Selection of Appropriate Respiratory Protective Devices (RPD) During Bushfires

PROCEDURAL

GUIDELINE

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Citation

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Review period

This AFAC guideline should be reviewed by the doctrine owner come 1 May, 2022.

Contents

Acknowledgements

None to note at this time.

Source of authority

Approved by AFAC Council on 28 April, 2017.

Purpose

This guideline has been prepared to assist and support AFAC members in managing the selection of respiratory protective devices (RPD) during bushfires.

Scope

This guideline covers the types of RPD that may be used and worn by workers during bushfires or at controlled fires, e.g. a prescribed burn, or bushfire.

This guideline specifically excludes RPD used by workers at structure fires, vehicle fires, HAZMAT incidents and other like incidents.

Statement of engagement

This guideline has been developed via a consultative process involving the AFAC Personal Protective Equipment (PPE) Technical Group (custodian), Rural Land Management Group, Urban Operations Group and the Work Health and Safety Technical Group.

Audience

This guideline has been developed as a reference tool for AFAC members.

Definitions, acronyms and key terms

In this guideline, the following terms have specific meanings.

AFAC member: A current member of AFAC as listed on afac.com.au.

Bushfire: A general term used to describe a fire in vegetation.

Worker: Terminology used in health and safety legislation to describe a person, including employees and volunteers that carry out work in any capacity for an AFAC member.

Introduction

AFAC guidelines are a preferred or advisable course of action. AFAC members are expected to be aware of the guideline and how to best apply it to the circumstances faced by their organisation.

This guideline has been prepared by the Personal Protective Equipment (PPE) Technical Group to assist AFAC members in meeting their obligations under health and safety legislation to provide as safe a work environment for their workers as is reasonably practicable.

A number of members already have RPD policies and / or procedures in place, and application of this guideline will ensure a consistent approach is undertaken by all AFAC members.

AFAC's guideline

A range of RPD exists that could be used at bushfires. Not all RPD available is suitable for use. This is where the terminology 'reasonably practicable' needs to be given careful consideration from a risk management perspective as there is no definitive answer given to the many variables that exist during bushfires. Variables may include type and density of smoke, duration of exposure to smoke, fitness and training of the worker wearing the RPD and the ability to carry and replace RPD and associated consumables on a fireground.

Types of RPD

RPD generally falls into two categories; disposable and reusable. Both types can be used at bushfires and there are multiple options within each category.

The classification system for respirators is:

- P1 - respirators used to protect against mechanically generated particulates;
- P2 - respirators used to protect against mechanically and thermally-generated particulates; and
- P3 - respirators used to protect against all particulates including highly toxic materials.

When RPD use is necessary, workers are, at a minimum, required to wear P2 RPD protection during bushfires that meet the following requirements.

- Provide protection from mechanically and thermally generated particles with a minimum rating of P2 as stipulated within AS/NZS 1716 or equivalent international standard.
- Demonstrated flame resistant properties (e.g. AS/NZS 1716 – Appendix C).

Disposable respirators

Disposable respirators are only available as P1 or P2 (please note that P1 respirators are not suitable for use at bushfires). The most commonly used type of RPD during bushfires is a P2 mask, but these are only suitable for filtering airborne particulates, and only have limited ability to filter out gases or vapours. The masks consist of a paper or composite material that is held in place by rubber or elastic retention straps that fit over the nose and mouth. They may come in a range of sizes, and may have exhalation valves fitted and / or include carbon filters fitted to filter nuisance vapours etc. They provide a practical solution for use during bushfires. Like all RPD, disposable respirators are reliant on a good fit to achieve maximum particulate filtration. There is no requirement to have an ongoing respirator maintenance program in accordance with AS/NZS 1715 for disposable masks, but wearers should be trained in how to fit and wear disposable masks and also be made aware of their limitations.

Reusable filter respirator

Filter respirators use replaceable filters to clean the air. The filters are fitted to half face piece, full face piece, or head covering masks that provide wearers protection from particulates, gases and / or vapours depending on the filters fitted.

Filter life depends on a number of variable factors including the wearers breathing rate, the characteristics and level of the contaminant, the length of exposure to a contaminant and environmental conditions such as temperature and humidity.

It should be noted that when a P3 filter is used with a half face piece mask, its protection factor is only equivalent to a P2 filter.

Use of reusable respirators requires the implementation of an ongoing respirator maintenance program in accordance with AS/NZS 1715.

The integration of reusable respirators is increasing during bushfire response, but their suitability for extended use – as may be experienced during a major fire – remains questionable due to the increased effort to breathe through cartridge type filters and the ability to maintain an ongoing face seal due to sweat and facial hair. Replenishment of cartridges can also create supply issues when workers are working remotely or are inaccessible.

Reusable powered air respirator

Powered air respirators use a motorised blower unit to draw air through a filter to deliver clean air into the respirator face piece. The units consist of a battery pack, blower unit, filter and face mask.

These are rarely used during bushfires as they tend to be too unwieldy for extended periods of use and are reliant on the availability of replacement batteries to operate.

Reusable self-contained breathing apparatus (SCBA)

SCBA is a self-contained unit that provides the wearer with an independent supply of breathable air. The average SCBA weighs approximately 12 kg when ready for use. Specialist training is required to become an SCBA operator. SCBA is normally used at structure fires and other incidents where a wearer has the potential to be exposed to life threatening atmospheres.

Use of SCBA during bushfires is considered impractical due to the size, weight and short duration of the available air supply (35–45 minutes).

Supporting discussion

Smoke from bushfires is known to contain hundreds of chemicals some of which may cause health issues because they are either hazardous or present at elevated levels. The toxins of most concern to those involved in dealing with bushfires are:

- carbon monoxide
- respirable particles
- aldehydes
- volatile organic compounds (VOC).

Under health and safety legislation, it is a requirement – so far as is reasonably practicable – that the health and safety of workers is not put at risk from the work they carry out. This is achieved in a normal work environment by using the 'Hierarchy of Controls' shown below.

- Elimination – remove the hazard (cause of danger).
- Substitution – control the hazard by replacing it with a less risky way to achieve the same outcome.
- Isolation – separate the hazard from the people at risk.
- Engineering – use engineering controls, e.g. making physical changes, to lessen any remaining risk, e.g., vehicle protection systems.
- Administration – use administrative controls to lessen the risk, e.g. use of Standard Operating Procedures (SOP).
- Personal Protective Equipment (PPE) – require workers to use appropriate PPE, e.g. RPD.

Under this hierarchy, PPE is only used as a last resort. Unfortunately, emergency service workers do not work in a 'normal work environment', so PPE is often used as a means to manage risk during bushfires.

Risk assessment

Because AFAC members operate in situations with significant variables, the range of RPD available to them, the environment in which they are used and the training available to workers that operate them can be situation unique. Selection, use, care and maintenance of RPD during bushfires is predicated on the use of a risk assessment process that determines what type of respiratory protection should be used, and any other control measures needed to ensure worker safety.

Conclusion

AFAC members are required to ensure, so far as is reasonably practicable, that the health and safety of their workers is not put at risk from the work they carry out. In a bushfire environment, this creates significant challenges as each situation is different. Consequently, what is 'reasonably practicable' will vary.

To ensure a consistent approach is undertaken, AFAC members should:

- ensure their workers are provided with training in the selection, care, use and maintenance of RPD and the levels of protection it can provide in accordance with AS/NZS 1715;
- conduct ongoing risk assessments at each bushfire to determine when RPD is required and what the most appropriate RPD to be used is in that specific situation;
- when possible, minimise worker exposure to bushfire smoke at a bushfire; and
- when possible, minimise the amount of time workers are exposed to smoke at a bushfire.

Note: Detailed information on bushfire smoke, its content, health effects and smoke exposure management can be found in *Smoke Exposure Management on the Fire Ground: A Reference Guide* by Fabien Reisen and C.P. (Mick) Meyer published by the Bushfire CRC.

AFAC DOCTRINE

1 RESILIENT COMMUNITIES

Bushfires and Community Safety	AL
Classifying Bushfire Fuels in Australia	GE
National Position on Prescribed Burning	GE
Smoke Alarms in Residential Accommodation	AL
Comm Safety Messaging, Catastrophic Bushfires, Black Saturday Lessons*	AL
Change Your Clock, Change Your Smoke Alarm Batteries	AL
Fire Safety for Road Tunnels	AL
Carparks Incorporating Multitiered Vehicle Stacking Devices	AL
People in Cars During Bushfires	AL
Principles for Educating Children in Natural Hazards and Emergencies	AL

2 TRUSTED RESPONSE

Australasian Inter-service Incident Management System AIIMS	SL
Class A Recycled Water for Firefighting Purposes	ELA
Firefighting Water Point Markers	ELA
Unauthorised or Illegal Use of RPAs in or Near Emergencies	ELA
WHS Hazard Management: A Risk Management Approach to Safety	SL
WHS Hazard Management Framework for Emergency Responders	SL
Acetylene Cylinder Incidents	ELA
Compressed Air Foam Systems (CAFS)	ELA
Emergency Medical Response	ELA
First Responders Attending a Swift Water Incident	ELA
Managing Bushfire at the Urban-Rural Interface	AL
Managing Fatigue in Emergency Response	SL
Managing Heat Stress in Emergency Response	SL
Managing Hydration in Emergency Response	SL
PV Array DC Isolation Switches	ELA
Responding to Incidents Involving Landfill Gas Leaching	GE
Use of Temporary Flood Barriers	ELA
Vertical Rescue	AL

3 CREDIBLE INFORMATION

Fire Risks from the Management of Gamba Grass in Northern Australia	GE
Use of Chemicals in Bushfire Control and Prescribed Burning	GE
Use of Lookouts, Awareness, Comms, Escape Routes, Safety Zones (LACES)	ELA
Use of Personal Fire Shelters in Wildfires	ELA
Wind Farms and Bushfire Operations	ELA
Aerial Appliance Safe Use and Minimum Maintenance	ELA
Aerial Ignition Operations	ELA
Case Studies: Sharing and Retaining Knowledge by Practice and Research	NK
Conducting Independent Operational Audits	ELA
Glossary of Standardised Industry Terms	AL
Identification of Portable Fuel Containers	RS
Landscape Fire Performance Measures Data Dictionary	GE
Safety Considerations for Photovoltaic Arrays	ELA
AFAC / AIDR Glossary of Standardised Industry Terms	ALT

4 EFFECTIVE GOVERNANCE

Strategic Directions for Fire and ES in Australia and New Zealand 2017-2012	SE
What Is Operational Success for Fire and Emergency Services?	SE
Climate Change and the Fire and Emergency Service Sector	ELA
Common Hose Couplings for AFAC Members Agencies in Australia	RS
Duty Death Register Reflected on the National ES Memorial	SE
Endorsement of Level 3 Incident Controllers	ELA
Identification of Portable Fuel Containers	RS
Leadership Capability Framework	SL
Role of Chiefs	SE
Emergency Service Vehicle Warning Devices	ELA
Fire Aviation Training and Assessment	ELA
Fundamentals of Doctrine: Best Practice Creation	NK
Heavy Tanker Crew Cab Chassis	RS
Medium Tanker Crew Cab Chassis	RS
Member and Stakeholder Consultation	NK
Operational Response Vehicle Tyre Management	RS
Optimising the Service Life of Operational Response Vehicles	RS
Rural Firefighting Vehicles: Burn-over Protection	RS
Selection of Appropriate Respiratory Protective Devices During Bushfires*	RS
Selection, Use, Care and Maintenance of Personal Protective Equipment*	RS
Australia and New Zealand Qualified Products Fire Chemicals	RS

5 RESEARCH INFORMED

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CAPSTONE

FUNDAMENTAL

PROCEDURAL

TECHNICAL

*Accurate as at 1 June, 2017. See www.afac.com.au/doctrine for more information.

TRAINING RESOURCES

1 RESILIENT COMMUNITIES

- Assist with Prescribed Burning — SL
- Conduct Complex Prescribed Burn — SL
- Conduct Simple Prescribed Burns — SL
- Develop Complex Prescribed Burn Plans — SL
- Develop Simple Prescribed Burn Plans — SL
- Foster a Positive Organisational Image in the Community — SL
- Participate in Community Safety Activities — SL

2 TRUSTED RESPONSE

- AIIMS Aides-memoire and eBook — SL
- AIIMS Intelligence Officer Training Resource Kit — SL
- AIIMS Introduction and Principles Online — SL
- AIIMS Training Resource Kit — SL
- Check Installed Fire Safety Systems — SL
- Drive Vehicles — SL
- Employ PPE at a Hazmat Incident — SL
- Inspect Dangerous Goods Facilities — SL
- Monitor Hazardous Atmospheres — SL
- Navigate to an Incident — SL
- Operate Breathing Apparatus — SL
- Operate Communications Systems and Equipment — SL
- Operate Pumps — SL
- Protect and Preserve Incident Scene — SL
- Render Hazmat Incidents Safe — SL
- Respond to Isolated Structure Fire — SL
- Respond to Urban Fire — SL
- Respond to Wildfire — SL
- Suppress Urban Fire — SL
- Suppress Wildfire — SL

3 CREDIBLE INFORMATION

- Conduct Briefings and Debriefings — SL
- Interpret and Analyse Fire Weather — SL
- Take Local Weather Observations — SL

4 EFFECTIVE GOVERNANCE

- Assist with Formulation and Implementation of Plans and Policies — SL
- Communicate in the Workplace — SL
- Lead, Manage and Develop Teams — SL
- Manage Financial Resources — SL
- Manage Marketing Requirements — SL
- Manage Organisational Communication Strategies — SL
- Manage Procurement — SL
- Work Autonomously — SL
- Work in a Team — SL

5 RESEARCH INFORMED

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*Accurate as at 1 June, 2017. See www.afac.com.au/shop for more information.