

# SEASONAL FOCUS



## CHIEF OFFICER'S EXPECTATIONS

Our fire season is rapidly approaching and early indications suggest there is potential for significant fires around our state to occur during spring.

For the past few years I have communicated my expectations that all operational members of CFA complete Minimum Skills, the hazardous trees package (every three years) and the entrapment drill (annually). Our district leadership teams have asked me for further clarity so in response I provide the following:

- Before any firefighter responds to a fire, they need to have completed wildfire Minimum Skills, the hazardous trees package and the entrapment drill.
- All districts must ensure they allocate time and resources to support brigades and groups as a priority to undertake these activities and consider innovative ways to help our members.

- Crew leaders are able to 'sign off' members as having completed the hazardous trees package and entrapment drill as a way of reinforcing their knowledge and supporting captains and training officers by spreading the load across the brigades and groups. Captains (OICs) of brigades remain accountable for ensuring this is applied to their brigades in accordance with 'Standard Operating Procedure 2.01 - Brigade Officers - Responsibilities of'.
- I ask our leaders at every level to discuss with their teams the requirements and accountabilities detailed in 'Standing Order 6 - Training & Competence' and 'Standing Operating Procedure 6.04 - Firefighter Skills - Development and Maintenance of', which have been in place for many years.



To read the Chief's full expectations turn to the last page.



# Yinnar tanker struck by tree

## Introduction

Imagine starting your shift at a raging fire. The steep terrain is covered by dense vegetation, with erratic winds causing intense fire activity. In the dark of the night visibility is poor. The air is filled with smoke and the sound of the firefight. Your job is simple: protect assets and put out anything on fire. Over a few exhausting hours, you battle difficult conditions to save isolated properties. All is going well, until you hear a loud crack above you.

You don't have time to think about the large branch suspended over your truck, or your fellow crew members hosing down that very tree. What should you do?

There's one crew that already knows the answer because they were faced with this scenario. They've shared their story here so that others can learn from their experience and avoid a similar accident.

"It doesn't worry me [sharing my experience], if it's going to improve something down the line somewhere," one member said.

## Incident overview

In the words of one crew member, "It was a tough night". They were part of a strike team tackling the Yinnar South fire, which had been sparked by lightning two days earlier and was now burning in a tough landscape known as Heartbreak Hills. All crews had been briefed on various hazards including the

presence of falling trees throughout the fireground, though they weren't given any specific warnings.

The strike team and a DELWP crew were mainly tasked with blacking out burning vegetation in an effort to stop fire breaking out and threatening more Jumbuk Road properties. The bush road, which forms a loop with O'Reillys Hill Road, was too narrow to allow overtaking. The strike team had to drive single file around this loop, with the lead tanker peeling off to the refill point and rejoining the line an hour later,

At about 4am, when the crew pulled up behind a tanker which had stopped at the loop's narrow refill point, their only focus was "anything on fire".

The tanker crew found themselves next to a steep bank and there was a large tree a metre away with a small fire burning in its trunk. The crew assumed the burning tree was safe because several other crews and full strike teams had already driven past it, reportedly dousing it numerous times. From the road the two-metre wide eucalyptus looked structurally solid. However, appearances at night can be deceptive.

The crew leader and driver were in the cabin and three members in the rear. One was hosing off the left side of the road while the other two were directly hosing down the tree when they heard a loud crack. The heavy branch above them snapped off and it was too late to do anything.



**Left:** The crew was on board when the first branch fell

**Right:** The tree fell on the tanker hours after the crew left the scene

It landed on the centre of the truck, missing the crew on the rear who dived for cover and were protected by the rollover protection system bars (ROPS). The cabin was hit the hardest and after holding for a minute, the centre of the roof began to cave in. The crew leader immediately exited the tanker to check on his team and then issued a mayday call over the radio. Apart from some scratches, no-one was injured and the crew abandoned the vehicle, (leaving the engine, lights and handbrake on as protocol dictates) in case further vegetation fell onto the tanker.

They made their way towards their strike team leader, who went to their assistance after hearing the loud crack, and were transported to the staging area for debriefing and release. The crew was shaken but otherwise unharmed. The damaged tanker was left in situ until it could be safely retrieved by a recovery team which arrived about five hours later. During this time the entire tree collapsed, causing significant damage to the tanker. .

The tanker driver was at work the next day when his partner called him after seeing an image of the tanker on the front page of a newspaper. The photo of the crushed tanker led readers to believe the crew had been on the tanker when the tree fell. In reality, the damage occurred hours after the crew had left the scene. This was the first of many inaccurate media, internal CFA and social media commentary, which caused distress to the crew, their family members and communities.

All crew members were all up-to-date with their tree hazard awareness training and never thought this would happen to them. "Over the years, I've heard it happen to other people but you don't realise it can happen to you.

"We just didn't spot it...It could have happened to anyone."

## Lessons identified

**Following procedure:** After the initial incident, the crew was understandably disappointed that the tanker sustained further damage. However, if the tree had fallen while they moved the tanker from beneath the branch, the crew could have suffered serious injuries or even death. They made the correct decision to leave the vehicle for the recovery team to safely retrieve. While the damage to the vehicle was costly to repair, the safety of crew members is paramount.

**Communication:** The tree that fell had informally been flagged by a different crew earlier that day. However, the night crew was never given this specific information in their briefing. It's vital that everyone follows the correct communication procedures to ensure important information is passed on. Crews are actively encouraged to speak up at their briefing and ask questions if they feel information is lacking. 'Salmon Cards' (Incident Report Cards) , hazard reports and CFASafe, can also flag hazards. At incidents where a safety officer is appointed, pass on hazard information to them.

**Distance from a hazardous tree:** The tanker was about one metre from the base of the tree that eventually fell. One crew member commented that next time they would probably re-assess the distance. However, given the incident occurred in the early hours of the morning in darkness, tree hazard assessment would be difficult for anyone.

**Changing risk:** Before the incident, the crew had responded to very intense fire activity. They went from a high-pressure firefight to a seemingly safer blacking out task, spending a few hours stationed near a property not under immediate threat. The stark contrast highlights that risks are always present on the fireground.



**Risk assessment and size-up:** From the road the tree looked to be structurally solid. A 360-degree size-up, verified by someone qualified to assess and treat, may have led to a different outcome.

**ROPS:** The truck was fitted with ROPS which protected the crew from the falling branch.

**Learning from experience:** Crew members wanted to tell their story and reflect on the incident in a no blame, no fault environment. This has enabled all of us to learn from their experience and reflect on how we would have reacted in the same situation.

**Misinformation:** Firefighters and their families should discuss how the spread of misinformation can lead to distress. Emergency situations can be frantic and sometimes misleading, or false information can be unknowingly shared despite good intentions. Everyone should be aware that information, particularly on social media, which has not been distributed by an official source (such as EMV), verified ("CFA has confirmed that...") or reported by multiple outlets, could be misleading and damaging.

## Conclusion

Working in demanding environments is typical for a firefighter. As conditions change we need to continually reassess where we are, who is with us, what we are currently doing and what we need to alter. This dynamic risk assessment allows us to enact our 'Safe Person Approach' when we can't change the environment. Be sure to practise, taking six seconds for safety every time something changes. Talk as a crew and don't be afraid to speak up. Your family wants you to come home.

After reading this case study, consider what actions you would take if confronted with a similar incident and think about:

- would you do anything differently if your brigade responded to a similar incident?
- has your brigade completed the hazardous tree package?
- would you recognise the signs of a hazardous tree?
- who would you tell or contact if you recognise a hazardous tree during your operation?
- if faced with a similar situation would you know how to enact a mayday?

# Hazardous trees

Falling trees, limbs and branches can strike operational personnel and members of the public, block access along roads, designated escape routes or fire control lines, or can be a traffic hazard.

A weakened tree structure is a heightened risk and is an important hazard to be aware of. All personnel should be able to identify tree hazard markings and be able to use barrier tape to establish exclusion zones, and request expert assessment and treatment.

## How to identify hazardous trees

### Look up for:

- hung-up branches
- tree lean
- branch or trunk defects
- effects of wind on the tree

### Look down for:

- trees with exposed dry wood
- exposed roots
- defect in lower trunk
- active fire or smoke at base of tree

### Look around for:

- trees affected by fire
- trees beside roads and tracks
- diseased, stressed or drought-affected trees



## Message from the Chief Officer







- Complete your Tree Hazard Awareness training. Discuss the risks of tree hazards at your next brigade meeting.
- Never park or work under hazardous trees.
- Discuss tree risk during your safety briefings.
- Maintain situation awareness and continually reassess the risk.

### More information

<https://files-em.em.vic.gov.au/public/Safety/Tree-Hazard-Mitigation-Matrix.pdf>  
<https://files-em.em.vic.gov.au/public/JSOP/SOP-J08.03.pdf>  
<https://files-em.em.vic.gov.au/public/Safety/TreeHazardPictorialGuide-2017.pdf>  
<https://files-em.em.vic.gov.au/public/Safety/SFS-Tree-Hazards.htm>

## TREE HAZARD MITIGATION MATRIX

## JSOP 8.03 - TREE HAZARD - BUSHFIRE (SCHEDULE 4)

					
SOUND TREE		POTENTIAL HAZARDOUS TREE		CPD TREE	
PRE & POST FIRE		PRE FIRE		POST FIRE	
DEFINITION	<b>SOUND TREE</b> An assessed sound tree that is <b>not currently hazardous</b> and is not likely to become a clear and present danger tree (CPD) when exposed to fire or other disturbance associated with the incident.	<b>POTENTIAL CPD TREE – PROTECTION ASSURED</b> A tree which in its current state <b>does not appear hazardous, but may become a CPD tree if it catches alight</b> or is impacted by wind or other fire-related disturbance. It has a high probability of surviving the fire intact based on the proposed protection measures and likely response resources available.	<b>POTENTIAL CPD TREE – PROTECTION NOT ASSURED</b> A tree which in its current state <b>does not appear hazardous, but may become a CPD tree if it catches alight</b> or is impacted by wind or other fire-related disturbance. It <b>does not have a high probability of surviving the fire</b> intact based on the proposed protection measures and likely response resources available. The tree <b>may partly or wholly fall and impact personnel</b> (but is not expected to do so during the time frame of the current operation).	<b>CLEAR AND PRESENT DANGER TREE</b> A tree or branch that is <b>likely to fall within the expected time frame of the current operation</b> and impact personnel in its potential impact zone.	
MARKING SYMBOL	NO MARK - APPEARS SOUND	 YELLOW DOT	 YELLOW X	 YELLOW K	



# Entrapment drill



Fire behaviour is hard to predict, so everyone needs to be prepared. There's no substitute for practising the entrapment drill, especially when it involves ensuring clear communication and safety of crews during an emergency situation.

Seconds are critical. Repeated hands-on training on how to run an entrapment drill and perform it well could make all the difference for your and your crew's safety.

## Always maintain situational awareness

### Basic checklist

1. Look at your options and immediately act on the best one.  
Options other than the vehicle may be available.
2. Use all PPE/PPC.
3. Protect your airway.
4. Ensure the pump is running.
5. Account for all members.
6. Locate blankets.
7. Delivery lines turned off, except on deck.
8. Operate hazard lights, headlights and emergency warning lights.
9. Engine running fast idle 1000rpm minimum.

### Cabin

- Mayday if appropriate.
- Close windows and vents. Turn on air con in recirculate mode.
- Roll down crew protection curtains and seal.
- Activate crew protection sprays just before impact of heat and flames.

### Rear deck

Where fitted with ROPS canopy:

- Sit in crew ROPS and deploy/secure crew protection curtains.
- Take charged hose line with fog branch into your safe area.
- Cover yourself with dry fire blankets for additional protection.

### Backup

- If the crew protection system (sprays) fail, use fog branches directed towards heat source from deck area.

**When the danger has passed and it's considered safe, exit the vehicle.**

## Safety notes

- Ensure crews are briefed and understand the fire conditions.
- Crews operating a tanker with a crew protection spray system should ensure this is operational when attending bushfire and/or planned burn incidents.
- Ensure there are sufficient protective fire blankets for all crew members and all pumps and crew protection systems are tested and in working order.
- Consider conserving water to extend protection by deck-mounted branches or crew protection sprays.
- In the event of an entrapment situation, do not hose down crew members prior to the firefront passing, as damp clothes or wet fire blankets may cause steam burns.
- If an incident involves several vehicles, group them together and park command and control and/or slip-on type vehicles as close to the leeward side of tankers as possible. If it's safe to do so, members in command and control and/or slip-on type vehicles should exit and take refuge in the cabin or on the deck of tankers.
- If the crew protection spray is unserviceable during bushfire or planned burn sessions, it must be reported for priority repair to CFA's district mechanical officers. In this instance, the vehicle may continue to be used for emergency response, subject to the vehicle's crew leader doing a dynamic risk assessment and setting in place mitigation actions for the safety of the crew. Where possible an alternative vehicle should be considered.

## More information

Follow SOP 9.32 Entrapment Procedures for Appliances

<https://www.members.cfa.vic.gov.au/mycfa/Show?pagelD=displayDoc&docId=004921>



# Lessons learned from entrapments

## Introduction

Since CFA's beginnings in 1944 there have been several major fires and incidents that have shaped our organisation and the direction of rural firefighting. In the 1983 Ash Wednesday fires, 11 CFA volunteers and one casual firefighter died when their tankers were burnt over. Another tragedy was the 1998 Linton fire where five CFA volunteers lost their lives after their tanker was trapped and burnt over.

Improvements in training and equipment following such burnovers has helped to prevent similar tragedies. Since 2006 there have been no serious injuries or deaths to CFA firefighters despite multiple entrapments. But we mustn't become complacent.

CFA members have survived entrapments because, despite the chaos of the situation, their **regular training and situational awareness meant they knew exactly what to do**. We must continue this annual training so that everyone comes home safely.

## Background

Entrapment is a life-threatening situation for all firefighters. The circumstances leading up to entrapments mostly result from sudden changes in fire intensity and direction, usually following a wind change or from underestimating the fire behaviour. Due to the loss of situational awareness, there's often very little warning before the crew is overrun. In some cases, the change in fire behaviour can occur so suddenly that there's very little time to do anything, which is why it's so important to rely on your training and the systems.

Our tanker protection crew systems have been evolving ever since the deployment of standard tanker design and heat shielding after the 1977 Western District fires. Following the Ash Wednesday tragedy, the tanker fleet was upgraded to all diesel-powered vehicles and pumps, and research was completed into fire resistance materials for tankers. Significant crew protection component research and changes in firefighter safety started after the 1998 Linton fire.

Post Linton, crew protection systems installed on new tankers include personal protective radiant heat shield blankets, low level water indicators, water spray deluge systems, internal cabin drop-down radiant heat shielding, additional radiant heat shielding around water pump systems and vulnerable tanker components, a reduction of plastic materials on the external surfaces of tankers, metal air cleaner filters, and flame-resistant hoses and cabling.

Since 2000 all crew members require minimum firefighting skills to be able to respond operationally, and our training emphasises situational awareness. Even with improved situational awareness training, CFA entrapments have still occurred. However, there have been no serious injuries or deaths since the tanker crew protection system was installed in 2006.

Recently CFA assessed critical control measures for entrapments and applied these across a series of incidents and near misses that occurred between 2009 and 2015. There were positive results in the areas of people and equipment,



Above: Before and after shots of a tanker caught in a burnover

largely because of the enhancements in crew protection systems, the adoption of Minimum Skills training, and the yearly compulsory entrapment drill.

Understanding the environment at a particular moment is imperative to improving safety. However, increasing the level of overall situational awareness can be extremely difficult when working in unfamiliar surroundings. The crew leader's ability to pre-empt sudden danger relies on a variety of environmental considerations. What's the weather doing? Is there a forecast wind change? What personnel do I have and what is their experience? What is my plan if something goes wrong? Have I identified an anchor point? Do I have any triggers to adjust my plans?

Recently we have also seen increased awareness and compliance with critical doctrine such as entrapment procedures, LACES, rural/urban interface firefighting and situational awareness.

It's important to recognise that, one of the key control measures when dealing with an emergency incident is to ensure CFA members are well prepared to manage the risk. This preparation includes knowledge through education, skills through training, ability through experience and practical application, all supported by appropriate personal protective equipment.

It's very important to report entrapments or near misses to CFA, so that we can further understand the effectiveness of improvements we've made over recent years. You should use CFASafe on the intranet or Incident/Near Miss Report Cards (salmon cards) to report these instances.

## Lessons identified

By analysing entrapment and near-miss incidents, we've identified the following lessons.

**Personnel capability:** Agencies need to ensure that the capabilities of the personnel on the fireground are suitable for the tasks to be performed.

**Radio communications:** An effective communication plan is vital and must cater for all people deployed to the incident.

**Firefighter safety:** Monitoring your surroundings and constantly reviewing your assessment of the potential hazards is critical to safety. This includes identifying and reporting near-miss incidents. Wearing appropriate protective clothing contributed to the crews' survival. Training on how to protect yourself in extreme fire behaviour is critical to firefighting safety. Reconnaissance and local knowledge (knowing the area) is an important part of managing the risks of firefighting.

**Near-miss reporting:** By reporting near misses quickly through the incident organisation structure, incident controllers can provide important and timely advice about firefighter safety.

**Information flow:** The key role of all personnel is to manage information through the incident organisational structure and ensure they have what they need to make effective and appropriate decisions.

Everybody is responsible for passing on information about fire location and behaviour through the incident organisational structure. This is one of the most important tasks of all personnel at the incident.

The use of Red Flag Warnings must only be to provide information, not directions to fireground commanders.

**Firefighter welfare:** Fatigue and stress affect the quality of decisions made by firefighters and those managing the incident, and this needs to be recognised by the people managing fires and those coordinating response to fires.

## Firefighter comments

Thanks to CFA's safety procedures numerous firefighters have survived entrapments over the years. Here are some of their comments.

“ The crew on the back discussed strategies in preparation for possible worsening conditions later in the day. This included starting the pump and checking for prime as well as talking through the emergency drills, and then getting the blankets out and putting them in a quickly accessible position.”

“ The crew's survival is a direct result of their training and the way they all reacted. All crew had practised burnover drills and safety and survival training a number of times as part of their pre-summer preparations. The crew mentioned how their normal reaction was to panic, however they kept their composure and clear thinking throughout the ordeal despite the frightening conditions.”

“ One of the brigades undertook more detailed drills and familiarisation sessions on each appliance in their brigade [in addition to mandatory training]. These crew members all emphasised during interviews the benefits of the training and how it made them feel confident during the response and the entrapment. It was also apparent that this crew was more comfortable with their performance as a team prior to and during the entrapment.”

“ The crew had undertaken a burnover drill prior to the fire season and so were versed in the process to protect themselves in a burnover. The flames breached the heat shields on the appliance and the deployment of burnover protection worked effectively. Without this, it is entirely probable the injuries would have been more severe.”

“ The Chief Officer's requirement for pre-season mandatory burnover drills clearly prevented further injuries to the crew at the rear of the appliance.”



# Volunteer injured falling from tanker

## Introduction

District 13 volunteer firefighter Pamela was seriously injured and missed several months of work when she fell from her brigade's tanker in July 2018. Her story is a reminder that common, everyday tasks still pose risks which, if you are not careful, could impact both your CFA and personal life for months.

## Incident overview

On the day of her accident, Pamela was participating in an exercise which involved significant map reading and hydrant inspections. Pamela had to regularly climb in and out of the tanker. After the tanker and its three crew members had returned safely to the station, Pamela opened the passenger door to exit the cabin rearward as she had done numerous times already that day. She held onto the handles at the door's base and placed her feet in the foot well steps below. However, as Pamela was reaching for the wheel rim step, she lost her footing and fell backwards onto the concrete. In reaching out to break her fall she landed on her arm, fracturing her elbow.

"I knew I'd broken my arm the moment I fell. I was in excruciating pain," Pamela said.

Brigade members immediately provided first-aid and called for an ambulance. Pamela spent a week in hospital, where she underwent orthopedic surgery to insert metal plates and screws in her arm (see photo). She missed more than ten weeks of work.

A year on, Pamela is still unable to return to active operational firefighting duties, and in addition to the physical limitations Pamela has struggled with the emotional impact of the injury.

Pamela couldn't lift and carry her two young grandchildren, which restricted the simple activity of babysitting on her own. An activity Pamela loved became an impossible task. "Life was difficult with one arm," she said.

Thankfully Pamela is now looking forward to a return to active duty, but she won't forget her experience over the past year. "The pins in my arms will not be removed, and they are a constant reminder to me about making sure I do the right thing.

"You need to take the time to be conscious about how you take each step."

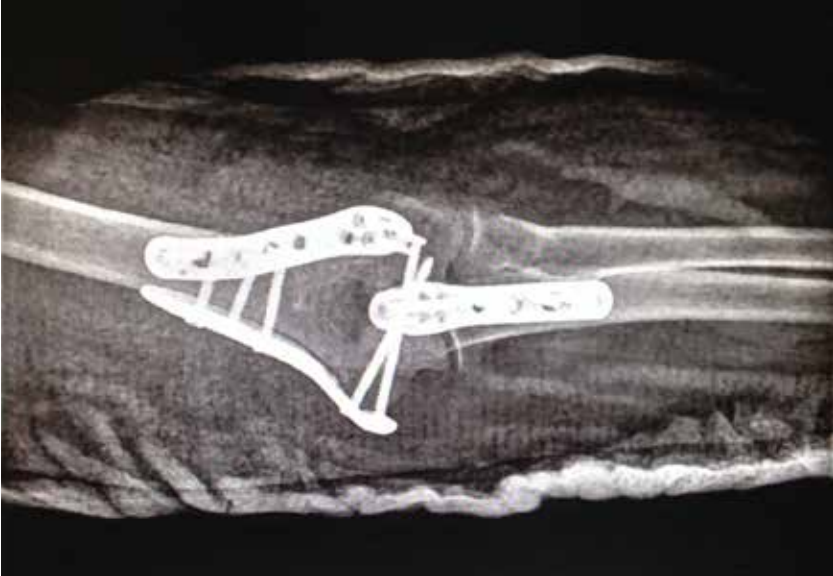
## What worked well

**Response:** Pamela's fellow crew members immediately responded to the situation. They gave her first-aid and called an ambulance.

**Peer support:** Pamela praised the peer support from her brigade and district, and the help for her husband on the night of her injury.

## Lessons identified

**Three points of contact:** Firefighters should ensure they always have three points of contact when entering and exiting vehicles. Following this incident, CFA's wellbeing team produced a '3 Points of Contact' poster which was sent to every brigade to help raise awareness.



**Vehicle familiarisation:** Wheel rim steps on a vehicle can be slippery and care must be taken to stand directly on the top rather than part way around the sides. To help you enter and exit the cab, all trucks have grab handles that must be used. They may be a dark colour and difficult to see at times, but it's crucial you know where they are on your brigade's trucks.

**Gloves:** Pamela's gloves were fairly worn and had smooth palms which may have reduced their grip. Gloves should be inspected regularly and replaced when they have reduced grip.

**Situational awareness:** On the night of the accident the weather was cold and wet, and the truck's steps were slippery. The soles of Pamela's boots were also slippery and covered in mud. If possible, wipe your boots and always be aware of your surroundings.

**Managing fatigue:** Before the fall Pamela exited and entered the cabin at least nine times as part of the training exercise. She was tired and realises now that she should have spoken up and suggested to her captain that her workload be redistributed.

## How to address lessons identified

- Place the 3 Points of Contact poster in a useful position so members will see it
- Discuss falls from trucks as a safety share at meetings
- Ensure drivers consider their passengers' abilities to get in or out of a vehicle safely
- Remind each other of the safest way to get in and out of the brigade's trucks
- Familiarise yourself with the steps and grab handles on your brigade's trucks
- Maintain the grip on both footholds and handholds
- Consider other factors that may affect your ability to get in and out of trucks such as how tired you are, the protective clothing you normally wear, and items you are normally carrying.

## Conclusion

It can be easy to overlook the safety risks of simple tasks when you regularly face fires and other hazardous situations. This case study shows we can't be complacent about the risks of falling from trucks. Pamela needed surgery and missed several months of work, as well as not being fit for operational duties. Taking an extra few seconds to safely exit the cabin could be the difference between responding to an emergency or spending 12 months on the sidelines.

# Preventing truck injuries

CFA is continuously receiving injury claims from members who've hurt themselves getting into and out of cabins, rear deck areas and using ladders. There have been numerous incident reports involving falls from trucks resulting in serious injuries, and the number is likely to be much higher because of unreported incidents.

Stepping on, entering the cabin or crew area, stepping off the back deck and using a ladder, are everyday activities that can cause significant injuries to staff and volunteers.

The main causes of falls from a truck are human error and failure to follow the 'three points of contact' rule. This rule requires at least three points of contact to be maintained with the vehicle at all times – two hands and one foot, or both feet and one hand. This allows maximum stability and support, reducing the likelihood of slipping and falling.

The illustrative poster below is the outcome of an investigation agreed by HSEW, F&EM investigators and an investigation review panel.

## 3 Points of Contact

Entering and exiting CFA vehicles and climbing ladders safely are important actions that are often overlooked. CFA members have slipped and fallen, resulting in ergonomic strains, sprains and broken bones.

Always face the vehicle or ladder when climbing down

Two hands and one foot are used to position the body for safe entry, exit or climb

Use your hands to hold yourself in place. Securely grip hand-holds or handles while one foot safely supports your weight

While going up or down, your movement should be slow and steady to avoid injury from slips, falls or striking other objects



## Getting on and off the vehicle

- Whenever possible park the vehicle in an area free from hazards.
- Check the area for traffic before entering or exiting the vehicle.
- Before stepping off the vehicle, check for uneven surfaces such as potholes or kerbs which may cause you to slip.
- Don't jump down – this is bad for your knees and you're more likely to fall.
- Always use steps and handholds if provided.
- Take your time to climb down from the cab, load area or catwalk facing the vehicle and use the handholds.
- When entering or exiting CFA 4WDs, hold onto the door or steering wheel to help maintain your balance.
- Watch your head clearance.
- Dry your hands/clean your gloves and wipe excess mud off your boots for surer grip.
- Don't rush to climb out after a long shift.
- Descend slowly to avoid straining a muscle.
- Be extra careful when working in inclement weather.

## Maintenance

- Report missing or damaged equipment.
- Carry out pre-use checks on your vehicle. For example, check steps and handholds are in good condition.
- Report any damaged/worn holds that could cause a fall.
- Always inspect your vehicle and the area surrounding your vehicle before entering or exiting the vehicle:
  - Survey the environment for items such as ice, grease, oil, debris, rocks, potholes, uneven surfaces
  - Survey the vehicle for cracks or excessive wear to the access points such as steps, handholds, etc
  - Ensure vehicle clutter is removed and equipment secured to avoid trip hazards when entering or exiting.
- Check the treads on your footwear regularly and replace as needed.

Three points of contact sounds simple, and you probably already do it most of the time. But it's that one time you don't that can land you in trouble.



# Fatigue

Fatigue is similar to feeling tired but it is not the same thing. When you are tired you yawn and stretch and feel like taking a break. When you are fatigued your brain begins to lose its 'thinking power'. You can lose track of what you're doing and start to make simple mistakes.

Have you ever been so exhausted you forgot basic procedures, or made simple mistakes? Fatigue poses significant safety risks on the fireground, because it can lead to:

- poor decision-making
- reduced emotional control
- reduced situational awareness
- increased injury risk
- impaired focus and difficulties with concentration
- reduced physical coordination and balance
- microsleeps

The impact of 17 hours without sleep is equivalent to a blood alcohol level of 0.05%. At 24 hours, this increases to 0.1%.

## Managing fatigue

Below are the actions to take to manage fatigue.

Risk level	Possible individual actions	Possible supervisor actions
Moderate	<ul style="list-style-type: none"> <li>• Advise supervisor of status</li> <li>• Optimise hydration and nutrition</li> <li>• Ensure breaks are taken</li> <li>• Start double checking</li> <li>• Rotate tasks</li> </ul>	<ul style="list-style-type: none"> <li>• Increase frequency and duration breaks</li> <li>• Start monitoring behavioural and task symptoms</li> <li>• Rotate tasks</li> <li>• Implement double check</li> </ul>
High	<ul style="list-style-type: none"> <li>• Advise supervisor and team members of status</li> <li>• Maintain hydration and nutrition</li> <li>• Move to lower risk tasks</li> <li>• Defer non-urgent tasks</li> <li>• No solo work</li> <li>• Power nap</li> <li>• Start requesting cross checking (second set of eyes) on key tasks</li> <li>• Caffeine</li> </ul>	<ul style="list-style-type: none"> <li>• Switch to lower risk tasks</li> <li>• Advise team members of status and ask for their support in looking out for and managing risks</li> <li>• Further increase break frequency and duration</li> <li>• Advise resourcing centre of status</li> <li>• Obtain second opinion for key decisions</li> <li>• Increase monitoring of fatigue symptoms</li> <li>• No solo work</li> <li>• Support power napping</li> <li>• Defer non-urgent tasks</li> </ul>
Extreme	<ul style="list-style-type: none"> <li>• Stand down</li> <li>• Get home safely</li> <li>• Sleep</li> </ul>	<ul style="list-style-type: none"> <li>• Stand down</li> <li>• Get home safely</li> <li>• Sleep</li> </ul>



# Dehydration

Dehydration is an excessive loss of salt and fluids from the body. While firefighting you can lose over one litre of fluid per hour which significantly increases the risk of dehydration, exhaustion and heat stress.

## Dehydration can lead to:

- fatigue
- reduced motor coordination
- headaches and/or dizziness
- reduced speed, endurance and aerobic exercise capacity
- reduced situational awareness, alertness and concentration
- irritability
- death

## Signs of dehydration

- Headache
- Thirst
- Dizziness
- Nausea
- Cramps
- Cool hands and feet
- Lack of sweating/dry skin
- Dark yellow urine

## Risk factors for dehydration

- Increased intake of caffeine, saturated fats and energy drinks
- Alcohol consumption
- Some medications (including antihistamines, antidepressants and some blood pressure tablets).

## Preventing dehydration

Ensure you drink plenty of fluids before physical activity. Don't wait until you are thirsty to drink water, because by that time you are already dehydrated.

The recommended daily intake is eight glasses for women and 10 for men.

On days where you engage in intense physical activity, or in extreme weather conditions, it's recommended that you drink up to 1200ml of water per hour with a 600ml electrolyte replacement drink each hour.





# Aviation awareness

During the 2018-19 summer season there was an increased number of near misses surrounding ground crews being impacted by firebombing loads on the fireground, be it directly or by drift. Luckily there weren't any serious injuries but it's worth remembering that **firefighter deaths have occurred overseas in very similar circumstances** where the firebombing load dislodged large tree branches which impacted crews. Fire-bombing safety and awareness is vital for everyone on the fireground.

## Firebombing safety

- Suppressants and retardants dropped from fire-bombing aircraft may travel at high speed and the impact can break or dislodge material from trees.
- Low flying aircraft may create turbulence that can also dislodge material from trees.
- Both situations may pose a danger to on-ground firefighters near a firebombing target.
- Ground personnel must be alert, and watch and listen for the noise of low flying aircraft, which could indicate firebombing is imminent.
- If ground personnel are near a firebombing target they must move a safe distance clear of the target area.
- The air attack supervisor and firebombing pilot are responsible for warning ground personnel of incoming drops from firebombing aircraft and ensuring they are clear before allowing a firebombing operation to proceed. However, sometimes they may not be able to see ground crews.
- To assist in alerting ground personnel of impending drops, the pilots of firebombing aircraft with a siren capability will activate the siren prior to and during the release of any load.
- Sirens on firebombing aircraft may be difficult to hear in a noisy environment – for example when vehicles, pumps or chainsaws are being used.



## If you are caught in a firebombing drop zone

1. Move safely away from the fireline.
2. Do not run or panic.
3. Watch out for falling branches and debris – firebombing loads can hit with high inertia.
4. Place hand tools well clear of you.
5. Secure your hard hat or protect your head with your arms.
6. Watch your footing – foams and retardant can make the ground surface slippery.
7. If you are hit with foam or retardant, wash off with cold water.

### State Airdesk dispatches

There were 1,293 individual aircraft dispatches to CFA incidents recorded on the State Airdesk dispatch system during 2018-2019. This doesn't include training events or joint flights such as reconnaissance runs.

### More information

CFA Members website: <https://www.members.cfa.vic.gov.au/mycfa/Show?pagelid=aviation>

Firebombing safety video: <https://files-em.em.vic.gov.au/public/aviation/Video/Firebombing-Safety.mp4>



# Aviation awareness tips

## Introduction

In the 2018-19 fire season the State Airdesk Dispatch System dispatched 1,293 individual aircraft to incidents – a 67 per cent increase since 2014-15.

Last season there was a noticeable increase in near misses involving ground crews on the fireground, whether directly or by drift. Below, we've outlined some lessons identified during the season by CFA volunteer air attack supervisors (AAS) Mike Carney and Andrew Avent, including some quotes from them. The aim is to minimise risk and keep ground crews safe.

## Lessons identified

**Incident control:** The incident controller informs personnel about the pre-determined dispatch (PDD) aircraft channel as specified in the district communications plan. AASs and aircraft pilots (if there isn't an AAS on scene) are required to communicate with the ground crews. If the channel is changed for some reason, details of the new channel must be passed onto the AASs/pilots. They can only do their job properly by communicating with ground crews.

**Contact with aircraft:** Ground crews are often scared to talk to aircraft, but aircraft are just another resource, like a tanker, working on the fire.

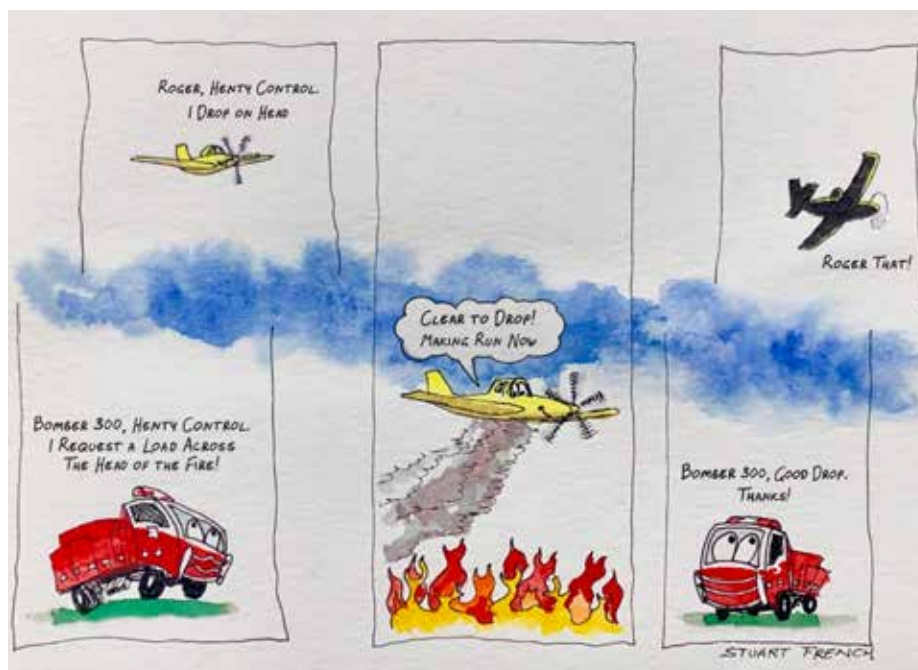
"Ground crews believe that talking to aircraft is a command role and they are not part of the command or directive process. Many of us are volunteers and we are not special. We're just crew leaders in aircraft tankers trying to achieve the same outcome as the team on the ground."

**Work with RDOs:** The Incident controllers of level 1 incidents must work with RDOs to establish the aircraft operations unit.

**Call signs:** Familiarise yourself with the aircraft call signs. More training at brigade level is needed about aircraft types, roles and terminology to help with communications. Bird Dog is a twin engine fixed-wing aircraft, and Firespotter is a single engine fixed-wing aircraft.

"We hear it all: firedog, firespotter, hound dog and many more. Crews need to know what the AAS platform is at a job. It will be a Bird Dog, Firebird, or Firespotter."

**Help from AAS:** An AAS may help you with a size-up and suggest aircraft tasking. The AAS will most likely see spot fires before you do and we will most likely try to contain these before communicating with you.



"Crew leaders may not realise that when we're working an edge we may 'disappear' momentarily to attack a spot fire."

**Take cover:** When you're working a fire edge and you know aircraft are working close by, be prepared to move away from the fire edge and take cover if necessary. Your safety is paramount, so leave hoses and gear on the ground and move away quickly. Don't return to the fire edge until you have the all-clear – a second or multiple drops may occur close to the last one.

**Use of siren:** Not all pilots remember to activate their sirens on a drop. If you don't hear a siren when an aircraft does a drop, notify the AAS who will ensure the siren is activated.

**Unsafe release:** If there's an unsafe release, tell someone immediately such as the crew leader, sector commander or the aircraft directly. Informing the AAS is the fastest way to prevent it occurring again. The bomber pilots do sometimes listen to the ground chatter on the radio and they will hear you if you call an unsafe drop.

**Engage with aircraft:** Crews need to be aware that when an aircraft is ready to drop, they need to leave the area and allow the aircraft to drop. Better coordination between ground crews and aircraft will help us to pull up grassfires sooner. Crews need to closely engage with aircraft. This can be simply just

pulling back off the actual drop location, pulling into the black and then getting quickly back onto the drop location and extinguishing the less active fire edge.

"I've seen classic long finger grassfires get away due to a vehicle not moving off the fire attack to allow an aircraft to drop. The best jobs are the ones where you know the lead tanker crew member is aware of the plan, knows the tactics and communicates. It's like poetry when it works."

**Aerial ID code:** It's important for crews to know their vehicle's aerial ID code (see photo for an example) and if you hear an aircraft calling your vehicle aerial ID code, pick up the microphone – your life may depend on it. You may be about to be overrun by fire or in the path of a drop.





# Plume fire awareness

During the 2018-2019 bushfire season, there were an unprecedented number of 'plume-dominated' fires across elevated ranges of Victoria. Plume-dominated fires are characterised by a large vertical plume or convection column that may extend over many kilometres into the atmosphere.

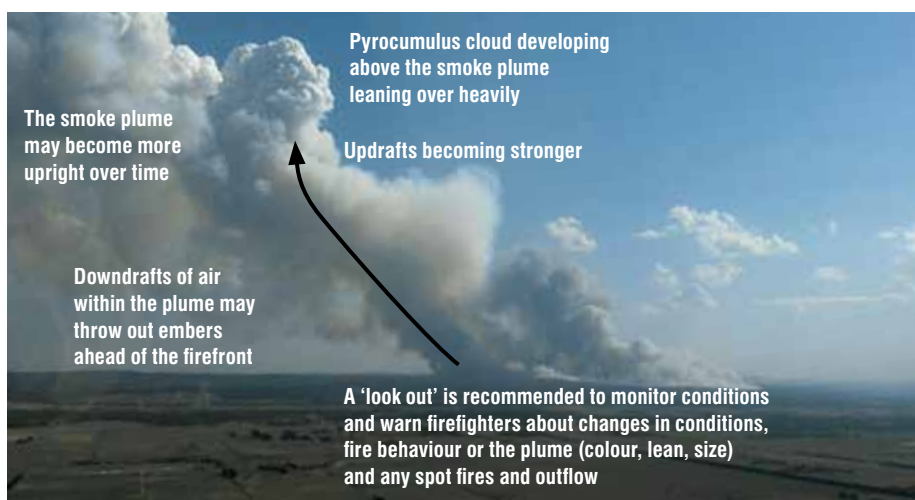
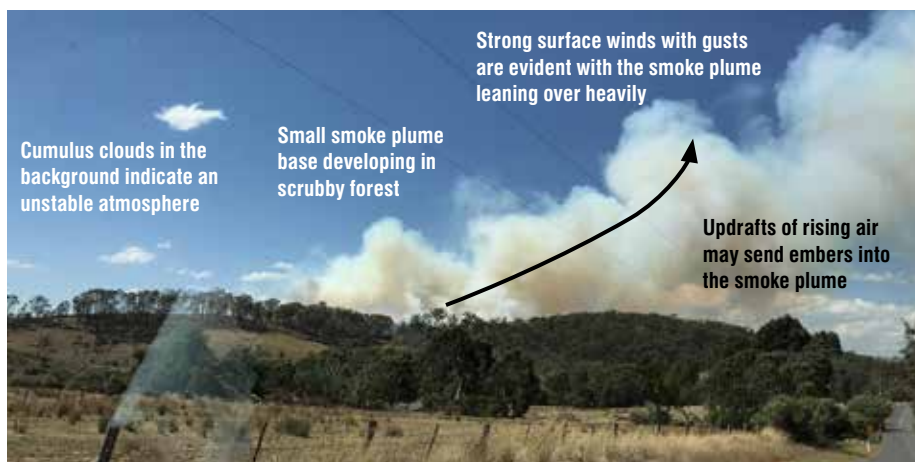
Plume-dominated fires are typically associated with large cumulus (pyrocumulus) or thunderstorm type clouds. Pyrocumulus clouds are not necessarily a concern. However, if well developed they can interact with the upper atmosphere and alter fire behaviour. Changes can be rapid and dangerous for firefighters.

Plume-dominated fire risk factors (even in low-moderate fire danger rating conditions) include:

- unstable atmospheric conditions
- burning forest fuel in hilly terrain
- rapid fire growth/increasing heat release
- incredibly dry fuel bed following years of drought
- a cold front or sea breeze impacting a fire.

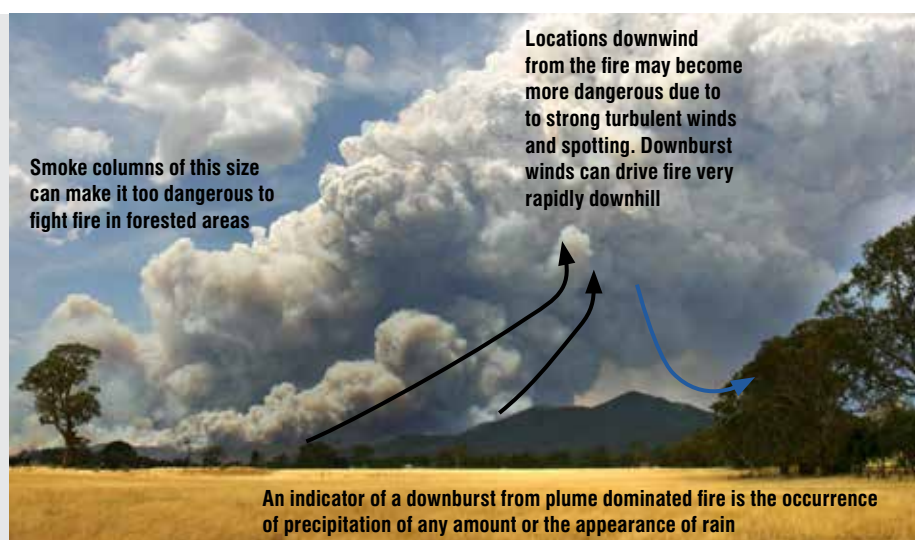
## What is pyrocumulus?

Pyrocumulus cloud typically has a crisp, white, fluffy cotton wool appearance. It forms in the upper portions of a smoke plume, often above copper-brown or dark grey smoke. Intense fires with well-developed pyrocumulus cloud may continue to grow into a thunderstorm (becoming pyrocumulonimbus cloud).



Plume-driven fire behaviour can unexpectedly:

- increase fire intensity
- change the wind direction
- change the fire's speed and direction
- increase the amount of spotting
- change the direction of spotting
- generate downdrafts and create conditions dangerous for aircraft
- trigger thunderstorms and generate lightning.



# Toxic plume modelling

An increasing number of waste fires and their impact on the community has highlighted the importance of identifying and managing the spread of smoke and chemicals. Toxic plume modelling allows us to predict the likely travel and concentration of released products, providing valuable input for community warnings and operational decision-making.

CFA continues to improve capabilities to support this need. We have pre-incident planning models available for an increasing number of high-risk sites, including identified waste sites and major hazard facilities. A real-time modelling service provides a dispersion model from the initial Triple Zero (000) details. This is available for any structure, non-structure, hazmat and related call types and provides initial guidance on the downwind dispersion from an incident.

In addition to chemicals, the toxic plume modelling capability has been expanded to predict dispersion of particulate matter (PM2.5). This provides a capability in line with the Community Smoke, Air Quality and Health Standard exposure guidelines, as well as providing new products such as deposition of particulate on the ground.

## Recent incident examples

The 2018 south-west peat fires in the Cobden area generated plumes of toxic smoke containing PM2.5 and carbon monoxide. Plume modelling was used to predict days when nearby communities would be at greater risk. By monitoring wind changes, authorities could forecast the smoke's path and relocate people as needed. The modelling also gave guidance on the ideal locations for deploying air monitoring equipment, which was used to detect areas where residents were at risk of carbon monoxide poisoning.

Plume modelling was also used during the significant dangerous goods waste fires in the Melbourne area over the past 12 months. In August 2018, columns of black smoke from a West Footscray factory fire sparked concerns among Melburnians. More than 140 firefighters responded to the out of control blaze at a warehouse which contained, among other substances, asbestos, acetone and oil. Emergency services used plume modelling to monitor the toxic smoke as it spread across the city's western suburbs. Predictive models and impact assessment tools identified schools and child care facilities that were likely to be affected by emissions from the fire, enabling more than 50 of them to close for the day.

## When you should use plume modelling

General triggers for considering plume modelling include:

- where significant and persistent smoke or emissions (products of combustion seen and unseen) are present with potential or confirmed impact on a community
- offsite release of chemical gas or vapour, particularly when there's potential to exceed exposure standards
- where a community warning has been issued or advice given to shelter/protect in place (eg close doors and windows and turn off air conditioning)
- protracted incidents where wind changes may affect fireground operations, such as impacts to rehab/staging or other vehicles and their crews.

In many cases, plumes from large fires may appear to be travelling up above the ground and not threatening the community. However, as the fire is extinguished, a reduction in heat commonly results in the plume remaining closer to the ground and community impact is likely.

There's also the potential for smoke from buoyant plumes to travel over nearby communities and then disperse downward into communities some distance away. In these situations, you may consider modelling for large fires at an early stage before impacts occur.

## How to access the service

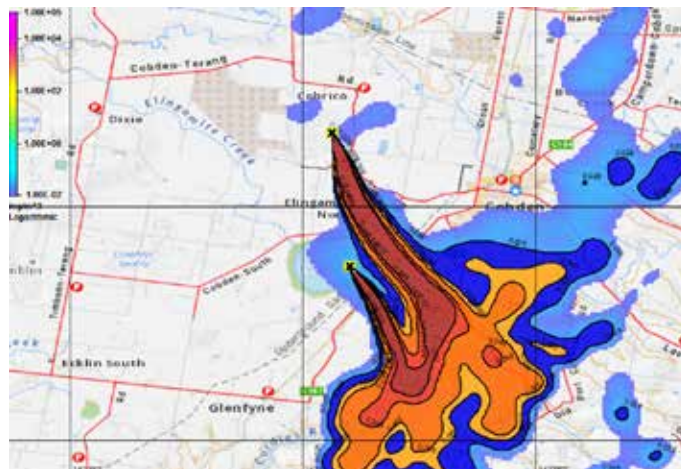
Incident response models are available through the on-call duty scientific officer, who can be contacted through the rostered duty officer. Models can be emailed or viewed online via a link provided at the time.

Good incident intelligence is imperative to accurate modelling. Please ensure the person making the request has access to up-to-date information about the incident such as release scenario, plume observations and local weather conditions.

High-risk site pre-incident planning models are continuously available through a dedicated web portal. Requests for new sites or access to the web portal should be emailed to [plumemodelling@cfa.vic.gov.au](mailto:plumemodelling@cfa.vic.gov.au)

Modelling requests for exercises and general enquires should also be sent to this email address.

Note that approval from an RDO/catchment officer is required to access this service or to request models.

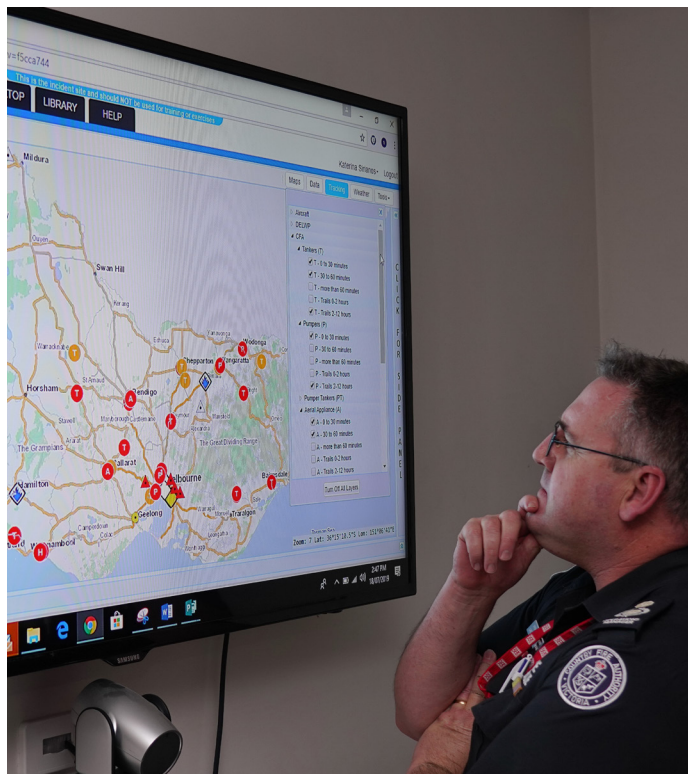




# Resource Tracking System

In mid-2018 CFA introduced the Resource Tracking System (RTS) to allow us to track the location and movement of our operational vehicles. The system collects location data and displays the position of any vehicle that is fitted with a CFA mobile radio. Whenever the CFA mobile radio fitted in a vehicle is switched on, it will send GPS location data to a secure CFA system.

Location data is generated by a GPS receiver attached to the vehicles CFA Mobile radio, and is transmitted to the RTS system via the channel the radio is set to. This includes the digital dispatch channels, CFA digital incident management channels and fireground channels.



## Frequently asked questions

### How will RTS work, and what will be tracked?

All vehicles fitted with the current CFA mobile radio will be RTS enabled. This includes all trucks, brigade and district vehicles as well as private vehicles equipped with a mobile or 'bag' radio operating on digital channels. When the mobile radio is switched on, the vehicle's location will become visible on the mapping system used by incident controllers.

### How is the tracking device installed?

The tracking functionality is built into the CFA mobile radio and its GPS antenna. No additional installation to vehicles (other than FCVs) is required.

### Will resources be tracked in real time?

Yes. Data from each vehicle is regularly sent to the RTS system while the radio is turned on and operating on a digital channel.

### What information is transmitted?

RTS sends GPS position, heading, speed, and digital radio channel.

### Who will use the data?

This data will be primarily used by incident management teams to allow them to track the location of individual vehicles. Only personnel who have an EM-COP or eMap log on will be able to access the system.

CFA's fire services communications controllers (FSCCs) at VicFire may use the information in the event of a Duress or Mayday call being received.

### Can CFA install a tracker without me knowing?

No. All CFA members have been advised of the installation of tracking on all CFA mobile radios by the CEO/Chief Officer. For new and future members, A letter introducing RTS is included in the welcome pack of new members.

### What if I don't want to be tracked?

CFA considers the safety of all personnel to be of the highest priority and therefore the RTS will be active at all times. The only option for personnel to opt out of being tracked by this system is not travel in any vehicle that's fitted with the enabling technology. Members using CFA vehicles during incidents will be required to have the radio turned on at all times so that location data can be made available.

If you are not on CFA business, in a private vehicle fitted with a CFA bag radio for example, simply turn off the radio and no tracking data will be transmitted.

### How accurate is the data collected?

Position is usually accurate to within 5 metres, but if the GPS signal is affected by buildings it may be accurate only to within 50 metres. Also, the data is only accurate when the report is sent. The next report should be sent a few minutes later. If a fireground channel is used an FCV equipped with a cellular/satellite modem needs to be within normal radio range to relay the report. Otherwise, the tracking data will drop off the system and only the last known position will be recorded. Similarly if the radio is switched off, no tracking data will be sent.

It's important that the CFA members in control vehicles fitted with a CFA mobile radio are aware that the system tracks the vehicle and records the location data for both immediate and historical analysis. By using RTS-fitted vehicles, consent of CFA staff, CFA volunteers, coast guard brigade members and fire industry brigade members is implied to allow CFA to use GPS tracking technology to determine location information for the purposes set out in the RTS Business Rule.

### Further information:

<https://www.members.cfa.vic.gov.au/mycfa/Show?pagelD=resourceTracking>

## CHIEF OFFICER'S EXPECTATIONS

Our fire season is rapidly approaching and early indications suggest there is potential for significant fires around our state to occur during spring. Already there have been fires in northern NSW where warnings have been issued and lives and property have been under threat.

The responsibilities and accountabilities of my role are varied. But what occupies much of my thinking is "have I done everything in my power to ensure that our members go home safe to their loved ones?" Every day our firefighters respond to hundreds of fires and incidents and as a result regularly put themselves into harm's way as we undertake our mission of saving lives and property.

Last year fire agencies had multiple instances where trees hit vehicles and many near misses. And despite our best efforts training our firefighters in fire behaviour and how to maintain situational awareness on the fireground, we continue to have burn overs and burn unders at fires.

I am asking for the help of every member of CFA – especially our crew leaders – to turn this around. We owe this to our families and loved ones, our fellow members and ourselves.

For the past few years I have communicated my expectations that all operational members of CFA complete Minimum Skills, the hazardous trees package (every three years) and the entrapment drill (annually). Our district leadership teams have asked me for further clarity so in response I provide the following:

- Before any firefighter responds to a fire, they need to have completed wildfire Minimum Skills, the hazardous trees package and the entrapment drill.
- All districts must ensure they allocate time and resources to support brigades and groups as a priority to undertake these activities and consider innovative ways to help our members.
- Crew leaders are able to 'sign off' members as having completed the hazardous trees package and entrapment drill as a way of reinforcing their knowledge and supporting captains and training officers by spreading the load across the brigades and groups. Captains (OICs) of brigades remain accountable for ensuring this is applied to their brigades in accordance with 'Standard Operating Procedure 2.01 - Brigade Officers - Responsibilities of'.

- I ask our leaders at every level to discuss with their teams the requirements and accountabilities detailed in 'Standing Order 6 - Training & Competence' and 'Standing Operating Procedure 6.04 - Firefighter Skills - Development and Maintenance of', which have been in place for many years.

While we work together to provide opportunities for our firefighters to prepare themselves for the summer fire season, please do not forget:

- hit fires hard and fast
- ensure you do your part to ensure information and warnings are issued to our community members so they can make informed decisions about their safety
- everyone comes home, every time, safely. The safety of our people is my highest priority
- be individually ready, both physically and mentally, for a long season
- ensure your community is ready – engage them and communicate well
- be confident to make decisions at all levels – back your training and knowledge
- work together with all agencies and at all levels: state, region, district, group, brigade and, most importantly, the community.

Demonstrate our values at all times:

- We put safety first
- We excel through teamwork
- We are dynamic and adaptable
- We act with integrity
- We respect each other

Our role in the community is such an important one, and you should all be proud to be part of CFA. I will never underestimate what you all achieve to keep Victorians safe.

Our leaders, at all levels, need to lead by example and focus on doing the right thing, building capability, making accountable decisions and being adaptable. The environment we work in is often complex and dangerous; and we must rise to the challenge, make transparent and timely decisions, and act with integrity at all times.

You should all be proud to be part of CFA. Look after yourself, your families and your teams, and be ready for the challenge our environment presents.