

Rail Safety Investigation

Report No 2012/06

Safeworking irregularity and near miss incident

Passenger train and track maintenance machine

near Kilmore East

21 September 2012

Investigation Report Front Cover Photograph of the Maintenance Machine

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The Chief Investigator

The Chief Investigator, Transport Safety is a statutory position under Part 7 of the *Transport Integration Act 2010*. The objective of the position is to seek to improve transport safety by providing for the independent no-blame investigation of transport safety matters consistent with the vision statement and the transport system objectives.

The primary focus of an investigation is to determine what factors caused the incident, rather than apportion blame for the incident, and to identify issues that may require review, monitoring or further consideration.

The Chief Investigator is required to report the results of an investigation to the Minister for Public Transport or the Minister for Ports. However, before submitting the results of an investigation to the Minister, the Chief Investigator must consult in accordance with section 85A of the *Transport (Compliance and Miscellaneous) Act 1983*.

The Chief Investigator is not subject to the direction or control of the Minister in performing or exercising his or her functions or powers, but the Minister may direct the Chief Investigator to investigate a transport safety matter.

Executive Summary

On the morning of 21 September 2012, a works crew contracted by the Australian Rail Track Corporation (ARTC) was engaged in replacing ballast on the standard-gauge line near Kilmore East. Workers were initially positioned at two sites about four kilometres apart. Ballast was to be transferred on-track from the 58 kilometre to the 62 kilometre location at which ballast replacement works were to be undertaken.

At the pre-work safety briefing the crew were informed that once the Albury-bound V/Line passenger train had passed through the worksite at about 0800, the Track Force Protection Coordinator would travel from the 58 to the 62 kilometre location and once there, provide permission for the works crew to occupy the track. However, mobile phone conversations, between the Coordinator—still at the 58 kilometre location—and workers waiting at the 62 kilometre location were misunderstood, resulting in an excavator commencing to access the track prior to the train clearing the worksite. The excavator was foul of the track when the train came around a curve about 300 metres from the worksite. On sighting the excavator, the train driver sounded the locomotive horn alerting the operator to his presence and the excavator was able to reverse away from the track before the train—travelling at about 40 km/h—passed.

The investigation found irregularities with the implementation of the rules for track occupation. This led to on-track activity with a train still in the protection zone. Since the incident the ARTC and the company in charge of safeworking at this site have initiated safety actions to clarify track protection procedures. The investigation has recommended that the applicable Code of Practice also be updated to improve clarity and that the ARTC reviews its rules for safety supervision on multiple worksites under common protection.

The investigation also found that communications discipline was deficient—leading to the misunderstanding—and makes recommendations aimed at strengthening safeworking communications protocol and practices.

# Circumstances

On 21 September 2012, a works crew contracted by the Australian Rail Track Corporation (ARTC) was engaged in replacing ballast near Kilmore East, at around the 62 kilometre location on the Victorian North-East line; part of the Defined Interstate Rail Network (DIRN). The work involved transporting ballast by Hi-Rail[[1]](#footnote-1) dump truck from a ballast stockpile near the 58 kilometre location and Hi-Rail excavators undercutting[[2]](#footnote-2) and replenishing ballast at the 62 kilometre location (Figure 1).

The works were planned to be undertaken between train movements. Track Force Protection—extending between the 55.5 kilometre and 70.3 kilometre locations—was in place under the control of a Track Force Protection Coordinator (TFPC) employed by a contract safeworking agency. The operation of the on-track machinery was being supervised by a Work Group Supervisor (WGS) employed by the works contractor.

Safeworking communications between the TFPC and track force protection personnel was by closed-channel UHF radio[[3]](#footnote-3)whereas communications between the TFPC and the WGS, and the plant operators was by way of CB radio[[4]](#footnote-4). Radio communication was affected by the undulating and lightly wooded terrain. The track curved at several points and the line-of-sight at the 58 and 62 kilometre locations was less than one kilometre in each direction.

The TFPC conducted a pre-work safety briefing that morning, involving all workers at the site. This was designed to inform the crew of train movements for the day, the plan for the management of Track Force Protection, radio frequencies for communications, and the ‘windows of opportunity’ during which track work could occur. The work group was informed that after three approaching trains had cleared the section, work could commence.

The first two trains passed through the site prior to 0800. Upon the third train—an Albury-bound passenger train—passing the 58 kilometre location, the TFPC informed a Hi-Rail dump truck at that location via CB radio, that it could access the track. The message was heard by a Hi-Rail excavator operator at the 62 kilometre location who thought it might have been addressed to him. Even though clarification was sought, the excavator operator subsequently commenced to on-track shortly before the passenger train appeared around a curve about 300 metres distant. Upon hearing the locomotive horn being sounded, the operator moved the excavator just in time to prevent a collision occurring; the passing distance reportedly being around two metres.

The near-miss was reported by the locomotive driver to ARTC Network Control at Junee and the network controller then informed the TFPC of the incident and ordered all work to cease pending the arrival of ARTC investigators.

The weather was dry with clear visibility and a light west-south-westerly wind.

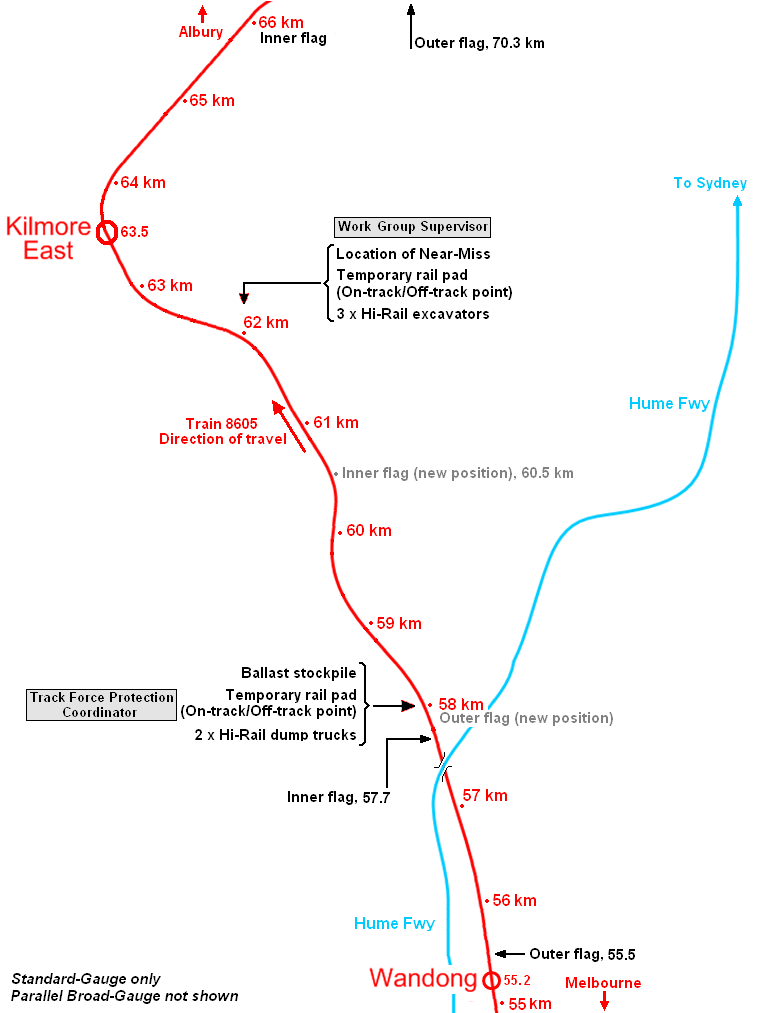


Figure : Diagram of the general works area depicting the position of personnel and machines at the time the Albury-bound train passed the 58 kilometre point.

# Factual Information

## Sequence of events

Following is the sequence of events on the morning of 21 September 2012:

0605 The TFPC reported for duty at the 58 kilometre location and obtained train running information from the network controller at Junee.

0630 A pre-work safety briefing—attended by all works crew at the site—was conducted by the TFPC.

0638 The Melbourne-bound XPT passenger train passed through the section and then track force protection was implemented.

The WGS and his assistants drove by road to the 62 kilometre location.

Once protection was established, one Hi-Rail excavator moved on-track and transferred from the 58 to the 62 kilometre location where it then moved off-track.

0732 The Melbourne-bound freight train passed through the section (track force protection was lifted on the approach of this train).

0813 to 0816

The Albury-bound V/Line passenger train entered the section. The flagpersons at the Melbourne end resumed protection when the train passed them.

The passenger train passed the 58 kilometre location and the TFPC informed the Hi-Rail dump truck at the 58 kilometre location by way of CB radio to get on track. This message was also heard by the excavator operator at the 62 kilometre location.

This excavator operator commenced to move his machine on-track but stopped short and requested confirmation from the WGS as to his authority to proceed. The WGS then called the TFPC by mobile phone to confirm whether they could occupy the track (the WGS and TFPC have conflicting versions of this conversation).

The WGS confirmed to the excavator operator that he was clear to move on-track, and the operator commenced doing so.

Part-way around a curve—approaching the worksite at the 62 kilometre location—the locomotive driver observed the excavator to be foul of the track, sounded the locomotive warning horn and made an Emergency brake application.

The excavator operator heard the horn-blast and reversed his machine away from the track.

0817 The V/Line train passed the excavator, reportedly with about two metres clearance. The locomotive driver then released the Emergency brake application and resumed normal running without stopping the train.

## Ballast replacement project

### Scope of work

The ballast replacement project undertaken by the ARTC had commenced at Beveridge at around the 48 kilometre location about two months prior and was progressing towards Albury. These works were part of a project to remedy a deterioration in the quality of the track on the Victorian North-East sector of the DIRN.

The project was overseen by an ARTC site supervisor and the work group consisted of:

* The TFPC and six flagpersons supplied by Melbourne contractor Safe Working Solutions.
* The WGS and two assistants supplied by Dubbo (NSW) contract company CR Rail.
* One Hi-Rail dump truck, two front-end loaders, and three Hi-Rail excavators supplied by several contractors.

The TFPC, with the assistance of the flagpersons, was responsible for providing Track Force Protection to the work group. Access onto the track was subject to safeworking clearance being provided by the TFPC.

On the day of the incident, ballast was being replaced under the bi-directional standard-gauge line. The intention was for the remainder of the ballast stored near the 58 kilometre location to be shifted to the 62 kilometre location after which the dump trucks would move their base to the ballast pad at the 66 kilometre location.

As part of the contractual arrangements, the track workers were paid a stand-by rate when idle and a higher rate when actively working on-track. This was mentioned several times by workers interviewed.

### Train movements

Ten train movements per day were typically scheduled through the works location. There were usually two early morning train movements prior to the works crew reporting for duty followed by the Melbourne-bound XPT sometime between 0630 and 0645. There was then a short period during which the crew could access the track before the passage—at about 0800—of a Melbourne-bound freight train followed by an Albury-bound passenger service. After that there were no train movements until about 1230. Between 1230 and 1800 there were typically another five train movements scheduled through the location.

Although the maximum line speed through this section was 130 km/h, a Temporary Speed Restriction (TSR) limited train speed to 60 km/h.

### Safety briefing

On the day of the incident, the pre-work safety briefing took place at the 58 kilometre location at about 0630, attended by all works crew although the investigation found that not all the workers present had signed the attendance sheet.

The TFPC informed the works crew that after the Melbourne-bound XPT passed—at about 0630—the track protection crew would move to their allocated positions and one excavator currently parked near the 58 kilometre location could travel to the 62 kilometre and remain off-track until the next two trains had passed at around 0800.

Following this the plan was for the Track Force Protection crew to move into position, after which the dump truck at the 58 kilometre location would transport the last of the ballast from that pad to the worksite at the 62 kilometre. Once this vehicle arrived at the 62 kilometre location, flagpersons on the Melbourne side would be moved north and the TFPC would transfer to the 62 kilometre to provide permission for the track machines to occupy the track.

### Track force protection

On the morning of the incident the TFPC applied the following protection on the standard-gauge line in accordance with standard requirements[[5]](#footnote-5):

* 55.5 kilometre location – outer flagperson and audible track warning signals (ATWSs) [[6]](#footnote-6)
* 57.7 kilometre location – inner flagperson
* 66.0 kilometre location – inner flagperson
* 70.3 kilometre location – outer flagperson and ATWSs.

In addition, there was one flagperson stationed beyond Kilmore East Station at the 64.1 kilometre location on the Up[[7]](#footnote-7) broad-gauge line with another standing-by to place ATWSs at the 58 kilometre location. As soon as the Albury-bound passenger train passed the flagpersons at the Melbourne end, they set up protection to permit the Hi-Rail dump truck to on-track and transfer to the 62 kilometre location. The intention was to re-locate the flagpersons at the 55.5 kilometre and 57.7 kilometre locations to the 58 and 60.5 kilometre locations respectively once the dump truck operator notified them that the truck was clear of the track.

### Communications

The TFPC was using two UHF-band radios; a closed-channel safeworking radio to communicate with the flagpersons and a public-channel CB radio to communicate with the works crew. The investigation was informed that UHF-band radio communications was known to be unreliable in the area so the back-up communication plan was for the TFPC and WGS to use their personal mobile telephones.

Radio checks on the safeworking and CB radios were not carried out at the start of the day to confirm the clarity of communications. The investigation was informed that radio checks were not conducted as a matter of course and radio etiquette (see section 2.5.2) was generally informal.

## Personnel

### Track Force Protection Coordinator

The Track Force Protection Coordinator (TFPC) started as a Level 2 rail safety worker[[8]](#footnote-8) in 2007 and had worked predominantly within the Broadmeadows-to-Wodonga rail corridor. For the previous three and a half years he had been a Level 3 rail safety worker[[9]](#footnote-9) and was employed by Safeworking Solutions as a safeworking coordinator. At the time of the incident his safeworking qualifications were current and appropriate for the role of TFPC.

The TFPC said that this was his third day at work after returning from rostered leave. On the previous two days he worked from about 0600 to 1730 each day.

On the day before the incident the TFPC requested that his company provide an additional Level 3 safeworker to be stationed at the 62 kilometre location. However, this request was denied and he was not provided with any guidance on how to re-deploy the existing safety workers. He therefore decided that on-track access at the 62 kilometre location would be delayed until after the section of track subject to Track Force Protection had been shortened and he could position himself at that location. He stated that he felt some degree of pressure from the works crew to keep the job progressing.

The TFPC stated that when the Albury-bound passenger train passed the Melbourne-end flagpersons they proceeded to establish Track Force Protection. The TFPC made a general CB radio call stating that there was a train in the work zone, but received no acknowledgement from the works crew at the 62 kilometre location.

Immediately after the train had passed the 58 kilometre location the TFPC spoke on the CB radio to the dump truck driver also at the 58 kilometre location, advising him that he could get on track. He then assisted the flagperson at the 58 kilometre location to position ATWSs in preparation for the move of the Melbourne-end protection. He stated that he also advised the truck driver to call him once he had reached the 62 kilometre location so that he could commence shortening the protection zone.

The TFPC was still at the 58 kilometre location when he received a call from the WGS on his mobile phone. His recollection of the conversation was that the WGS asked him whether they (the work group) would ‘get that window to get on-track’ and he replied that they would as soon as the train had gone past.

A few minutes later, the Junee network controller called the TFPC and informed him that the driver of the passenger train had reported a near-miss with an excavator at the 62 kilometre location and that the entire work group must be stood down immediately pending an investigation. The TFPC transmitted the instruction to the WGS by mobile phone and then travelled by road to the work site. He stated that when he arrived there he found the group still working on the track and repeated the network controller’s instruction. A few minutes later all vehicles, equipment and personnel had been cleared from the track and a safety debriefing was held. The work group then waited until the arrival of ARTC investigators.

### Excavator operator

The operator of the excavator stated that he attended the pre-work safety briefing on the morning of the incident and was aware that he had to drive his machine on-rail from the 58 kilometre to the 62 kilometre location after the Melbourne-bound XPT had passed, and then wait until the next two trains had also passed before occupying the track. He was also aware that he had to wait for the TFPC’s authority before proceeding. He stated that he had been working on this project for a few weeks and there was an underlying pressure to keep the job progressing.

Sometime after the Melbourne-bound freight train had passed, he heard the TFPC on the radio say something to the effect that ‘you are good to go on’, and assumed that he had been given permission to access the track. He had started moving his excavator towards the track when he recalled the TFPC saying that there were two trains to go through so he stopped and asked the WGS (who was also at the 62 kilometre location) to confirm the instruction because ‘there was a second train to go’.

He stated that the WGS called the TFPC via mobile phone after which the WGS’ assistant informed him that he was cleared to access the track. The excavator had just reached the tracks when the operator heard the locomotive warning horn, saw the train approaching, and immediately reversed his excavator away from the tracks.

The excavator operator stated that, after the train had passed, he was told to resume work and stopped only when the TFPC arrived and informed the group that due to the near-miss they had been ordered off the track and to await the arrival of investigators.

### Work Group Supervisor

The WGS had about 10 years experience as a rail safety worker, mainly in New South Wales. He was a qualified Level 3 Protection Officer in New South Wales which was accepted in Victoria as an appropriate level of track safety awareness when carrying out the role of WGS. He had started on this project the previous day.

The WGS attended the pre-work safety briefing and was aware that his works crew had to wait until the two trains due at around 0800 had cleared the section. He stated that he was sitting in his vehicle with his assistant when he heard the TFPC on the CB radio say what sounded like ‘guys, you are good to go’.

The WGS stated that at this point the excavator operator came up to him and asked him to confirm the instruction. The WGS called the TFPC by mobile phone and switched it to speaker-mode. His recollection of the conversation is that they were told they could access the track, with one truck on its way. The WGS stated that he repeated the question and was again told ‘yes’. His assistant then informed the excavator operator that he could access the track.

The WGS said he called the TFPC as soon as the incident occurred and was told in reply to ‘stay clear’ until he (the TFPC) arrived at the site. The TFPC phoned the WGS a few minutes later to inform him they would all have to stand down and await the ARTC investigation team. The WGS stated that the track was then tamped and certified and all plant removed.

### Locomotive driver

The locomotive driver stated that on his approach to Kilmore East he did not notice any track force protection. As he rounded the curve about 700 metres from Kilmore East Railway Station, he noticed a track machine on or near the line but could not be sure due to the scrub partly obscuring his view. He sounded a ‘long whistle’ and when the train came around the curve he saw the excavator backing off the track with its boom still foul.

At this point the driver made an Emergency brake application. The excavator backed away from the track and the driver estimated that the train was about 30 metres away when the boom was clear. The driver was able to release the brakes without stopping. He reported the incident to the network controller and also informed them that he was ‘okay to continue’.

## The train

### Consist

The train involved in the incident comprised an N-Class diesel-electric locomotive hauling a power van and five passenger cars. There were 51 passengers on board at the time of the incident. The train had a total length of 157.7 metres and a total mass of about 450 tonnes.

The locomotive’s event recorder indicated that it was travelling at approximately 60 km/h when it passed the 58 kilometre location. At 0816:48 the driver sounded the ‘country horn’[[10]](#footnote-10) and made an Emergency brake application. Seventeen seconds later, the Emergency brake application was released and power was reapplied. The train passed the excavator at a speed of about 40 km/h.

### Train air braking

**Emergency brake configuration**

The Emergency position of the automatic brake valve is used by the locomotive driver upon encountering a track or operating condition that requires a rapid and immediate out-of-course stop. The design intent of Emergency air braking is to provide a braking outcome that is more effective than maximum Service braking.

V/Line N-Class locomotives are fitted with North American equipment derived from a system developed by the Westinghouse Air Brake Company (now Wabtec) and adapted for use around the world. For reasons unknown to the investigation, the braking arrangement fitted to V/Line locomotive-hauled trains is not configured to provide a significantly more rapid or higher braking force for an Emergency air brake application compared to a Full Service one. Neither does the arrangement include a delayed-Emergency release feature that ensures the Emergency application is held for a minimum duration (typically about one minute) before a release is possible. This latter feature is designed to ensure the train stops before the brake can be reset and released.

**Emergency brake operation**

Westinghouse (now Wabtec) and rail operators require—out of a concern for the safe operation of the air brake system—that locomotive operating personnel bring their train to a complete stop following an Emergency brake application. However, V/Line places no such instructive requirement upon its locomotive drivers.

The locomotive driver in this incident—confronted with what presented as a potential collision—reacted appropriately by immediately setting an Emergency brake application. By the time his locomotive came into the potential sphere of collision, the excavator operator had moved the machine sufficiently clear that this was averted. With the immediate crisis now past and seventeen seconds after making the Emergency application, the locomotive driver released it, re-applied power, and continued on. The train did not stop and V/Line procedures did not require that it do so.

## Track operations and safeworking

### Track force protection

Section 15 of the *ARTC Code of Practice for the Victorian Main Line Operations* (TA20) provides that Track Force Protection must be instituted prior to any person, machine or obstruction being placed or work being carried out on a running line. Rule 3(b) of this section of the Code details how the protection is to be provided, stating that there must be an outer flagperson and an inner flagperson placed beyond the obstruction, to warn of an approaching train even if a train is not expected, and that protection can only be withdrawn when the obstruction has been removed.

This ARTC rule implies that on a single line, protection must be provided in both directions (as trains may approach from either direction) and that the train be clear of the protection zone prior to occupying the track. The rule is, however, not explicit in describing when track can be re-occupied following the passing of a train.

### Communications protocol

The investigation found that TA20, the ARTC code that applied in Victoria, did not address communications protocol, therefore in this instance there were no applicable guidelines for the workers at this site. However, Section 3.7 of the ARTC *Code of Practice for the Defined Interstate Rail Network*[[11]](#footnote-11)that applied to the DIRN in other areas of the ARTC network provides, in part, that when using voice communications over radio, satellite or mobile phone:

* Communication equipment shall be tested and checked for their intended operation before use.
* When offering a message or making contact, unique and positive identification shall be used.
* When receiving a message the called party shall not delay the acknowledgement unless it interferes with duties relating to safety.

This Code also specifies that, when transmitting and receiving, the caller and the receiver must establish their identities before there is an exchange of messages and that workers shall use standard radio terminology in their communications.

Communications protocols similar to the ARTC national code have been applied in other Victorian metropolitan and regional rail networks with an additional requirement that the caller shall ensure the recipient read-back the significant parts of the message to ensure it is clearly understood. This is also common practice in safety critical communications in other modes of transport.

### Practices to counter unreliable radio reception

This investigation was informed that in areas of poor UHF reception it is common practice among rail track workers to use mobile telephones as a back-up communication method. In other cases, particularly in mobile telephone ‘black-spots’, it was usual to position one or more intermediate radio operators to relay radio messages.

# Analysis

## The incident

It was necessary for regularly-scheduled trains to be permitted to continue to operate through the location, and works were being conducted under a Joint Occupancy Permit[[12]](#footnote-12). Joint Occupancy carries significant risks that require carefully considered management.

When the Albury-bound passenger train passed the 58 kilometre location, the TFPC informed a Hi-Rail truck driver at that location that he (the truck driver) could place the truck on-track. The message was overheard by workers at the 62 kilometre location and this was the trigger for the events that led to this near-miss incident.

Personnel working at the site had been briefed that a third train (the Albury-bound passenger service) was to pass prior to work commencing and the excavator driver was sufficiently aware of this instruction to query the message he had overheard. However, in seeking clarification, communication between the WGS and TFPC proved to be ineffective.

The content of the mobile phone conversation between the WGS and TFPC is disputed and it is likely that reception at either or both ends was not clear. It is concluded that communications etiquette was informal and lacked the rigour normally associated with safety critical communications. It is also surprising that the WGS did not explicitly query the location of the expected passenger train or the variation to the plan that had required the TFPC to be at the 62 kilometre location prior to providing occupation of the track.

Following the ineffective attempt to clarify safeworking instructions, the decision was made by workers at the 62 kilometre location to occupy the track. This decision may have been influenced by contractual arrangements and the difference between stand-by and working rates of pay.

After the near-miss had occurred, the TFPC informed the WGS to keep clear of the track, yet the works crew were told to continue their on-track activity and they stopped only when the TFPC reached the site and instructed them for the second time to clear the track.

## Radio communications

### Radio equipment

Both the safeworking and CB radios used on this day operated in the ultra-high frequency (UHF) band, requiring a clear line-of-sight for reliable communications. Due to the terrain, it was recognised that radio reception along this section of track would be unreliable. However, no consideration was given to testing reception at the start of the day and nor were intermediate radio operators added to improve reliability of safeworking communications. Due to reception being unreliable, the broadcast by the TFPC that a train was in the zone was missed by those at the 62 kilometre location.

The use of CB radio to deliver instructions on rail worksites is queried in the context of the potential safety implications. CB radio channels are shared by numerous users raising the potential for cross-communications with uninvolved parties. There are a number of alternative options and technologies available with the potential to improve the quality of safety critical communications, including providing access to the ARTC radio network.

### Voice communications

The occupation of track between scheduled train services by work groups at multiple adjacent work sites presents an elevated risk. The transmission of authority for track occupation needs to be reliable as errors can have significant safety consequences. However, in the absence of an applicable protocol, communication was informal and ineffective.

In the first instance, the instruction to the driver of the truck at the 58 kilometre location to occupy the track did not clearly identify the intended recipient. This led to the message being heard as possibly being relevant to others; in this instance the excavator driver at the 62 kilometre location.

In the second instance, the mobile telephone conversation between the WGS and TFPC that was intended to clarify permissions for track access was informal and inadequate. In order to avoid misinterpretation of safety critical messages, parties would be expected to use standard phraseology and read-back the significant aspects of the message to assure instructions are understood and confirmed. This explicit requirement to read-back instructions is a requirement on other Victorian networks and can improve the reliability of safeworking communication.

## Track Force Protection

The day before the incident the Track Force Protection Coordinator (TFPC) requested that an additional Level 3 worker be stationed at the worksite (the 62 kilometre location) as he (the TFPC) would be otherwise occupied at the 58 kilometre location and out-of-sight of the works crew. His company denied this request so the TFPC planned that work at the 62 kilometre location would not commence until he was physically present at the site. Had there been a safety worker stationed at the 62 kilometre location, in all probability that person would have ensured compliance with the provisions of the pre-work safety briefing.

In this instance the TFPC deemed it safe for works equipment (the dump truck) to occupy the track immediately behind the train, contravening the implied requirement of the ARTC safeworking code that protection be provided in both directions on a single line before track machines may occupy the track. The *ARTC Code of Practice for the Victorian Main Line Operations* (TA20) should be updated to reflect the intended meaning.

## Application of Emergency brake

It is a matter of concern that—after such a close call—the locomotive driver chose to and was able to promptly release the Emergency brake application and to continue without allowing the train to come to a stand. Under circumstances such as these, it is customary with this type of equipment that locomotive operating personnel will bring their train to a complete stop[[13]](#footnote-13). The reasons are two-fold: (1) coming to a stand ensures that the impact (or degree of involvement) of the train or locomotive in the threat that caused the driver to set the Emergency brake application is minimised, and the nature of the threat can be fully assessed before the train proceeds, and (2) stopping to release and recharge the air brake system before proceeding also affords time for it to recover from its depleted state and be conditioned to provide the next brake application whenever that might be required. V/Line locomotive-hauled train operating practices do not include the requirement to stop the train following a driver-initiated Emergency brake application and the installed air brake equipment is not arranged to enforce a stop.

# Conclusions

## Findings

1. The track was accessed by the Hi-Rail dump truck at the 58 kilometre location whilst the train was still within the protection zone.
2. The *ARTC Code of Practice for the Victorian Main Line Operations* (TA20) did not explicitly state when track maintenance machines may occupy the track after the passing of a train.
3. The *ARTC Code of Practice for the Victorian Main Line Operations* (TA20) did not include a communications protocol.
4. The excavator was permitted to occupy the track as a result of a misunderstanding between the Work Group Supervisor and the Track Force Protection Coordinator.
5. V/Line train operating practice does not require locomotive drivers to stop their train following a driver-initiated Emergency brake application.

## Contributing factors

1. The transmission of a broadcast radio message authorising occupation of the track without identification of the intended recipient, prior to the train having cleared the protection zone.
2. The lack of adequate communications discipline between the Track Force Protection Coordinator and the Work Group Supervisor resulting in the excavator operator being authorised to occupy the track when it was unsafe to do so.
3. The absence of safeworking personnel at the 62 kilometre location to supervise the safe occupation of track.

# Safety Actions

## Safety Actions taken since the event

### Australian Rail Track Corporation

The ARTC has informed all contractors that when Track Force Protection is used for ballast remediation undercutting activity, the danger zone is not to be accessed following the passage of rail traffic until the inner flagperson on the departure end of the worksite has reported that the rail traffic has exited the worksite limits and the safeworking person in charge authorises the activity.

### Safe Working Solutions

Safe Working Solutions has issued a Staff Bulletin stating that when Track Force Protection is used for track intrusion activity (track works), the danger zone is not to be accessed until the outer flagperson on the departure end of the worksite has reported that the rail traffic has passed that location and protection has been set. When confirmation has been received that the worksite has been protected, the safeworking supervisor may then allow access to the track.

In that Bulletin the company also advised safeworking supervisors to inform the company immediately if they believed safeworking staff allocated to them did not have the necessary experience or skills or the number of experienced staff assigned was inadequate to facilitate a safe work environment.

## Recommended Safety Actions

Issue 1

In this instance communication discipline was poor and it was not uncommon on projects of this nature for communication etiquette to be informal. Also, the *ARTC Code of Practice for the Victorian Main Line Operations* (TA20) did not specify a communications protocol.

RSA 2013011

That the Australian Rail Track Corporation includes a communications protocol in the *ARTC Code of Practice for the Victorian Main Line Operations* (TA20).

RSA 2013012

That the Australian Rail Track Corporation takes action to ensure that its contractors (including Safe Working Solutions and CR Rail) comply with protocol introduced for the conduct of safeworking communications.

Issue 2

The *ARTC Code of Practice for the Victorian Main Line Operations* (TA20) does not explicitly state when the track may be occupied following the passage of a train. Following this incident the ARTC informed its contractors that a train must have passed the inner flagperson at the departure end of the worksite before the track may be occupied.

**RSA 2013013**

That the Australian Rail Track Corporation includes a safety instruction in the *ARTC Code of Practice for the Victorian Main Line Operations* (TA20)stating explicitly when a track can be re-occupied by track force workers after the passage of a train.

Issue 3

The occupation of track between scheduled services by work groups at multiple sites under common protection presents an elevated risk and in this case was beyond the control of a single safeworking supervisor.

**RSA 2013014**

That the ARTC reviews its rules for supervision of work sites where there are multiple sites under common protection.

Issue 4

The air brake equipment manufacturer recommends that locomotive drivers should ensure their train is brought to a stand following any driver-initiated Emergency air brake application. This provides the driver with the opportunity to appropriately assess the situation that led to the decision to apply Emergency braking, and for the locomotive and train air brake condition to be properly restored in order to safely continue.

**RSA 2013015**

That V/Line considers adopting the standard requirement that locomotive drivers bring their train to a halt following any Emergency air brake application.

1. A road vehicle or road-driveable machine that has been modified to also travel on rail lines and that can be configured to travel in either mode (hence **Hi**ghway-**Rail**way). Sometimes also referred-to as a Road/Rail vehicle. [↑](#footnote-ref-1)
2. Clearing fouled ballast from beneath the track. [↑](#footnote-ref-2)
3. UHF radios operating on licenced UHF frequencies, not for public use. [↑](#footnote-ref-3)
4. Citizen’s Band radio is a short-range radio communications link between individuals on a selection of channels within the 27 MHz HF and 477 MHz UHF bands. The channels are open to public use. [↑](#footnote-ref-4)
5. Track force protection was implemented in accordance with *the ARTC Code of Practice for the Victorian Main Line Operations* (TA20*).* [↑](#footnote-ref-5)
6. A volatile device used as a warning signal to train and locomotive drivers. The device is placed upon the rail such that when crushed by the passage of a train or locomotive wheel, it produces an explosive noise. The device is also referred-to as a railway 'detonator'. [↑](#footnote-ref-6)
7. Towards Melbourne. [↑](#footnote-ref-7)
8. Level 2: 'Handsignalling'. For employees and contractors who conduct Handsignaller Level Two duties for protecting worksites on the rail network using hand signals and ATWSs but under the direct supervision of a Level 3 rail safety worker. [↑](#footnote-ref-8)
9. Level 3: 'Track Force Protection Coordinator'. This qualification allows the holder to conduct Track Force Coordinator duties for managing worksite protection on the rail network. Permitted activities include the instigation of track occupations, the operation of personnel protection (under live train running), and the supervision and coordination of large work groups. [↑](#footnote-ref-9)
10. The N Class locomotive has a selective dual-note warning horn; a ‘Town’ note and a louder ‘Country’ note. [↑](#footnote-ref-10)
11. This ‘national’ code was developed by the rail industry to provide uniformity in safeworking practices on the DIRN, although it has not been applied to the majority of the DIRN within Victoria, instead TA20 applies. [↑](#footnote-ref-11)
12. A safeworking arrangement whereby trains are permitted to operate through the works location and works personnel may access the track under their own protection. [↑](#footnote-ref-12)
13. Manufacturer’s equipment pamphlets and The Air Brake Association - Management Of Train Operation and Train Handling. [↑](#footnote-ref-13)