

Fighting fires in structures following arson attacks

By Colin Deiner, chief director, Disaster Management and Fire Brigade Services, Western Cape Government



The deliberate starting of a fire, more commonly referred to as arson, poses several unique challenges to responding fire services. Having to identify a possible arson attack, preserve evidence and be aware of the hazards associated with a rapidly spreading fire, are some of the issues the incident command team will have to be concerned with throughout the incident.

Depending on the mechanism used to perpetrate the attack it could be either rather easy or

extremely difficult to identify the cause of an arson attack on a structure. It is not my intention to write an article on the role of fire investigators and the science of fire cause determination here. I am hereby offering some thoughts on the steps that should be taken by operational fire crews and their respective command structures, right up to the incident command staff, to ensure that an effective and meaningful fire cause investigation can be undertaken following the conclusion of their activities.

Arson: key elements and types

By definition arson is always an intentional act where there is a desire to cause harm, damage or destruction to property, which can include personal property, real estate or natural environments. Arson can also be used to hide a more sinister intent such as ending someone's life and is essentially an illegal act as it violates criminal laws designed to protect property and public safety.

Investigators will confirm that setting fire to commercial

properties, including offices, factories, warehouses and stores is the most common form of arson they encounter, however, it is also prevalent in residential buildings such as houses, apartments or condominiums.

Deliberately burning cars, trucks or other vehicles are unfortunately fairly common in this country particularly during protests by disgruntled public transport users, taxi owners or political extremists.

Two other forms of arson are in the rural space with the intentional starting of fires in forests, grasslands or other natural areas as well as informal settlements where the intentions vary from personal attacks on individual shack dwellers or factional conflict.

Investigators/investigations

Investigating fires potentially caused by arson typically involves multiple organisations that bring together specialised expertise in fire investigation, law enforcement and forensic analysis. While almost all will want to determine the cause of the fire, they may also have differing motives depending on their role.

Many fire departments will have a specialised fire investigation unit within their fire safety division. Fire investigators within this unit are trained to determine the cause of fires. They assess the scene, collect evidence and identify signs of arson. They are usually the fire investigators from the various agencies on scene and it is critical that they observe the progress of the fire while it is still being brought under control. Crucial evidence, which might be compromised or destroyed as a



result of the firefighting activities, may be identified and collected or protected during this phase.

Police services will also often assist in arson investigations, especially when there is evidence of criminal activity. They work alongside fire investigators to collect evidence, interview witnesses and pursue suspects.

The private sector will also get involved when property insured against fire damage is involved, insurance companies often conduct their own investigations to determine the cause of the fire and assess claims. These investigators may work independently or collaborate with public sector investigators.

Insurance companies or even governmental agencies' inspectors will have access to forensics science labs who may need to conduct detailed analyses of fire debris to detect accelerants and other evidence of arson. They use advanced techniques such as gas chromatography-mass spectrometry (GC-MS) to identify chemical residues.

I have also been involved in instances where private fire science and forensics investigators have been hired in by property owners or insurance companies to conduct independent investigations.

It is therefore clear that many major fires that indicate a suspicious or unnatural origin might go through a range of investigative processes. The task of the various investigators will be made that much doable if they are provided with the maximum amount of evidence after the fire crews have left the scene.

Firefighting – where it starts!

The early response, arrival and size-up will be the first step in the process. It will always be the first priority of the initial responding units to identify any immediate threats to life and execute rescue operations if necessary. Concurrently, efforts to contain and extinguish the fire begin to prevent it from spreading to adjacent exposures.

The incident commander's (IC) initial size-up should provide some clues as to the origin of



► the fire and the pattern of the fire spread. Indicators such as multiple points of origin, the presence of accelerants, unusual fire behaviour and obstacles hindering access, can suggest intentional ignition.

If it is at all possible, it is at this point where the IC should initiate efforts to protect whatever evidence he/she can and, if even try to remove any objects that might be of value to the investigators later. Examples of evidence that may be collected in the early stage of the incident include remnants of accelerants, incendiary devices, witness testimonies and surveillance footage.

Fire departments should ensure that their Fire Safety Division's officials are also on a standby register and will be able to respond along with their operational crews. Too often in recent times I have heard of services removing their fire inspectors from standby due to budget constraints. This should not happen. Again, the value of having fire investigators at a working fire early must be appreciated and accepted as a crucial component of providing an effective 'full service' offering to the public.

The fire investigator should, after arrival, assume responsibility for securing the area of interest and preserving evidence. Firefighters should work diligently along with fire investigators to protect the area from contamination or tampering. This involves restricting access to authorised personnel only and providing space for the careful documenting of potential evidence. It would often be difficult for this to be done in a controlled manner due to the demands of the firefighting and possible rescue operations in progress.

Weighing up the risk and benefit to both these activities must be carefully done without placing an unnecessarily high priority on



one or the other if not entirely necessary eg the fire may already have been brought under control to the extent that work on the investigation can already commence in that specific area. Conversely, a fire investigator must realise that the nozzle teams might have to move into a sensitive area (and possibly) damage evidence to control the fire.

Having a good understanding of each other's needs and objectives on a fire ground will greatly assist in both being achieved. Fire Safety divisions should develop programmes whereby the operational firefighters in their service can regularly participate in training programmes focused on arson detection, investigation and evidence preservation. These programmes will enhance their skills in recognising arson indicators, collecting and documenting evidence and working alongside law enforcement and forensic experts.

The firefighter's role

Clearly the fire investigator will have a different role during the fire than the firefighters who comprise the entry and fire control teams.



Fire investigators may not be able to enter a structure while the fire is not yet under control and will rely on the entry teams to provide information which may be crucial to the resulting investigation. Equipped with the right knowledge and skills, firefighters will be able to identify the clues that will be needed.

These clues include the following:

- Points of origin: If the fire appears to have started in more than one location and if there are multiple points of origin, it could indicate arson. Also, try to identify and protect the area where the fire seems to have started to prevent further damage to potential evidence.
- Unusual fire behaviour: If the fire spreads unusually rapidly, it might suggest the use of accelerants. Take note of any unusual colours or odours in the smoke, which can indicate the presence of flammable liquids or chemicals.
- Presence of accelerants: Accelerants could create unusual burn patterns. Also, be alert to the presence of fuel cans, bottles or other containers that could have held accelerants.
- Forced entry: Broken windows, pried doors or other evidence of unauthorised entry are signs that could indicate arson.
- Disabled fire protection systems: Check for tampered fire alarms, disabled sprinklers or cut fire hoses that could indicate intentional sabotage.

The fire investigator

Fire investigators already present on the scene will need to identify individuals who are, in various ways, involved in the affected property. This could include the owners, management, employees or just

onlookers. It will be important to gather preliminary statements from witnesses or bystanders who may have seen the fire start or observed suspicious activity. They should note any individuals acting suspiciously at the scene, especially those attempting to access the fire area or interfering with the activities of the fire department. Any reports of vehicles seen leaving the scene or parked nearby under unusual circumstances should be followed up.

Certain structural specialists might be needed after an incident to assess the structural stability of the structural elements involved in the fire and to check if they had possibly been compromised before the fire. Checking the status of electrical, gas and water systems should also be done as tampering or malfunctions might provide clues.

Arsonists may have considered the prevailing weather conditions before starting a fire and using this information to ensure a rapid spread. It is therefore advisable to document the weather at the time of the fire, as wind direction and speed can affect fire spread and investigation.

Final thoughts

While it is not the function of the first responders to assume the role of a fire investigator they can play an important role in assisting the fire investigators to properly determine the cause of the fire and the possibility of an act of arson. By making a conscious effort to avoid disturbing evidence and minimising movement in and around the suspected point of origin you can mostly avoid contaminating or destroying evidence.

Finally, be observant! Record any immediate observations and actions during firefighting and report these to your commander as soon as you are able to safely do so.

After the fire is extinguished, firefighters should compile their observations and report them to fire investigators. This information can be crucial in forming an initial hypothesis about the fire's cause.

My final thought is for the management structures: Don't cut your fire safety budget by curtailing their investigators' early response to a fire. The short term saving will become a longer term regret. ▲