

## Event Learning Report

Event Type	People and Safety
Event Title	Blasting Incident
Location	Pole 199360 (P168) Elderslie Road Broadmarsh
Date	11 January 2021
Time	1445 Hours
Risk Rating: Actual	Minor
Risk Rating: Potential	Major
Incident Number	12643

**Report Issue Date:** 18/02/2021

**Version Number:** 1

**Report Status:** FINAL

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## Document Control

### Approval

The following table lists personnel who are responsible for authorising the document:

	Title	Name	Signature	Date
Approver:	General Manager – OC&SD	[REDACTED]	Maintained on file	18/02/2021

### Document History

The following table lists the changes made to this document:

Version	Date	Amended by	Comments
1	18/02/2021	[REDACTED]	Final

## 1 Introduction

### 1.1 Aim

The aim of this report is to investigate a blasting incident, which occurred on 11 January 2021. Actions and improvements to mitigate future similar events are identified in this report.

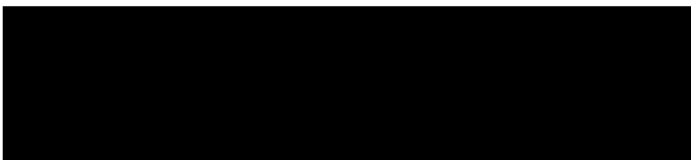
### 1.2 Methodology

An ICAM methodology was adopted by the learning team and it included the following:

- Interviews and discussions held with the workers involved.
- Review of documented work practices.
- Review of blast management plan.
- Assignment of actions in alignment with ICAM coding.

### 1.3 Learning Team

The investigation was undertaken by TasNetworks Safety and Wellbeing Partner, in consultation with:



## 2 Executive Summary

On 11 January 2021, explosives were used to blast a pole hole adjacent to pole 199360 on Elderslie Road Broadmarsh. The blast compromised the foundation around the existing pole and the pole lent over on an angle towards the road. The energised conductors in an adjacent span lost clearance height and ignited dry vegetation causing a fire.

The fire was brought under control within several hours. However, the fire occurred on a total fire ban day, and this has raised concerns to TasNetworks and the Broadmarsh community.

No building structures or livestock were lost during the fire and no one was injured by the blasting activity.

TasNetworks' investigation has identified that three primary factors contributed to the incident:

1. The pole was an angled pole, which had a split in the top of it and it was structurally compromised (which was why it was being replaced).
2. The amount of explosives used created too much pole vibration and weakened the foundation between the pole and blast hole.
3. The distance between the pole and blast hole was 400mm.

TasNetworks has historically relied upon the expertise of contractors performing explosives work and has not required a formal assessment of blasting activities around its infrastructure.

Key actions resulting from this investigation include:

1. Procedures to be updated to prohibit blasting on total fire ban days.
2. Procedures to be updated to require a formal assessment by TasNetworks of blasting works near our infrastructure. Formal assessment to consider factors such as:
  - structure condition and suitability for the use of explosives
  - powder factors to be used
  - desired vibration limits
  - proximity to existing infrastructure
  - protection or support of suspect or condemned structures
  - design changes or considerations
  - electricity network outages or protection setting arrangements
  - fire mitigation measures
  - a requirement for a TasNetworks representative to be on site.
3. Adverse Weather and Bushfire Response Procedure to be reviewed in relation to appropriate restrictions of work on total fire ban days.

The report concludes that the need to use explosives is an infrequent activity. TasNetworks replaces on average 1200 poles per year. On 10 occasions, explosives were used in the past 12 months.

Due to the unique specialist nature associated with the use of explosives, TasNetworks and its civil contractors provide limited guidance or governance around this activity and have relied on the expertise of the explosives company performing the work. This approach has been without incident and TasNetworks has not experienced an incident associated with blasting since TasNetworks was formed seven years ago.

Nonetheless, the incident highlights the variables involved with explosives work, and with hindsight, there are improvements which can be made, which were not apparent prior to the event.

Moving forward, TasNetworks will develop practicable guidance material, which enables each blasting activity to be formally assessed by TasNetworks and to consult with its contractors to ensure the risk of asset failure and fire is adequately mitigated.

## 3 Event Details

### 3.1 Background

Pole 168 (199360) is a HV strain pole on Elderslie road Broadmarsh. The pole was inspected on 25 February 2020 and was condemned by an Asset Inspector due to a crack being identified in the top of the pole. The pole was given a priority code of P6, requiring the pole to be replaced within 365 days.

The replacement date for the pole was scheduled for 13 January 2021. This date was selected to mitigate the number of outages on the feeder and to coincide with nine other pole replacements on the feeder in the area. The nine other pole replacements proceeded as planned on 13 January 2021.

In preparation for the above work, a TasNetworks' pole hole borer erector (Proline) was deployed to the area in December to pre-bore the pole holes. The Proline could not bore a hole adjacent to pole 199360 due to hitting rock.

TasNetworks issued a work order to a civil contractor on 17 December 2020, to dig the hole by excavator and requested the work be completed by 12 January 2021, in time for the planned outage on 13 January 2021. The contractor attended site on Friday 8 January 2021 and commenced excavating the hole. After approximately six hours of excavating the hole with a rock breaker, a depth of just over 1m was achieved. The contractor was of the opinion that the required depth of 2.3m would not be reached with the rock breaker, in time for the outage.

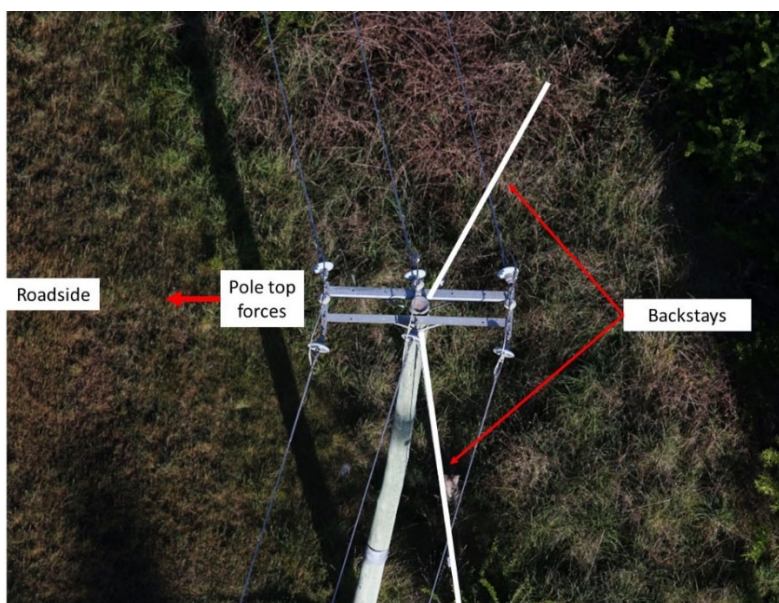
The contractor contacted TasNetworks' job manager and requested a scope change to drill and blast the hole due to encountering Dolerite rock. The TasNetworks' job manager verbally approved the scope change and the contractor engaged an explosives subcontractor to drill and blast the hole.

### 3.2 Event Description

On Monday 11 January 2021, an explosives subcontractor loaded and charged a hole adjacent to pole 199360 and the charge was fired at 1445 hours.

The blast disturbed or weakened the foundation on the roadside of pole 199360. The compromised foundation, coupled with the angle of the pole top forces, pulled the pole towards the road.

**Photo 1: Aerial view of pole 199360 illustrating pole top forces (photo 2014)**



The pole had two backstays and the stay bolts were in line with the split in the pole top. As the pole fell towards the road, the stay bolts pulled downwards, further opening the split until the pole eventually came to a rest at angle of approximately 60° from vertical.

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The energised 11kV conductors contacted vegetation, midspan between poles 199359 and 199360, creating a phase to earth short-circuit. The resulting arc flash ignited a vegetation fire.

Recloser (C520009) detected the fault and protection operated at 1445 hours.

No one was in the vicinity of the pole when the blast was initiated and no injuries resulted. Traffic management was in place.

**Photo 2: Pole 199360 post blast, held up by backstays**



**Photo 3: HV conductors touching vegetation between poles 199359–199360**



**Photo 4: Illustrates split in pole top**



### 3.3 Details of damage/impact

<b>Injuries</b>	Nil
<b>Environmental impact</b>	TFS estimated 4.3 hectares of burnt vegetation
<b>Asset damage</b>	Secondary damage caused to another pole base due to fire
<b>Supply loss</b>	273 Customers. Following isolation: 15:29 – 70 Customers restored 15:39 – 182 Customers restored. 21 Customers off during repairs. During restoration: 20:42 – 273 Customers interrupted (all customers off) 20:58 – All customers restored
<b>Plant or equipment damage</b>	Property fence posts burnt

### 3.4 Immediate Actions Taken

The following immediate actions were undertaken:

- The contractor notified TasFire Service who attended to the vegetation fire.
- The Shot Firer maintained the blast exclusion zone until the blast site was inspected.
- The contractor’s management team and TasNetworks Job Manager were notified.
- A road closure was maintained while conductors were lying low across the road.
- TasNetworks Job Manager and fault crew attended site to commence restoration works.
- The fire was brought under control within several hours.
- The contractor notified Workplace Standards Tasmania of the incident.
- Power was restored to all customers at 2058 hours.

## 4 Findings

### 4.1 Training and competence

1. The Shot Firer holds a Shot Firer Permit (No [REDACTED]) issued by WorkSafe Tasmania under the Explosives Act 2012.
2. The Short Firer's permit is endorsed for agrarian – agricultural works, structural – civil engineering works and surface – quarrying and open-cut mining. Pole hole blasting is considered a structural – civil engineering activity.
3. The Shot Firer also holds a Security Sensitive Dangerous Substance (SSDS) Permit (No [REDACTED]) Issued by WorkSafe Tasmania. A Shot Firer's Permit is only valid if it is used under a current SSDS permit.
4. The SSDS permit authorises the Shot Firer to transport, manufacture, use, store, sell, supply, import, export and buy, ammonium nitrate and explosive products.
5. The Shot Firer has more than 40 years' experience in blasting activities and has run his own explosives business since 1990. The Shot Firer reports to have worked for the electricity supply industry both in Tasmania and interstate throughout this time, and has blasted many pole holes throughout his career.

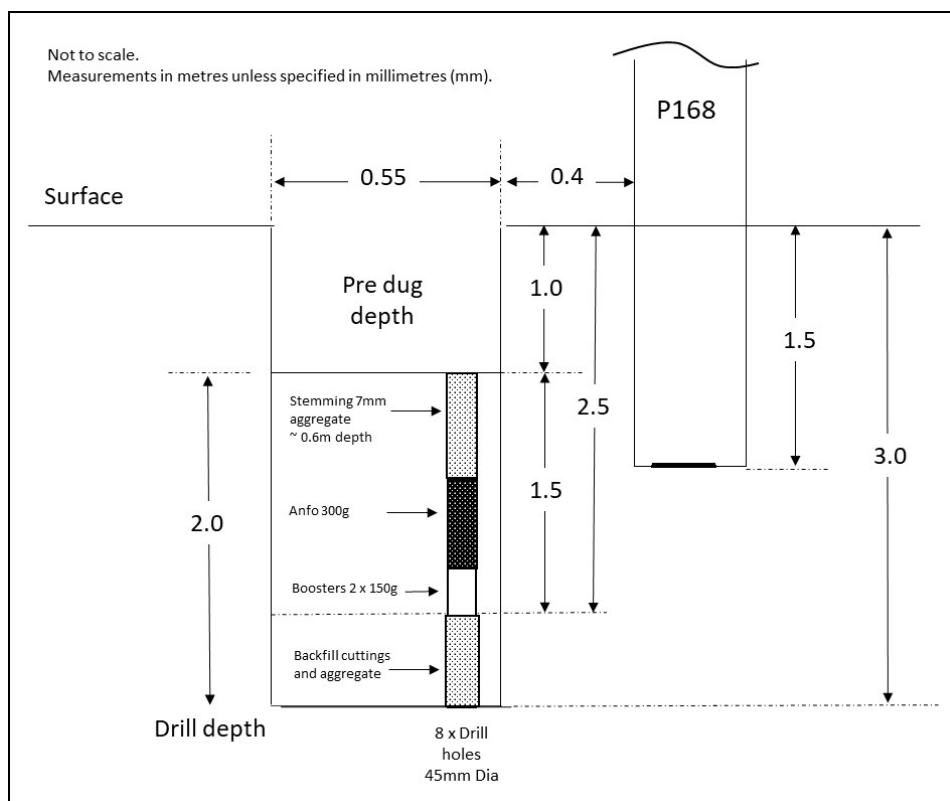
### 4.2 Blasting

1. The Shot Firer prepared and endorsed a blasting plan for the pole hole adjacent to pole 199360 Elderslie Road, Broadmarsh.

The Explosives Regulations 2012 specifies that blasting may only be carried out if there is a valid blasting plan. A blasting plan is valid if endorsed by the Shot Firer.

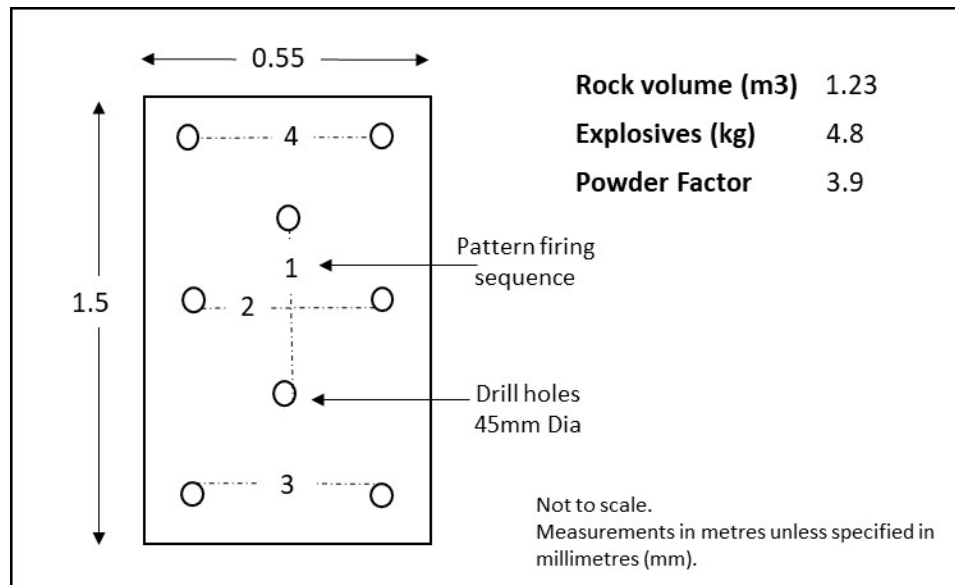
2. The blasting plan, among other things, specified the bulk explosives and initiation explosives to be used as well as provided a general blast layout. The blasting plan specified a powder factor of 5.
3. The following diagrams have been developed by the author to enable interpretation of the blasting plan.

**Diagram 1: Cross-sectional view of site**





**Diagram 2: Plan view of drill pattern**



- The calculated powder factor was 3.9. A powder factor is the quantity of explosives used per cubic metre of rock. The powder factor is based on the methodology that a set number of kilograms of explosives per cubic metre of rock will give a specific desired blast result.

- A review was conducted to determine the suitability of the powder factor.

Available commentary suggests that no standard powder factor exists for specific rock types and that a range of powder factors will be needed. The actual powder factor number will be a calculated estimate, based on the Shot Firer's experience<sup>1</sup>.

Reference material recommended by the industry indicates that a powder factor of 0.8 is recommended for hard rock, where blasting occurs on a typical open face or bench such as a quarry<sup>2</sup>.

A powder factor of 0.8 was discussed with the Shot Firer and another Tasmanian explosives company. Both companies expressed that they were familiar with the above recommendation. They advised that this powder factor would be a guide only when blasting in a confined hole with no open face. Both reported that it is common to increase the powder factor under the circumstances required for a pole hole.

- The Shot Firer reported that he filled the drill holes with stemming (7mm aggregate), then back filled the open portion of the excavation with tyres and natural fill, which came out of the excavation. Blast mats were placed over the top of the fill and a mud bucket from the excavator was placed on a mat, hard up against the pole. The Shot Firer advised that his objective was that, if the blast vented it would do so back towards the adjacent paddock and not towards the road.
- Photo 5 illustrates that the blast vented in the direction as predicted by the Shot Firer. The blast mats threw back towards the road while the majority of rock sprayed towards the adjacent paddock and to the right of the pole.

It is observed from photo 5 that the mud bucket (350kg in weight) has been thrown about three metres towards the road from where it was originally placed against the pole.

It is also observed that the blast was not contained.

<sup>1</sup> Konya, A, Konya, C (2019). Evaluating the effectiveness of powder factor. *Pitt and Quarry*. <https://www.pitandquarry.com/evaluating-the-effectiveness-of-powder-factor/>

<sup>2</sup> Dyno Nobel Asia Pacific PTY Limited (2020) Explosives Engineers Guide

**Photo 5: Scene immediately after blasting**



8. The blast fractured the ground between the new hole and the existing pole.

**Photo 6: Shows pole foundation compromised between pole and new pole hole (after dig out)**



9. Evidence indicates the base of the pole has been lifted upwards and rattled hard during the shock of the blast. This has caused the stay bolts, which were in line with the split in the pole top, to pull downwards through the pole, further opening the split as the pole fell towards the road due to the compromised foundation.

The stays remained attached to the pole, which ultimately prevented the pole from falling to the ground.

**Photo 8: Pole 199360 – post blast after recovery**



## 4.3 Pole 199360

1. Pole 199360 is a fully supported HV strain pole, which was installed in 1988. The pole was inspected on a five yearly cycle.
2. On 25 February 2020, the pole was inspected by an Asset Officer and a crack was identified in the pole top. The pole had a safety factor of 4.5, which is considered sound and not affected by wood rot.
3. The Asset Officer condemned the pole and assigned a replacement priority of P6, which required the pole to be replaced with 365 days.

**Photo 7: Illustrates crack in pole (taken 25/02/2020)**



## 4.4 Documentation review

1. TasNetworks have two documents, which provide commentary on explosives and blasting activities.
  - a. Line Workers Reference Handbook (Section 6.22 Explosives)
  - b. Work Practice – Using Excavators (Section 6.1.2 Blasting Work)
2. A review of the information contained within the two documents has identified that the information focuses primarily on four factors:
  - a. Shot Firer's must be licenced.
  - b. Explosives must be handled and stored in accordance with applicable legislation.
  - c. Electronic detonators are not to be used for firing due to potential interference from the electricity network.
  - d. Control of fly rock.
3. The documents do not provide guidance with regards to general risk mitigation and assessment measures, concerning items such as:
  - the use of explosives
  - proposed powder factors
  - desired vibration limits
  - proximity to existing infrastructure
  - protection of suspect or condemned structures
  - site assessment to determine structure condition and suitability for the use of explosives
  - design changes or considerations
  - electricity network outages
  - protection setting arrangements
  - fire mitigation measures, etc.
4. While the two documents referenced above are current versions, their particular sections regarding explosives use and blasting have not been updated for some time and it is noted that the documentation quotes old names of Statutory bodies, such as local councils, who no longer have jurisdiction over blasting activities.

## 4.5 Work flow process

1. The civil contractor provides services to TasNetworks under a Civil and Hard Holes Services Agreement. The civil contractor provides a schedule of rates to perform the services, which vary depending on type of machinery or expertise required. The services includes a schedule of rates for blasting.
2. A hard hole is any hole, which cannot be bored by a Proline, or a Proline cannot access the location for the hole. Where a hard hole is identified, TasNetworks job manager arranges for a work order to be issued to the civil contractor to perform the work.
3. Typically, hard holes are excavated with an excavator and a rock breaker is often needed to break the ground. On infrequent occasions, a rock breaker is insufficient to break the ground and the use of explosives is required.
4. Where a civil contractor identifies that explosives are required, a request is made by the civil contractor to TasNetworks' job manager to approve the scope change from the use of an excavator to the use of explosives.

5. The civil contractor contacts the job manager primarily because explosives work is at a higher schedule of rates than excavator work. Therefore, the approval is not given subject to an assessment of the conditions or suitability for the use of explosives. It is given to authorise the civil contractor to conduct the work and to charge the higher rate accordingly.
6. TasNetworks issued a worker order (No.300044055) to the civil contractor on 17 December 2020, to dig a hard hole at pole 199360. The work order requested the work be completed by 12 January 2021. The work order was received three days before the civil contractor shut down its operations for the Christmas period, as such, the work could not be completed before the end of the year.
7. The civil contractor resumed operations on Monday 4 January 2021 and scheduled the job to be completed on Friday 8 January 2021.
8. On Friday afternoon, after approximately six hours of excavating with a rock breaker, the operator was of the opinion that the required depth could not be achieved by rock breaking, before the due date of Tuesday 12 January 2021. A request was made to TasNetworks to use explosives and verbal approval was given.
9. Late Friday afternoon the civil contractor contacted an explosives subcontractor and asked if they could perform the job in on Monday 11 January 2021. The explosives subcontractor had another job on in the morning but agreed to perform the work if the civil contractor could drill the blast holes according to the drill pattern provided by the explosives subcontractor.

The civil contractor engaged a drilling subcontractor to drill the blast holes on Monday morning 11 January 2021.

10. The explosives subcontractor (Shot Firer) arrived on site approximately 1330 hours and completed a Safe Work Method Statement for the activity. Drill depths were measured to be at 3m below surface. The Shot Firer back filled the bottom of the drill holes with cuttings and aggregate to bring the bottom depth up to 2.5m below surface. The holes were then loaded with explosives and stemming before being backfilled, charged and fired at 1445 hours.
11. The Shot Firer reportedly took a cursory look at the pole and noticed it had two backstays on it and he assumed that they would be sufficient to support the pole in the event that the pole was rattled by the blast. The Shot Firer reported that he did not notice the split in the pole.
12. The civil subcontractor did not know why the pole was condemned either. This information is not typically passed on to the contractor when work orders are issued for hard holes. Under normal mechanical excavation circumstances, information regarding the status of the pole is not considered critical, as mechanical excavation typically has no impact on a pole.
13. The location for the new pole hole was pegged 400mm off the existing pole by TasNetworks. The civil contractor reports that they always aim to dig holes where TasNetworks request it to be placed. They reportedly understand from past experience that by moving the hole to another nearby location, it can have knock on effects to the design of the network along with additional costs for materials and work load if the hole is moved too far from its pegged location.

As described under 4.4.3, proximity to existing infrastructure is not assessed for blasting activities.

14. The civil contractor and explosives subcontractor, reported that they did not feel pressured or rushed, but were motivated to complete the work by the due date requested.

## 4.6 Protection

1. Protection operated as designed.
2. Feeder protection settings were not requested to be altered in preparation for the blast. As described in section 4.4.3 above, procedures do not guide or trigger discussions in this regards.
3. The charge was fired at 1445 hours. Recloser (C520009) which is located on Elderslie road detected a fault and protection started almost immediately following the conductors touching the ground.
4. Within nineteen seconds, the device reclosed three times after five seconds intervals, before it opened for the fourth time and locked out.

An extract of the protection log is provide below. Note time is Eastern Standard Time.

1374002	C520009 FDR 48185	ACR CB STATUS	11/01/2021 13:45:22.460	11/01/2021 13:45:23.467	INVALID	
1374002	C520009 FDR 48185	ACR CB STATUS	11/01/2021 13:45:22.460	11/01/2021 13:45:23.467	OPEN	
1374014	C520009 FDR 48185	ACR EF TRIP	11/01/2021 13:45:22.410	11/01/2021 13:45:23.467	ACTIVE	4
1374002	C520009 FDR 48185	ACR CB STATUS	11/01/2021 13:45:21.690	11/01/2021 13:45:22.607	CLOSED	
1374002	C520009 FDR 48185	ACR CB STATUS	11/01/2021 13:45:21.690	11/01/2021 13:45:22.607	INVALID	
1374014	C520009 FDR 48185	ACR EF TRIP	11/01/2021 13:45:21.690	11/01/2021 13:45:22.607	RESET	
1374002	C520009 FDR 48185	ACR CB STATUS	11/01/2021 13:45:16.640	11/01/2021 13:45:17.451	INVALID	
1374002	C520009 FDR 48185	ACR CB STATUS	11/01/2021 13:45:16.640	11/01/2021 13:45:17.451	OPEN	3
1374014	C520009 FDR 48185	ACR EF TRIP	11/01/2021 13:45:16.600	11/01/2021 13:45:17.451	ACTIVE	
1374002	C520009 FDR 48185	ACR CB STATUS	11/01/2021 13:45:14.880	11/01/2021 13:45:15.326	CLOSED	
1374002	C520009 FDR 48185	ACR CB STATUS	11/01/2021 13:45:14.880	11/01/2021 13:45:15.326	INVALID	
1374014	C520009 FDR 48185	ACR EF TRIP	11/01/2021 13:45:14.880	11/01/2021 13:45:15.326	RESET	
1374002	C520009 FDR 48185	ACR CB STATUS	11/01/2021 13:45:09.920	11/01/2021 13:45:10.638	INVALID	
1374002	C520009 FDR 48185	ACR CB STATUS	11/01/2021 13:45:09.920	11/01/2021 13:45:10.638	OPEN	
1374014	C520009 FDR 48185	ACR EF TRIP	11/01/2021 13:45:09.870	11/01/2021 13:45:10.638	ACTIVE	2
1374002	C520009 FDR 48185	ACR CB STATUS	11/01/2021 13:45:08.790	11/01/2021 13:45:09.201	CLOSED	
1374002	C520009 FDR 48185	ACR CB STATUS	11/01/2021 13:45:08.790	11/01/2021 13:45:09.201	INVALID	
1374013	C520009 FDR 48185	ACR OC TRIP	11/01/2021 13:45:08.790	11/01/2021 13:45:09.201	RESET	
1374022	C520009 FDR 48185	ACR PROT START	11/01/2021 13:45:03.760	11/01/2021 13:45:04.466	RESET	
1374002	C520009 FDR 48185	ACR CB STATUS	11/01/2021 13:45:03.750	11/01/2021 13:45:04.466	INVALID	
1374002	C520009 FDR 48185	ACR CB STATUS	11/01/2021 13:45:03.750	11/01/2021 13:45:04.466	OPEN	1
1374010	C520009 FDR 48185	ACR SEQ IN PROG	11/01/2021 13:45:03.700	11/01/2021 13:45:04.466	ACTIVE	
1374013	C520009 FDR 48185	ACR OC TRIP	11/01/2021 13:45:03.700	11/01/2021 13:45:04.466	ACTIVE	
1374022	C520009 FDR 48185	ACR PROT START	11/01/2021 13:45:03.500	11/01/2021 13:45:04.466	ACTIVE	
1374004	C520009 FDR 48185	ACR A/R STATUS	08/01/2021 12:30:46.100	08/01/2021 12:30:46.195	IN	

## 4.7 Fire mitigation

- Monday 11 January 2021 was declared a Total Fire Ban (TFB) day in southern Tasmania – the declaration was made at approximately 2pm on Sunday 10 January 2021.
- The use of explosives is not a prohibited activity on a TFB day. The civil contractor and explosives subcontractor were aware of this and proceeded with the work as planned.
- While blasting below ground is an acceptable activity, the possibility of damage to the electrical infrastructure, because of that activity, was not formally assessed with regards to the TFB, either by TasNetworks, the civil contractor or the explosives subcontractor.
- When the blast comprised the pole's foundation and the pole lent over on an angle, the energised conductors lost clearance height and ignited dry vegetation. The TFS were able to bring the fire under control within several hours, minimising impact on the environment and surrounding community assets.
- It should be noted that if the activity was deferred to a non TFB day during the bushfire season, a fire would still have occurred, although weather conditions would be more favourable for firefighting crews, potentially placing less risk to the environment and community.
- If the feeder was de-energised, prior to the blast, a fire would not have started.
- As described in 4.4.3, procedures do not specify a requirement to de-energise circuits prior to blasting.
- TasNetworks' Control Room has a Total Fire Ban Procedure (DOP 002). This procedure, among others things, requires the Control Room to monitor the Forest Fire Danger Index (FFDI) from the Bureau of Meteorology website on a TFB day and to initiate protection setting changes when the FFDI reaches 38.

Protection settings changes switch off the auto-reclose function on the respective feeder. This means the feeder will trip on the first detected fault and will not reclose to re-energise the circuit. It should be noted that while switching off auto-reclose protection mitigates fire risk, the first trip may create an arc flash sufficient enough to initiate a fire.

The procedure instructs Control Room operators to commence switching when the FFDI reaches 35 in a specific community area. This provides some leeway before the FFDI reaches 38.

At the time of the incident, the Control Room had altered protection settings for several community areas. Broadmarsh area and feeder 48185 was not altered as the FFDI had not reached 35 in that area.

At around 1700 hours, most communities had reached an FFDI of 35 and the Control Room switched off the auto-reclose function for the entire southern region around that time.

- The work crew did have several portable fire extinguishers in their vehicles. However, they were not able to access the fire, even at its infant stage, due to the unknown state of the power supply. For this reason, they stayed approximately 10 metres away from the conductors until they were proven de-energised by TasNetworks.

10. TasNetworks also has an Adverse Weather and Bushfire Response Procedure (No.R0000709015), which restricts certain field activity on a TFB day such as:

- Hot work (welding, grinding, cutting, use of heat torches, chainsaws, etc.)
- Driving off road in rural areas
- Operating network infrastructure
- Works associated with restoration of supply, etc.

The use of explosives or blasting is not covered within this procedure.

## 4.8 Other findings

The following findings did not contribute to the event, however they are captured here for learning purposes.

1. The Shot Firer provided an email notice to Brighton Council, informing Council of his intention to conduct blasting activities at pole 199360 on Elderslie Road. Following the event, it was identified that pole 199360 was located in Southern Midlands Council area and not Brighton Council.
2. There is no legal obligation on a Shot Firer to provide notification to local council for general blasting activities. The provision of notification appears to have been a legacy practice (pre-2012) from when local council had more jurisdiction over blasting activities.

Explosives companies interviewed as part of this investigation, report that they continue this practice as a courteous notice in case council receives noise or vibration complaints from the community.

3. Shot Firer's have an obligation to provide notice of their intention to use explosives to all property owners who may be affected by ground vibration or airblast over pressure in the vicinity of a blast.

There is no set distance required for such notification and it relies on the Shot Firer's experience and amount of explosives used. On this particular occasion, the Shot Firer was of the opinion that properties in this rural setting would not be affected and notification was not required.

## 5 Conclusion

The need to use explosives is an infrequent activity. TasNetworks replaces on average 1200 poles per year. On 10 occasions, explosives were used in the past 12 months

Due to the unique specialist nature associated with the use of explosives, TasNetworks and its civil contractors provide limited guidance or governance around this activity and have relied on the expertise of the explosives company performing the work. This approach has been without incident and TasNetworks has not experienced an incident associated with blasting since TasNetworks was formed seven years ago.

Nonetheless, the incident highlights the variables involved with explosives work, and with hindsight, there are improvements which can be made, which were not apparent prior to the event.

Moving forward, TasNetworks will develop practicable guidance material, which enables each blasting activity to be formally assessed by TasNetworks and to consult with its contractors to ensure the risk of asset failure and fire is adequately mitigated.

## 6 ICAM Coding

Organisational	
Code	Details
RM: Risk Management	<ul style="list-style-type: none"> <li>• The absence of a formal risk assessment by TasNetworks to an uncontrolled hazard and consequences.</li> </ul>
PR: Procedures	<ul style="list-style-type: none"> <li>• TasNetworks work procedures do not provide instructions to formally assess blasting works.</li> </ul>

Task / Environmental – Workplace	
Code	Details
TE1: Task planning	<ul style="list-style-type: none"> <li>Reliance on contractor expertise to identify and manage risk.</li> <li>Limited involvement by TasNetworks in assessing the blast activity.</li> <li>The distance between the blast hole and pole was 400mm.</li> </ul>
TE8: Equipment integrity	<ul style="list-style-type: none"> <li>Pole 199360 was compromised structurally due to a split in the pole top.</li> </ul>
TE24: Vibration	<ul style="list-style-type: none"> <li>Ground vibration has rattled the pole and the blast weakened the foundations around the pole base.</li> <li>The ratio of explosives used given the proximity to the pole.</li> </ul>
Absent / Failed Defences	
Code	Details
DF11: Control and recovery procedures absent	<ul style="list-style-type: none"> <li>The potential for failure was not anticipated and the capacity to recover was not built into the controls. E.g. power was not isolated.</li> </ul>

## 7 Action Plan

#	Action Description	Due Date	Owner
1	<p>Procedures to be updated to:</p> <ol style="list-style-type: none"> <li>prohibit blasting on total fire ban days</li> <li>require a formal assessment of blasting works by TasNetworks. Formal assessment to include factors such as:                             <ul style="list-style-type: none"> <li>structure condition and suitability for the use of explosives</li> <li>powder factors to be used</li> <li>desired vibration limits</li> <li>proximity to existing infrastructure</li> <li>protection or support of suspect or condemned structures</li> <li>design changes or considerations</li> <li>electricity network outages or protection setting arrangements</li> <li>fire mitigation measures</li> <li>having a TasNetworks representative on site.</li> </ul> </li> <li>As a minimum auto-reclose protection shall be switched off prior to firing explosives.</li> </ol>	15/03/2021	TasNetworks
2	Review Adverse Weather and Bushfire Response Procedure.	31/03/2021	TasNetworks
3	Issue and communicate updated procedures to relevant stakeholders.	31/03/2021	TasNetworks
4	Update Red Lesson to lift the current suspension on blasting once items 1-3 above are completed.	31/03/2021	TasNetworks