

Risks associated with the use of fire as a weapon by terrorists in the Australian context

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ABSTRACT

“Pyro-terrorism is the use of incendiary attacks to intimidate or coerce a government, the civilian population, or any segment thereof, to advance political or social objectives” (Baird, 2006). Pyro-terrorism attacks differ from traditional arson attacks and can comprise a component of dual-phase ambushes, incur injuries and fatalities, create fear and confusion, and delay the response and mitigation of an incident. The often simple application of fire as a weapon by terrorists creates a complex and challenging situation for counter-terrorism (CT) and emergency service agencies, with the traditional risks associated with fire, such as toxic atmospheres created by smoke and carbon monoxide, structural compromise, and rapid fire spread, compounded by actions seen in terrorist attacks. This includes the targeting of mass groups, ambush and armed assault, and devices planted to create secondary victims. This is not a new form of terrorism; however, the spike of pyro-terrorism globally over the recent years (GTD, 2019a) suggests that its ease of use is proving to be an attractive weapon at a time when terrorists are seeking simple methods of attack (Australian Government, n.d.). While pyro-terrorism targeting rural areas can lead to widespread bushfires causing destruction and death, urban areas are just as susceptible to pyro-terrorism as both a standalone tactic and in combination with other attack methods. Denser populations, flammable building materials, and delays experienced during evacuations contribute to the risks faced by urban populations. Australia has experienced political and racially motivated incendiary attacks although the focus of these has mainly been buildings and other structures. An attack in Melbourne in 2018 demonstrated that Australia is not immune to the threat of pyro-terrorism and the associated risks. This 2018 attack involved a violent actor who used a car fire in combination with an edged weapon to directly target civilians within the centre of the city. By analysing the use of fire by this attacker, and other violent actors overseas, we can begin to identify the risks faced when these methods are employed in terrorism and the importance of an integrated response to combat such incidents.

Key Words: Terrorism, Australia, Pyro-terrorism, Arson, Incendiary, Firebomb

INTRODUCTION

The terms fire as a weapon, or active violence with fire, refer to incidents, actual or thwarted, where smoke and or fire is used to directly inflict harm on an individual or group. Further, it encompasses incidents where smoke and or fire are used as a diversion or to further complicate rescue and response activities (Jernegan, 2021). When employed as a method during terrorist activities the term pyro-terrorism can be used. Pyro-terrorism can be defined as:

the use of incendiary attacks to intimidate or coerce a government, the civilian population, or any segment thereof, to advance political or social objectives. Pyro-terrorism possesses the four generally accepted elements of terrorism: targeting of non-

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combatants, political motivation, violence with a psychological impact, and organized perpetrators (Baird, 2006).

The use of pyro-terrorism as a tactic by various ideological, religious, or political actors is a noteworthy feature of the current threat landscape, with most western populations living with some degree of elevated terrorism threat level (Australian Government, n.d). The often simple application of fire as a weapon by terrorists has the propensity to create a complex and dangerous situation for civilians and emergency service agencies alike, with urban and rural environments both susceptible to pyro-terrorism. Pyro-terrorism differs from traditional conceptualisations of criminal arson through its intentions: notably, its strategic objectives aimed at coercing certain targets based on the perpetrator's ideological beliefs, and through its actions, often aimed at threatening the lives of those targeted. It can create chaos and confusion; be an element of complex ambushes, and delay counter-terrorism responses, therefore prolonging an incident and maximising publicity outcomes. Fire typically requires less expertise than the construction of an improvised explosive device and can cause great destruction and kill and injure victims without direct contact from the violent actors taking place. As a consequence of these factors, pyro-terrorism is capable of generating extensive media attention, a favourable result for terrorist groups whose strategies include spreading fear.

This research explored the increased use of pyro-terrorism globally in recent years to identify the broader risks that emerge when it is employed as a tactic, and how these risks relate specifically to the Australian context. The risks identified relate directly to conditions set or outcomes from terrorist actions that affect the safety of the public or emergency service responders. This paper aims to demonstrate the need for counter-terrorism and emergency service agencies to plan and prepare to address these risks. The intention is not to discuss the current threat posed to Australia or argue the propensity for the use of fire by terrorists, but rather, elucidates the primary and secondary risks that derive from the tactic in both urban and rural environments. Pyro-terrorism can target urban areas, capitalising on an increased population to endanger, flammable structural elements or the resulting confusion and disruptions. Within rural environments, pyro-terrorism can exploit the already existing bushfire threat to create largescale fires that cause death and destruction across expansive areas. In his study on fire as a weapon in high-rise structures, Sheppard (2017) discusses calculated pyro-terrorism as a thought-out means of violence rather than a convenience. While recognising the threat of terrorist induced bushfires, Sheppard (2017) also raises his concern of the vulnerability of high profile urban targets, pointing out, "terrorists have proven adept at spotting vulnerabilities" (p.62). Fire can be used as a standalone tactic, as seen with forest fires in Israel (Deshpande, 2009), or in combination with other attack methods, as exemplified with the Mumbai attacks in 2008, or it may be an unintended yet favourable outcome for terrorists undertaking an attack.

METHODOLOGY

This review article unites three fields; the extant literature of pyro-terrorism, the author's knowledge of fire and emergency management responses, and precedent/review of activity and engagements to articulate the possible risks and consequences of pyro-terrorism in the Australian context.

This study engaged in a qualitative analysis of the knowledge of pyro-terrorism. Scholarly understandings of pyro-terrorism were explored alongside evidence of pyro-terrorism attacks targeting civilian populations, outside of conflict zones, both in Australia and around the world, by terrorists motivated by a wide array of beliefs. Open-source content from

global media outlets, terrorism databases as well as the SITE intelligence group was used to identify pyro-terrorism events for research. Some non-terrorism events were included for case studies where it was identified the perpetrators' actions generated similar risks to those that would be experienced if it was a terrorist-actor who had initiated the attack.

Key search terms used in this study spanned "fire as a weapon", arson, "active violence with fire", and pyro-terrorism. While the first three terms can be applied to other forms of criminal activity, pyro-terrorism is quite specific with Baird's (2006) definition of pyro-terrorism adopted for this research as it encompasses the key attributes of terrorism definitions, "targeting of non-combatants, political motivation, violence with a psychological impact, and organized perpetrators" (Baird, 2006).

Extremist propaganda was also accessed via SITE Intelligence group to develop an understanding of the available content and advised methods terrorist organisations have distributed.

BACKGROUND LITERATURE

Pyro-terrorism remains an under-researched area with the current literature on the topic leaning more towards the rural environment and bushfire risk, with limited discussion on the urban environment. Further to this much of the current literature fails to delve into the threat it poses, the associated risks, and the difficulties that are likely to arise during the response to this form of terrorism. Bendle (2009) noted that pyro-terrorism has not received the "analytical attention it demands" (p. 19), and further elaborated about its potential effects on critical infrastructure, natural resources, and economies (p. 8). This is supported by Sheppard (2017), who argues that the academic community has failed to take the significant differences between pyro-terrorism and other forms of terrorism seriously (p.61). Sheppard (2017) raised the point that some may feel work in this area may suggest pyro-terrorism is a new form of attack. He contested this, stating that Palestinian militants have used fire as a weapon for some time and that his review of the literature suggests that "failures of imagination" (p. 62) are a more urgent danger. Sheppard (2017) also began to highlight the risks posed by terrorists targeting high-rise buildings in urban environments, when much of the current literature addresses the bushfire or forest fire risk.

Despite the limited research on pyro-terrorism, terrorists, and other extremists have engaged in pyro-terrorism for centuries with right-wing and jihadist violent actors among them. Approximately 55 terrorist organisations around the world were identified as having applied fire in some form during attacks between 1968 and 2005 (Besenyő, 2019, p. 1229); among these were environmental and animal rights extremists (Chermak et al., 2013). Waves of extreme right-wing arson attacks have occurred in Europe during periods deemed "refugee crises" between 1991 and 1994 as well as 2015 to 2016 (Koehler, 2019), and while a majority of these attacks targeted uninhabited buildings, there were some that put lives at risk (Koehler, 2019 p. 5). In recent years SITE Intelligence (2019, March) has identified right-wing extremism activity online that calls for arson attacks on mosques to increase polarisation in multi-cultural communities and provoke retaliation.

Israel's forest areas are said to have been targeted in pyro-terrorism attacks over the past four decades (Deshpande, 2009, p. 38). In April 2018 a new tactic emerged with incendiary kits and balloons used to reach deeper into Israeli territory to ignite forest fires without terrorists having to cross the border. Hamas have learnt to exploit these fairly primitive devices, with their inception by other groups dating back as far as the 2nd Century B.C (Zych, 2019). While there have been no reported human casualties so far, they have "allowed Hamas to challenge

the Israeli military and emergency services” and proven to be a useful terrorist tactic providing intimidation of societies and impact on government. (Zych, 2019, p. 75).

The use of fire as a weapon appears to have been more strongly embraced by jihadist terrorists after Al Qaeda in the Arabian Peninsula (AQAP) released its 9th issue of *Inspire* Magazine in May 2012 (Al-Malahem Media, 2012). Despite an Al Qaeda website providing a six-point plan on how to inspire arson attacks against US targets in 2004 (Besenyő, 2019, p. 1231), the global terrorism database shows that a spike in the use of incendiary attacks occurred from around 2012 onwards (GTD, 2019a). While increased use of pyro-terrorism has been identified, pyro-terrorism as a whole is a fairly rare tactic (Deshpande, 2009, p. 42) with the Global Terrorism Database (2019a) recording only 7,240 incendiary related attacks out of 106,097 terrorist attacks globally between 2008 and 2018.

While it is difficult to fully credit an increase of pyro-terrorism to any one factor, it is probable that *Inspire* magazine contributed to this increase to some degree, during a time where lone-actor terrorist attacks have become more frequent (Institute for Economics and Peace, 2016, p. 34-48). An article in *Inspire*'s 9th issue titled “It is of your freedom to ignite a firebomb,” featured an image of the Sydney Opera House and specifically discussed the December 2002 and 1983 Australian bushfires, citing the devastation they caused. This article went on to guide readers on choosing the right time and circumstances to undertake an attack as well as providing instructions on creating a timed incendiary device (Al-Malahem Media, 2012). Not long after this, in 2013 the 10th issue of *Inspire* was released (Al-Malahem Media, 2013). This issue featured a smaller single page article encouraging the arson of vehicles in the west, using headings such as ‘easy to do’ and ‘procedures.’ *Inspire*'s use of specific images and references to Australia highlights that Australia is a favourable target for jihadist terrorists and that through inclusion in their propaganda AQAP may motivate and mobilise home-grown extremists who could be inspired to engage in an attack on home soil (Harris-Hogan, 2012). Couple this with the simple instructions provided in the magazine and the risks associated with pyro-terrorism in the Australian context should be explored.

Fast forward to the emergence of Islamic State (IS) and their 5th issue of *Rumiyah* magazine in 2017 where the use of fire against the west is again a feature, with the article ‘Just Terror Tactics.’ Just as *Inspire* did, this article provided simple instructions on planning an attack and choosing a location. IS further simplified their message instructing on Molotov cocktails, rather than the more technical timed incendiary devices, and discussed urban targets and tips for claiming responsibility for an attack. This ensures they receive the credit for attacks to help further spread fear (Al Hayat Media Centre, 2017).

Jihadist propaganda online, especially IS aligned media groups and supporters, continue to discuss and incite the use of fire as a weapon among other tactics. Groups such as al-Haqq Foundation (SITE Intelligence, 2019, February), as well as IS supporters have created posters, guides, and videos in various languages which have been posted to Telegram chat groups (SITE Intelligence, 2020, August). The imagery used in this propaganda has included graphically altered images of western targets (SITE Intelligence, 2019, February), images and reference to real-life fires, including Australian and Californian bushfires (SITE Intelligence, 2020, October), as well as realistic graphics from the video game grand theft auto (SITE Intelligence, 2020, August). Bushfires in Australia and more specifically Victoria were mentioned among other western locations in a July 2020 video titled “incite the believers” posted by al-Hayat Media (SITE Intelligence, 2020, July). This video appears to revisit the earlier topic discussed by *Inspire* magazine, again hoping to motivate and mobilise home-grown Australian terrorists to undertake a pyro-terrorism attack. The widespread death and destruction caused by the bushfires appear to have caught the attention of a terrorist organisation that is constantly evolving and adapting its methods in an attempt to engage in successful attacks against western targets.

The perceived relevance of the information seen in the 9th issue of *Inspire* magazine is a likely motivation for resurrecting and re-circulating this content, which has been identified along with newer content encouraging the use of airships to start fires, following on from success in Gaza (SITE Intelligence, 2019, November).

AUSTRALIA'S EXPERIENCE

Australia is not immune to the use of fire by terrorists and other violent extremists. One of the five white supremacists convicted over a spate of firebombings on Chinese restaurants in Perth in 2004 (Harris-Hogan, 2017) was identified as having already served prison time for earlier arson attacks on Asian owned businesses as part of the neo-Nazi Australian Nationalist Movement in Perth in the 1980s (TRAC, n.d.). Other arson attacks have included the 1995 attack on the French Consulate in Perth ("Israeli Woman Imprisoned," 1995) and two separate attacks targeting a Toowoomba mosque in 2015 ("Toowoomba mosque damaged," 2015). In Melbourne, three Sunni Muslim men were convicted of terrorism charges after they tried to burn down a Shiite Mosque in 2016 ("3 convicted of terrorism," 2019).

While mainly targeting uninhabited buildings these attacks can still generate fear, damage critical infrastructure, and lead to adverse outcomes for the community. Counter-terrorism police in Melbourne are continuing to investigate a deliberately lit fire of a power and phone tower in May 2020, with an offender yet to be arrested (Pearson, 2020). This follows an increasing trend of attacks on 5G towers globally (Meleagrou-Hitchens & Crawford 2020), with SITE intelligence (2020, May) identifying online chatter promoting these 5G arson attacks.

Of most concern are attacks that directly threaten the lives of community members through the use of violence. The man arrested over the murder of a security guard at a Melbourne abortion clinic in 2001 had reportedly planned to "shoot as many as possible before setting fire to the clinic and sealing the doors," (Harris-Hogan, 2017, p. 6). The anti-abortion activist was fortunately overpowered before he could execute his plan.

In the wake of anti-lock-down protests during the 2020 Covid-19 Pandemic SITE intelligence (2020, May 12) identified a right-wing accelerationist Telegram channel inciting arson attacks against police in Sydney, providing maps of police station locations. While this is a concerning idea no such attacks have taken place at this stage.

Melbourne Attack 2018

The most recent example of fire being exploited in an Australian national security context comes from 2018. On Friday 9 November 2018, at around 4.20pm, the Somali-born perpetrator ignited a four-door utility containing several LPG cylinders in the middle of Bourke Street in the CBD (Henriques-Gomes, 2018). He then proceeded to attack people in the vicinity with a knife, killing one and injuring two others before being shot and killed by responding police (SBS News, 2018). It was reported that the perpetrator's passport had been cancelled in 2015 after concerns he was going to travel to Syria to fight with IS (Henriques-Gomes, 2018), an action that likely saw him refocus his efforts into carrying out an attack on home soil. Limited official open-source information is available in regards to this attackers exact intentions, we can however address the facts that are known and identify the risks associated.

The location and time of the day provided ample potential victims and almost guaranteed a high degree of media coverage. Such a busy location in the center of the city could have seen crowds converge to observe what was occurring, thereby providing extra victims for the terrorist to target. The use of LPG cylinders in the vehicle presents a risk of a boiling liquid expanding vapour explosion (BLEVE) (Hahn, 2019), with the potential for explosion occurring

during the initial stages, injuring many civilians, or as a form of secondary device, exploding as emergency services converged on the scene. The fairly intense fire could have drawn firefighters into a potential ambush unaware of the malicious intent behind what was occurring. If the police had been unable to stop him as quickly as they did (Henriques-Gomes, 2018), a risk exists that paramedics and firefighters could have been attacked or their response delayed as they staged while the active threat was ongoing. This could have led to fire spread and delayed the medical treatment of victims. Again the exact intentions of the attacker are unknown but the burning vehicle did come to rest just on the footpath of a tree-lined street close to the awning of a building. The flame height at the peak of this fire, which can be seen in news images ("Bourke Street attacker," 2018), had the potential of igniting nearby trees or building awnings which could have spread the fire to a structure. This then leads to a whole number of the risks discussed later in this paper regarding structure fires and evacuations.

RISKS

Considering Australia's experiences along with observations from international events we can begin to understand the risks to safety that are associated with pyro-terrorism and interpret how it relates to the Australian context.

Urban Environment

Strict building regulations mean that Australia's high-rises are quite safe with active and passive fire safety features aimed to reduce the spread and effects of fires (Wormald Australia, n.d.). During the San Bernardino terrorist attack in 2015, however, one of these features worked against first responders. Whilst the incident did not involve fire, a round from one of the terrorist's firearms struck a sprinkler pipe causing a flow of water that soaked some victims (Braziel et al., 2016). The police and probation officers attempting to rescue victims were without litters or stretchers and discussed afterward how difficult rescue operations were when victims became slippery from the water.

Despite this occurrence, sprinklers play an important role in containing fires and reducing their spread throughout structures. They form part of a building's fire protection systems along with other elements such as smoke detectors and pressurised staircases assisting in evacuation. In 2006, an Al Qaeda operative was arrested after he had gained employment at a hotel in England to learn how to disable security and fire systems as part of a larger terror plot (US Department of Homeland Security, 2012, p. 4). If these features are sabotaged by terrorists and made inoperable, there is again a risk the fire could rapidly grow and spread, hampering the efforts of firefighters and affecting responder safety and the safety of anyone trapped. Apart from sabotage, the use of strategically placed incendiary devices could also reduce the effectiveness of a building's fire safety features (Sheppard, 2017). If this was to occur, firefighting crews may be required to establish alternate water sources and entry points, delaying their response to the fire.

Any delays in attacking structure fires can lead to compromised structural integrity and possible collapse (Kodur et al., 2019, p. 6), endangering the lives of those who cannot evacuate safely and preventing firefighters from entering. In New York City in 1995, a gunman entered the Freddy's Fashion Mart in Harlem, firing shots and taking hostages before setting fire to the store. 8 people died including the gunman with firefighters forced to abandon their rescue attempts due to the risk of structural collapse (Atwater, 2012, p. 25). Temperatures can reach above 1,000°C during the fully developed stage of a fire which significantly affects the structural members of a building (Kodur et al., 2019, p. 6). While not the primary tactic, the subsequent fires which developed after aircraft struck the World Trade Centre on 9/11 led to

the structural collapse of the buildings (Pfeifer, 2013, p. 5). If the evacuation corridors in a 100-story building are congested a complete evacuation could take up to two hours (Sheppard, 2017, p. 57). This delay is a real concern in Australia with overcrowding in high-rises an ongoing issue (Wright 2017), combined with sabotage, and fairly transient occupants unaware of building layout and evacuation procedures. These concerns exist even before considering the possibility of non-compliant combustible cladding on the building.

After a fast-moving external high-rise fire occurred at the LaCrosse Building in Docklands, Melbourne in 2014, it was discovered that the building's façade was clad in a combustible cladding contrary to the Building Codes of Australia (Genco, 2015). This aluminium composite cladding (Victorian Building Authority, n.d., Aluminium Composite Panels) was found to contribute to the fast rate of fire spread and raised concerns that several other buildings around Australia could be covered in the same. While investigations in Melbourne continued, the Grenfell Tower fire occurred in London in June 2017, killing just over 70 people (Fox Koob et al., 2019). This fire was attributed to the same form of combustible cladding that Australian authorities had been concerned about following the Lacrosse fire. The Grenfell fire exposed the vulnerability of high-rise buildings and the risks for those living in them.

Buildings with combustible cladding targeted by terrorists pose the risk of rapid fire spread endangering the lives of occupants and responding emergency services, with the high temperatures causing delamination of the panels, dropping debris from height, as was seen at Grenfell (Taylor, 2017). The intensity of the fire and high winds can also lead to fire spread to nearby structures. When another external high-rise fire involving combustible cladding occurred in Melbourne in 2019, the Metropolitan Fire Brigade refused to publicly release a list of suspect buildings stating, "Given the current environment we have in terms of terrorism and other arson activity, the release of information that identifies properties at risk of rapid-fire burning, would be a risk to those communities," ("Arson, terror fears over suspect cladding," 2019). This shows an understanding of the risks associated with the application of pyro-terrorism within the urban environment.

Rural Environment

While great risks exist with pyro-terrorism in the urban environment, risks in the rural environment are also significant. Bushfires are nothing new for Australia and much of the risks posed by bushfires exist whether the cause is pyro-terrorism or not. Over the warmer month's bushfires rage through many Australian states requiring large amounts of manpower on the fire ground, in support roles, and at the strategic level. They force the evacuations of communities, threaten critical infrastructure, and can result in death. AQAP appeared well aware of these factors when they encouraged the lighting of bushfires in *Inspire Magazine*. Saying this, terrorist organisations would face difficulty instilling fear and claiming the credit for a bushfire in a setting the government would be quite capable of denying or discrediting such involvement (Bendle, 2009, p. 15). It has been reported that Australian fire services attend between 45,000 and 60,000 vegetation fires each year, with arson and suspicious fires accounting for almost half of the vegetation fires in Australia (Bryant, 2008, p. 2). With such a large number of deliberately lit fires occurring each year, the ability for a terrorist organisation to suddenly lay claim to a bushfire would be difficult, with the fear held by the community already in place from a history of bushfires and arson activity in rural areas.

While there has not been a recorded bushfire caused by pyro-terrorism in Australia, other countries have experienced attacks. The United States (U.S) faced a spate of pyro-terrorism attacks in the 1990s when the Earth Liberation Front (ELF) set fires to various forests, commercial and industrial buildings (Bendle, 2009, p. 17). Spain and Greece have claimed pyro-terrorism in politically motivated bushfires that have occurred there, as well as Estonia

who in 2006 had their forests threatened with pyro-terrorism by a group calling itself Forest Incinerators (Deshpande, 2009, p. 38-39). A third of all bushfires in Israel are reportedly caused by pyro-terrorism (Baird, 2006, p. 418), although some argue that considering the nature of the Palestinian-Israeli conflict these are more military acts rather than terrorism (Sheppard, 2017, p. 24).

Among the risks that exist with terrorists igniting bushfires are the destructive forces that can result. It has been claimed that bushfires can rival the destructive forces of nuclear weapons (Baird, 2006, p. 415), leaving terrorists with an extremely effective weapon that takes little effort. The plots can be quite hard to intercept and the fires very difficult to control (Besenyő, 2019, p. 1236). The results can be disastrous if multiple fires are ignited over a large area, with communities at risk of being cut off and the threat that multiple fire fronts could combine into a single large front as we saw with weather changes during bushfires in Victoria and New South Wales in 2020 (Wahlquist et al., 2020). With bushfires, the topic of climate change has been raised in recent years with conditions conducive to bushfires expected to increase, yet despite the risks to public safety pyro-terrorism and climate change are rarely addressed together (Buck, 2017). The favourable conditions for bushfires could lead to added interest by jihadist groups as they continue to adapt their strategies to attack western targets.

Ambush Tactic

The use of fire by terrorists could initially mask the malice behind an incident and increase the risk of harm to our responding emergency services. The fire could be used as an ambush tactic with responders, focussed on extinguishment and victim rescue, lured into a trap (Wood, 2017). Two separate incidents that occurred in the U.S involved a fire and the subsequent ambush of emergency responders resulting in the deaths of firefighters and a sheriff's deputy. In Memphis, in 2000 two emergency calls, including one from the suspect saw emergency services respond to a house fire in a quiet neighbourhood with a report of shots fired. As firefighters arrived they were immediately shot at by the suspect who killed two of them before also killing an arriving sheriff's deputy (Yellin, 2000). On Christmas Eve 2012 in Webster New York, firefighters arrived on the scene of a house and car on fire in what was described by authorities as a trap. Four firefighters were shot, with two dying from their wounds (Robbins & Kleinfeld 2012). Although not terrorism, these incidents illustrate the risks associated when fire is used as an ambush technique by an individual with malicious intent. The victims in both of these incidents appear to have been drawn into the response to the fire and then targeted with limited opportunity to escape once there. In 2014 a Florida man was killed in a shootout with police after setting fire to his house and ambushing responding officers, killing one. It was reported that this violent actor held anti-government and anti-establishment beliefs (Associated Press, 2014).

In Australia, firefighters were forced to retreat when attacked by a violent individual with an axe in Melbourne's north in 2015. In what was described as an arson rampage the violent actor set several cars and a house on fire before targeting responding firefighters ("Firefighters turn hose on man," 2015). While the intent of this individual is unclear this incident helps to illustrate that while uncommon, Australia is not immune to the risks associated with the use of fire in an ambush context.

When discussing ambush, and especially the ambushing of emergency responders, the topic of secondary devices needs to be raised. Traditionally this has focused on the use of explosives; however, discussions should be extended to the use of pyro-terrorism targeted at emergency responders (Sheppard, 2017, p. 27). It may sound quite extreme, but the use of timed incendiary devices adds a risk that the first wave of emergency responders could be injured or isolated from additional support and resources (US DHS, 2012, p. 7), especially in a bushfire scenario with rapidly changing fire conditions.

Delays in Response

Fire services are equipped and experienced in the response to fires while policing agencies often face the threat of aggression and violence, however, pyro-terrorism can begin to blur the lines in traditional response strategies between police and fire services (Frazzano & Snyder, 2014, p. 2). An increased risk then emerges with elements of all fields of expertise needed to effectively combat these situations. Firefighters are unable to enter a location to extinguish a fire if there is a risk they will come under armed attack. They are equipped to tackle the heat and toxic smoke but not a ballistic threat. For the police, they are unable to enter the scene to counter the threat of violence if they are required to pass through a smoke or fire-filled environment. Combinations of both fields of expertise are needed to address the complexities at a pyro-terrorism attack location. During a series of complex coordinated attacks by terrorists in Mumbai India in 2008, fire was used during the siege at the Taj Mahal Palace Hotel to delay the response by government security forces. In analysing their response, Shankar et al., (2011, p. 50) cited a lack of coordination between fire services and other agencies with fire services reportedly slow to respond, and their equipment inadequate (Rabasa et al., 2009, p. 11). Delays in response can work in the terrorist's favour by prolonging the duration of the attack, thus creating more casualties, and more dramatic images to increase media interest (Urban Fire Forum, 2014), just as we saw in Mumbai. (Rabasa et al., 2009, p. 1-2).

Evidence suggests that significantly more damage is caused by arson fires than ordinary fires (Sheppard, 2017, p. 46), therefore increasing the need for a quick knockdown. Potential delays in attacking the fire can occur due to concerns over scene safety and the threat of violence, the need for forced entry, or delays in arriving on the scene, with any large scale incident likely to cause traffic disruptions (US DHS, 2012, p. 7). In looking at the delays in firefighting due to the threat of violence we can again refer to those incidents of firefighter ambush in the U.S. Another ambush occurred in Oregon in 2018 and while fortunately no emergency responders were killed, it did delay the commencement of firefighting activities due to the ongoing threat. The original structure fire spread to three other homes with all four houses eventually burning down (Li, 2018). Similar scenes were seen after the Webster fire in 2012 where seven homes were destroyed due to firefighters being unable to protect these exposures due to the continued threat of gunfire (Regan & Santora 2012). While withdrawing from these types of scenes addresses the firearms risk, the risk to firefighter's safety is inversely affected with delays leading to fire growth and spread making for a more complex fire-fight. This also increases the risk to any victims who may be requiring rescue.

Resourcing

As fires or incidents grow in size they start to place pressure on emergency service resources. Despite the likelihood of complex coordinated attacks being lower in Australia (Zammit, 2017), lone-actor or small-cell terrorist attacks could still affect resourcing at an incident. The use of incendiary devices at multiple locations or a large bushfire can see the need to split emergency services resources across multiple locations, leading to a risk of a delayed response or insufficient resources to tackle the threat, scale of the fire, or the number of casualties (Wood, 2017). At the height of the LaCrosse high-rise fire in Melbourne, almost 30 firefighting appliances and 122 personnel were on scene combating the fire (Metropolitan Fire and Emergency Services Board, 2014, p. 13). These are just the firefighting resources on the scene of one fire, with multiple other agencies also providing resources in support of the fire service at this incident. The 2019/2020 Australian bushfire season has been described as the state of New South Wales' busiest on record with the widespread bushfires not only straining fire service resources but also emergency call centre staff and the state's ambulance service who's call volume also dramatically increased (Fitzsimmons, 2019). With heavy call volumes and crews committed at multiple or large scale incident locations, it becomes difficult

for the emergency services to provide the resources needed to combat a pyro-terrorism event, with this resourcing difficulty contributing to the delays discussed above.

Risks to Civilians

While traditional arson typically targets buildings and infrastructure, terrorist attacks often target civilians to leverage power. The use of fire as a weapon by terrorists can be indiscriminate, with burns, smoke inhalation, and other evacuation-related injuries leading to fatal outcomes. Fire can trap victims in an incident, it can cause confusion and hysteria and can kill without the violent actor having to make direct contact with the victims. In 2007, 68 people were killed on a train in India when timed incendiary devices detonated on-board (US DHS, 2012, p. 5). In September 2012, a dual-phase arson and armed attack on the U.S mission in Benghazi, Libya, contributed to the death of the U.S Ambassador by smoke-inhalation (Pfeifer, 2013, p. 6). The threat toxic smoke possesses can be further exemplified by the 1980 MGM Grand fire in Las Vegas. While not caused by arson, it resulted in 85 fatalities. Of these, 79 deaths were caused by either the smoke, carbon monoxide, or a combination of both (Clark County Nevada, n.d., VIII-4). For victims who are exposed to carbon monoxide a by-product of the combustion process, decreased oxygen levels can lead to disorientation, confusion, and panic (NSW Health, 2013) which can affect their decision-making and how they respond to the ongoing threat.

The threat of ambush is not exclusive to emergency services either, with civilians ambushed during a terrorist attack in Nigeria on the 6th of July 2013 (GTD, 2019b). In this attack, a fire was ignited at a government school by members of the terrorist group Boko Haram. As staff and students fled the burning building, they were shot in an ambush resulting in 46 fatalities. Although occurring in different threat environments to that of Australia, these illustrate some of the risks that exist to civilians when fire is incorporated in single or dual-phase terrorist attacks.

ADDRESSING THE RISKS

Multi-agency strategies need to be developed before an attack occurs to plan ways to mitigate any life-threatening fire threat during an active violence situation such as a terrorist attack. In the event fire is used by terrorists, or other violent actors, fire services need to play a vital role during the decision-making process to combat the incident. Fire services can provide police and counter-terrorism leaders with expert knowledge on fire suppression, fire safety systems, and fire behaviour. Policy and procedures should be developed and put in place to allow agency commanders of all levels to respond appropriately to reduce delays in firefighting, and victim rescue, while addressing any active threat. The appropriate use of resources and considerations for potential multiple coordinated attacks should also play a part in this planning. The incidents discussed in this paper help to demonstrate that fire can be applied as a weapon in a variety of ways; therefore any related policy should provide a level of flexibility for responders to adapt it to the situation they are faced with.

Within the Northern Virginia region of the USA police and fire agencies have come together looking at how to combat what they refer to as “active violence with fire incidents”(Northern Virginia High Threat Response Program, n.d.). Known as the Northern Virginia High Threat Response Program, work on developing a comprehensive Fire as a Weapon Incidents Database (FWID) has been carried out along with practical research into response strategies (Jernegan, 2021). This research has included activities such as training police in basic fire suppression operations as well as the use of equipment such as breathing apparatus and thermal imaging cameras for smoke-filled environments. They have also

assessed the compatibility of firefighting equipment with police tactical vehicles, and how to use police ballistic equipment to protect firefighting vehicles. These research activities have allowed local agencies to begin exploring ways to integrate their response for pyro-terrorism or active violence with fire incidents in order to develop evidence-based policy.

Developing these relationships between emergency service agencies is important. Coordination between the emergency services is crucial to ensure that each agency's strategic direction is consistent with that of the control agency. For terrorism events, the control agency will likely be the police. This cooperation and coordination needs to flow down to the tactical and operational level so those on the ground combating the event are acting with a unified approach providing the best possible response to these events.

The strategic level of emergency service agencies set a direction for their organisation's response and coordinates their agency's resources. The strategic direction they stipulate is used by tactical level commanders closer to, or at the scene of, the incident to develop tactical plans in line with this direction. These tactical plans are then executed by the operational level commanders on the scene of a terrorist event (JESIP, n.d). The operational level is likely the first command structure enacted for an incident, initially conducting operations based on their agency's policy and procedure at the time.

In addition to policy and procedure, equipment and training should be provided to frontline emergency services to better prepare them for an integrated response to these incidents. The scenes of Mumbai highlighted the extremely dynamic and high-threat situation that the emergency services may face, with some policing agencies in the U.S recognising that an ongoing armed threat at a pyro-terrorism attack may create an environment too unsafe for firefighters to enter. However, the equipment and expertise of firefighters are still required to combat these fires. In saying that, the fire condition at an incident can make it too unsafe for police, as was seen at a Freddy's Fashion Mart fire. Police attempted to provide cover to firefighters who were working to control the fire and rescue the hostages. Eventually the heat and smoke forced the police to withdraw while firefighters continued further into structure without police protection (Atwater, 2012, p. 25). In answer to these difficulties agencies such as the LA County and San Bernardino County Sheriff's Departments are now training their tactical operators in the basics of firefighting (San Bernardino County Sheriff SED, 2020) and obtaining the appropriate equipment to address fire as a weapon (L.A Sheriff Dept. SEB, 2020). This contributes to reducing the time it will take to access these fires, contain them, address any potential armed threat, and rescue victim who may be trapped.

The concept of SWARM units has been raised with the acronym standing for Syndicated, Water-enabled, Anti-siege, Response Matrix. These integrated teams of firefighters and police could be created for the purpose of rescuing hostages or threatened person's in environments "that may include firearms, smoke, and fire, or explosives," (Newman, 2011, p. 43). To be successful these units would need to be on standby to provide a quick response to attacks. While this concept has merits through its ability to provide a higher level of expertise in response to fire as a weapon incidents, the low frequency of incidents would create difficulties for agencies to justify maintaining such a capability. In a position statement produced in 2014 by the Metropolitan Fire Chiefs Urban Fire Forum, Integrated Tactical Response Teams, formed by first responding resources similar to those developed for active shooter incidents were a recommended practice to improve capability for fire as a weapon incidents (Urban Fire Forum, 2014).

Training for frontline emergency service responders should go beyond just how to respond to such events. Educating responders on early recognition of potential fire as a weapon incidents will help them to more swiftly identify the event and shape their response more appropriately. Being aware or recognising the potential of an ambush or unfolding pyro-

terrorism attack could lead to earlier decision making, improving the response to an incident. This may then flow onto improved recovery due to a reduction in damage and fatalities.

CONCLUSION

The use of fire by terrorists further increases the risks faced by both innocent civilians and responding emergency services, requiring a coordinated response from agencies. Fire's simple application as a weapon in terrorist attacks presents unique challenges and calls for skills and capabilities that extend beyond what a traditional policing response can provide. The ability to deal with an armed threat in a fire or smoke-filled environment has challenged agencies and policymakers. While pyro-terrorism as a whole is a fairly rare tactic (Deshpande, 2009, p. 42) this paper has not tried to credit the likelihood of pyro-terrorism above any other form of terrorism but rather aimed to highlight its simplicity in use and the associated risks it generates.

Fire could be used by the home-grown jihadi, the right-wing extremist, or during environmental protest and action. Its use can aid in a plan of ambush or contribute to the complexities of siege situations. As was seen with the 2018 Melbourne terror attack and discussed in jihadi propaganda, the use of fire can grab news headlines and put extremist activities on the front page. In a time where terrorist groups are evolving and continuously trying to exploit vulnerabilities, it is important to understand that both the urban and rural environments are susceptible to the effects of pyro-terrorism, from bushfires to city high-rise fires. While bushfires will occur with or without terrorism, the targeting of urban environments is of great concern. Densely populated areas and fire behaviour within structures lead to extreme dangers for the civilian population and emergency service responders. The incidents discussed from across the world are examples of these added complexities of pyro-terrorism with Australia not immune. Pyro-terrorism should be part of current counter-terrorism discussions and planning to ensure agencies are developing a strategy to adequately respond to these events.

Considering the amount of pyro-terrorism propaganda circulated and attacks that have been carried out by jihadist and right-wing actors, Sheppard's argument for more research in this area is valid. The significant appeal and consequence of pyro-terrorism warrant further study (Deshpande, 2009, p. 37) and with the current literature on pyro-terrorism leaning towards the bushfire threat, it is hoped this paper will encourage further discussion about the urban environment. The use of fire as a component of single or dual phase attacks must be further recognised, researched, and understood if it is to be effectively countered.

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