network Rules and Procedures for TWA.

The JHG PO indicated that it was common to adopt this practice during use of a TWA and had been done so many times before.

Sydney Trains have acknowledged that this was not an approved practice under the rules and procedures for TWA but that its use was known by the Safety Division of the organisation at the time of the incident.

Removal of railway track signal protection during a Track Work Authority

The JHG PO said that it was his clear intention to ask the handsignallers on the Up Main to remove their RTS to allow rail traffic to pass through the worksite unimpeded. This intention was conveyed to both handsignallers at their pre-work briefing at the site shed at Dora Creek station prior to them leaving for their designated locations.

For the OHS, this meant they were being asked to enter the Danger Zone, while a train was on its way towards them at track speed, in order to retrieve the RTS.

Evidence provided from the OHS log indicates that of the 14 trains that travelled through the section since the TWA was granted at 0650 until the near hit incident at 1526, 11 of those trains were allowed to 'run free', that is, the protection was removed prior to the arrival of the train.

This practice places the OHS in danger, as the worker is being asked to enter the Danger Zone alone with no other specified form or method of protection to remove the RTS while a train is moving towards them at track speed.

The OHS said that as he reported the near hit to the PO, he heard the PO say over the radio he should have informed the OHS that there was a train closely approaching". However this could not be verified as these radio transmissions were not recorded.

Evidence provided by Sydney Trains Network Rules Unit for this investigation indicated that the practice of removing the protection while the TWA was in force, was not an approved activity under the RailSafe Network Rules and Procedures. The practice of removing the protection effectively fulfils the TWA each and every time it occurs. If protection is removed to allow trains to run unimpeded, then effectively there is no TWA in place.

Sydney Trains Network Rules Unit indicate they were aware of the non-conforming practice at the time and have since provided instruction to the portion of its workforce where this type of protection is used more commonly that it is not an approved practice. Sydney Trains also undertook to revise the Network Rules and Procedures to make it clear that this practice is not acceptable.

Making a safety assessment

The common rule for all work on track is NWT 300 Planning Work in the Rail Corridor. That rule says, among other things, that work in the rail corridor must be planned and a safety assessment made by the PO. The manner of recording information about the safety assessment and the way the assessment is conducted is not described in the rules.

One of the factors involved in the use of a TWA is the placement of the handsignallers. NWT 300 states in part:

> 'When making a safety assessment, Protection Officers must consider, amongst other factors, if:
>
> - Easily-reached safe places will be available for workers…'

The PO for this work made their safety assessment from the site office next to Dora Creek station. No attempt was made to visit the site to understand if there was an easily reached safe place for the OHS or if the location provided suitable visibility for the OHS to see, and be seen by, approaching rail traffic

Evidence provided for this investigation revealed that the PO for this work was on site from Monday 4 May to Thursday 7 May 2020, working afternoon shift 1600 – 0200, and that there were opportunities to visit the site to establish that it was suitable for the task.

There was no overt instruction provided by JHG to the PO for this purpose. During the review by the JHG internal safeworking advisor, there was no indication that the adequacy of the safety assessment was checked or validated.

The location of the outer handsignaller

While NWT 300 does not mandate that a site visit is required by a PO when undertaking the safety assessment, the PO was not able to confirm how he verified that the safety assessment for the site chosen for the OHS was suitable. NPR 702 is quite specific in terms of the placement of handsignallers when using handsignallers only. It states:

> 'Protecting Worksites using handsignallers only
>
> Protection Officer
>
> 3. Choose locations where handsignaller, Drivers and Track Vehicle Operators can see each other clearly…'

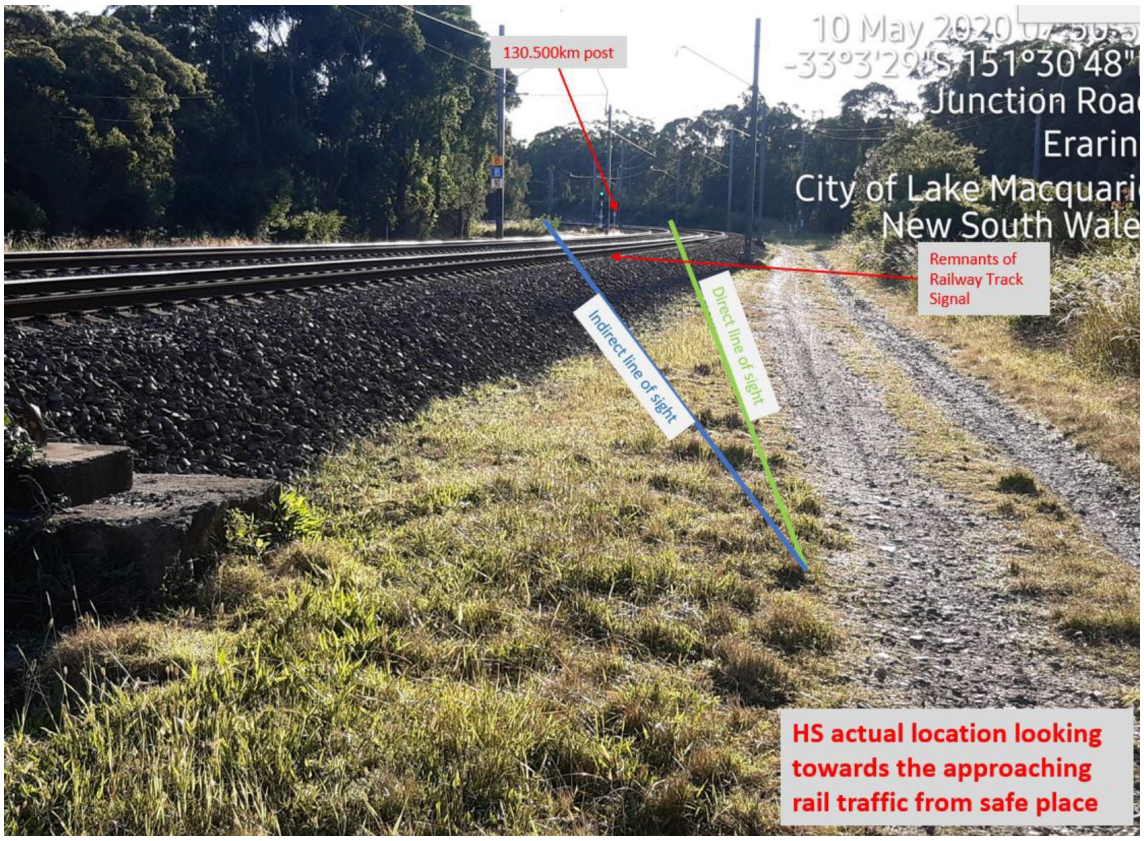
Evidence provided from the OHS was that at approximately 0900 he relocated himself approximately 50 - 100 m closer to the worksite, that is in a southerly direction, in order to establish better sighting distance with rail traffic on the Up Main. The reason for the relocation was a train standing at signal E1 on the Down Main line awaiting authority to proceed.

A train in this position on the Down Main obscures rail traffic approaching in the Up direction as the stationary train impedes visibility around the left hand curve. Figure 2 below shows the location where the OHS was stationed and the impact of a train standing at signal E1.

The location of the OHS was noted on the WPP as at 130.500 km, however the position the OHS adopted after relocation at 0900 was closer to 130.380 km.

The OHS decision to relocate was made without consultation or knowledge of the PO and placed the OHS slightly within the required 2500 m distance to the inner handsignaller, who was located at 128.000 km. This is a technical breach of NPR 702, however there is no evidence to suggest it had an adverse effect on the worksite protection.

Figure 2: View from the outer handsignaller's original location



Source: John Holland

Communications between the Protection Officer and handsignallers

The OHS described some of the radio communications between the PO and the various handsignallers as confusing and ineffective. The OHS described having to clarify the arrangements with the inner handsignaller for the Up Main TWA in order to confirm who instructions were being given to at particular points in time.

The OHS reported that formal open channel radio protocols as described in the RailSafe Network Rules and Procedures NGE 204 and NPR 721 were not being used, and that the communication was casual and unclear. It was not possible to validate this assertion with certainty as these open channel radio transmissions were not recorded.

Competency of workers at CSC

The CSC question set did not test whether the placement of the handsignallers met the requirements of the Network Rules and Procedures in terms of visibility between the handsignaller and drivers of approaching rail traffic.

Operators at the Sydney Trains CSC are required to possess safeworking qualifications. The required qualification at a minimum is PO2. To implement a TWA as a method of protection requires a PO3 or above qualification. Of the 12 CSC operators, 9 were (as at July 2020) PO2 level only. The CSC operator who took the call from the PO at Dora Creek was a PO2 at the time of the incident.

The operators at the Sydney Trains CSC were, in some cases, providing advice and support to POs about methods of protection they could not implement given their current level of qualification (PO2).

Knowledge and awareness of the various review and approval processes

A common factor across Sydney Trains review processes that form part of the approval for worksite protection examined through this investigation, was that they did not appear in the training materials and courseware for PO training which raised questions as to how POs and contract POs in particular are made aware of review process requirements.

The courseware for Sydney Trains PO 4 training did not reference the APS system or the Major Works review process for the use of Lookout Working, nor the ASB peer review process. There was one reference to the CSC, and that was in relation to being able to seek support through a rail safety coach. There was no reference to requirements to submit WPP details for review by the CSC.

The applicable review processes for worksite protection approval, require POs to do a range of things in relation to the planning and delivery of their proposed worksite protection arrangements, but they were not routinely provided with any training or support material to make them aware of and competent to do these tasks.

The applicable review processes do exist in various forms outside of the Network Rules and Procedures, including in memos, newsletters, and internal Sydney Trains procedures. However, given they are outside of the Network Rules and Procedures then if changes are made to them, there is no assurance that changes would be notified to people that need to know and understand them, like a contract PO.

Changes to Sydney Trains Network Rules and Procedures are communicated to employees through defined and comprehensive change and communication processes which are distributed more broadly through a subscriber mailing list. However not all contractors are on this distribution list.

The rail industry, like many industries, relies upon an extended supply chain rather than purely in-house resources. As a result, many POs are contractors and do not have ready access to internal information resources like an employee would.

Changes to auxiliary processes that support worksite protection rules and procedures, like the ones made for review processes involving the CSC and APS in this incident, were not communicated to the JHG contract PO and as a result, there is little assurance that JHG or other contractors who need to know this information received it.

Without ready access to information and training about Sydney Trains review processes that sit out side of the Network Rules and Procedures, there is an increased risk of errors and mistakes occurring in the planning, preparation and delivery of worksite protection services. An integrated set of training materials and processes to communicate changes to contractors are essential to ensure all workers, employees and contractors alike, are aware of and competent to provide worksite protection services on the network.

Prohibitions in the Network Rules

The RailSafe Network Rules provided instruction about the required responses during the use of the various work on track rules. The rules are predicated on the basis of instructing people what they must do in order to deliver the desired safe outcome and are not based, for the most part, on informing people what they cannot or should not do, as it is not possible to identify each and every undesired practice for the application of the rule or procedure.

But, there are exceptions to this in some rules, for example in Lookout Working NWT 310, contains a specific prohibition on the use of radios and telephones.

‘Lookouts must:

- Not use radios or telephones to warn workers….’

This prohibition was included in the rule because it is a known practice that compromises the safe outcomes intended by the rules and there is a desired need to specifically tell people about the prohibition. Other rules are silent on prohibited or undesired practices and rely on the description of the approved practices to deliver the desired safe outcome.

Workload

The interruptions to the work because of the cancellation of Lookout Working and the need to implement a new type of protection on the Down Main, incurred delays to the work and caused an increase in the workload for the PO. At interview, the PO acknowledged the workload increase, but did not report that it was beyond his capability to manage and did not believe it contributed to the incident involving the OHS later in the afternoon. The investigation determined that it was unlikely that the workload level of the PO contributed to the incident.

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.

Safety issues are highlighted in bold to emphasise their importance. A safety issue is a safety factor that (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.

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 safeworking occurrence involving NSW Trains 283D and an OHS near Dora Creek NSW, 9 May 2020.

Contributing factors

- **There was an unapproved practice occurring during Track Work Authority of asking the Outer Handsignaller to remove Railway Track Signals from the track as a train was closely approaching in order to let it run free, which placed the Outer Handsignaller at risk of being struck by the train. (Safety issue)**
- The Outer Handsignaller, under direction from the Protection Officer, removed the Track Work Authority Railway Track Signals while a train was heading towards their location.

Other findings

- Sydney Trains Protection Officer training and competence assessment did not address a number of important operational safety processes, such as the Corridor Safety Centre, making sure these workers get the information they need.
- The various processes used to register, review and approve the Worksite Protection Plan did not detect some basic deficiencies that impacted its effectiveness such as a site visit to determine safe place location.
- The operators at the Sydney Trains Corridor Safety Centre were, in some cases, providing advice and support to Protection Officers about methods of protection they were not certified to implement.
- NPR 709 requires placement of Railway Track Signals on the right hand rail in the direction of travel of rail traffic, often placing the worker in the Danger Zone of the adjacent line.
- The workload of the Protection Officer increased signifcantly during the day because of the cancellation of the pre-arranged Lookout Working by Sydney Trains Major Works and the Sydney Trains Absolute Signal Blocking Peer review process, meaning Absolute Signal Blocking was not available because of the lack of a peer review person.
- The Sydney Trains Absolute Signal Blocking peer review process effectively prevented use of this method in certain parts of the network unless an additional person was provided and present to conduct the review.

Safety issues and actions

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues. The ATSB expects relevant organisations will address all safety issues an investigation identifies.

Depending on the level of risk of a safety issue, the extent of corrective action taken by the relevant organisation(s), or the desirability of directing a broad safety message to the rail industry, the ATSB may issue a formal safety recommendation or safety advisory notice as part of the final report.

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 or are planning to carry out in relation to each safety issue relevant to their organisation.

The initial public version of these safety issues and actions will be provided separately on the ATSB website on release of the final investigation report, to facilitate monitoring by interested parties. Where relevant, the safety issues and actions will be updated on the ATSB website after the release of the final report as further information about safety action comes to hand.

All of the directly involved parties were provided with a draft report and invited to provide submissions. As part of that process, each organisation was asked to communicate what safety actions, if any, they had carried out or were planning to carry out in relation to each safety issue relevant to their organisation.

The initial public version of these safety issues and actions are provided separately on the ATSB website, to facilitate monitoring by interested parties. Where relevant, the safety issues and actions will be updated on the ATSB website as further information about safety action comes to hand.

Unapproved practice during TWA

There was an unapproved practice occurring during Track Work Authority of asking the Outer Handsignaller to remove Railway Track Signals from the track as a train was closely approaching in order to let it run free, which placed the Outer Handsignaller at risk of being struck by the train.

Issue number:	RO-2020-006-SI-01
Issue owner:	Sydney Trains
Transport function:	Rail: Infrastructure
Current issue status:	Open - Safety action pending
Issue status justification:	Sydney Trains have included this issue in their change request process for Network Rules. The amendment will be to reinforce the existing requirement in step 12 of NPR 702 as it relates to a TWA using an inner and outer handsignaller protection, in that both the inner and outer protection must be replaced immediately after the passage of each rail traffic movement.

Proactive safety action taken by Sydney Trains

Action number:	RO-2020-006-NSA-002
Action organisation:	Sydney Trains
Action status:	Open

Sydney Trains acknowledged through correspondence that the practice of asking the Outer Handsignaller to remove protection while a train is approaching is not an approved practice within the rules and procedures for Track Work Authority.

Sydney Trains have included this issue in their change request process for Network Rules. The amendment will be to reinforce the existing requirement in step 12 of NPR 702 as it relates to a Track Work Authority using an inner and outer handsignaller protection, in that both the inner and outer protection must be replaced immediately after the passage of each rail traffic movement.

ATSB comment

ATSB notes that Sydney Trains are taking action; this action, when completed, should address the safety issue.

General details

Occurrence details

Date and time:	9 May 2020 – 1526	
Occurrence category:	Incident	
Primary occurrence type:	Safeworking – near hit with worker	
Location:	Dora Creek, New South Wales	
	Latitude: 26º 16.464' S	Longitude: 133º 45.508' E

Train details

Track operator:	Sydney Trains	
Train operator:	NSW TrainLink	
Train number:	283D	
Type of operation:	Passenger	
Consist:	H40	
Departure:	Newcastle (Wickham)	
Destination:	Sydney	
Persons on board:	Crew – 2	Passengers – Unknown
Injuries:	Crew – nil	Passengers – nil
Damage:	None	

Sources and submissions

Sources of information

The sources of information during the investigation included:

- Sydney Trains recorded audio
- Sydney Trains data logger report
- Sydney Trains Incident Information Management System (IIMS) reports
- Sydney Trains RailSafe Network Rules and Procedures
- John Holland 5 Whys investigation report and statements
- Swetha International Investigation report and statements
- TfNSW training material for Protection Officers and Handsignallers
- Interview with the Protection Officer
- Interview with the Outer handsignaller.

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:

- Sydney Trains
- John Holland Pty Ltd
- NSW Trains
- Swetha International Pty Ltd
- Transport for NSW
- Office of the National Rail Safety Regulator

Submissions were received from all of these parties. The submissions were reviewed and, where considered appropriate, the text of the report was amended accordingly.

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.

Table of abbreviations

APS	Access Pre-Advice System
ASB	Absolute Signal Blocking
ATWS	Automatic Track Warning System
CSC	Corridor Safety Centre
JHG	John Holland Group
NCO	Network Control Officer
NGE	Network Rule General
NPR	Network Procedure
NWT	Network Rule Work on Track
OHS	Outer Hand Signaller
PO	Protection Officer
RIM	Rail Infrastructure Manager
ROC	Rail Operations Centre
RTS	Railway Track Signals
TOA	Track Occupancy Authority
TWA	Track Work Authority
WPP	Worksite Protection Plan