



THE CRITICAL ROLE ACCELERANT DETECTION DOGS PLAY IN FORENSIC INVESTIGATIONS

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When fire investigators and forensic engineers are called to the scene after an incident, it is their job to determine the origin and cause of the fire. Sometimes things just do not add up. Suspicious circumstances surrounding the physical evidence on site can lead investigators to suspect arson and foul play.

Fire investigators take a systematic approach to understanding the science behind an incident, and one of the most powerful tools available to forensic experts analyzing the scene of a fire is a professionally-trained accelerant detection dog. >>>

ACCURACY AND EFFICIENCY IS THE NAME OF THE GAME

Accelerant detection dogs are trained to locate the residual scents of flammable substances, such as gasoline, diesel fuel, lamp oil, paint thinner and kerosene, that are often used as accelerants in cases of arson. The dog will sniff out and lead fire investigators to traces of unburned fuel so that samples can be taken from precise locations and then sent to a lab for analysis. Dogs can detect extremely low volumes of fire accelerants. They can find remnants of accelerants at fire scenes far more quickly and accurately than humans, at levels that are at and sometimes beyond the sensitivity of lab testing techniques and equipment.¹



An accelerant detection dog's involvement in an investigation brings incredible value to the file when it comes to cost and time efficiency. As experienced investigators and forensic engineers, we are certainly capable of analyzing burn patterns: deep charring, low burning areas of consumption, shapes and sizes of burn areas, and other factors for evaluating potential samples. We suspect there are accelerants in particular areas, and then take samples for the lab to test. But an accelerant detection dog brings a whole new level of accuracy and efficiency to a fire scene investigation.

I have had the pleasure of working with Smoke, our resident accelerant detection dog here at Origin & Cause. He is one of only two accredited accelerant detection dogs in Canada,

and he is an incredible forensic investigation tool. He will sweep an entire building, and based on smell he will tell me exactly where to collect samples for the lab. The end result is fewer and more accurate samples, and a far more time- and cost-effective investigation.

A SUPERPOWER SENSE OF SMELL

It is common knowledge that dogs have a keen sense of smell, but the actual degree of sensitivity is staggering. Smell is a dog's primary sense, and it is 10,000 to 100,000 times more acute than ours.² While that statistic alone is impressive, it is even more compelling to use analogies in comparison.

ANALOGY TO VISION: If you could see and recognize something 500 meters away, a dog could see and recognize the same object 5000 kilometers away.

ANALOGY TO TASTE: If you could taste a teaspoon of sugar in your coffee, a dog could taste a teaspoon of sugar in over 3.5 million litres of water.

What makes dogs' sense of smell so much more powerful than ours? For starters, they have 300 million olfactory receptors in their noses compared to our 6 million. And by comparison, the part of a dog's brain dedicated to analyzing and processing odours is 40 times bigger than ours.²

Dogs' noses also work differently than human noses. We smell and breathe through the same airways. A dog's nose separates these functions, one for olfaction and one for respiration. So a dog can sniff almost continuously while inhaling and exhaling. And they can move their nostrils independently, which helps them locate the source of a particular smell.²

There is a lot more physiology involved in understanding a dog's sense of smell, science that goes beyond the scope of this article. Given their extremely heightened sense of smell,

dogs are routinely used in search and rescue missions and government investigations to combat terrorist threats, impede the flow of illegal narcotics, and to detect unreported currency, concealed humans and smuggled agricultural products.³ So it is apparent what makes accelerant detection dogs so good at their jobs, and so critical to professional forensic fire investigations.

PRECISE SAMPLING= LOWER LAB TESTING COSTS

Using an accelerant detection dog during a fire investigation is always the most efficient and cost-effective method of identifying potential samples for lab testing. Fire accelerant lab tests cost approximately \$400 per sample, and using an accelerant detection dog can help insurance companies improve accuracy and save money on the cost of a fire investigation.

FEWER SAMPLES MEANS REDUCED COST

Physical evidence can raise a 'red flag' for forensic experts, but without a dog to zero in on precise locations, investigators must rely on burn patterns alone to identify areas for sampling. That can mean more samples are required for lab testing, and more testing-related costs for the insurance company. An accelerant detection dog can identify precise locations for sampling, which means fewer samples and a reduced overall cost.

Using an accelerant detection dog is like bringing the lab right into the fire investigation scene. A dog can sweep an entire building relatively quickly, and pinpoint exact locations that need to be sampled. There is very little room for error; the dog is never wrong. In fact, standard lab tests can sometimes come back negative, but because the dog sensed something, deeper tests are conducted and accelerants can be revealed.

For less than the cost of 3 sample tests, an accelerant detection dog can identify areas of interest and remove the potential for human error.

INVESTIGATIVE DOG TRAINING IS METICULOUS AND REWARDING

A great deal of care is taken when training accelerant detection dogs, and the process begins early. Dogs are pre-qualified and raised from pups in warm, loving, family settings.



Accelerant detection dogs are trained to detect the presence of ignitable liquids. They are taught to alert investigators through behaviour changes when an odour is present. They learn to:

- Detect accelerants in and on a variety of materials including (but not limited to) wood, newspaper, cardboard, plastics, rubber, linoleum, Styrofoam, carpet and carpet padding, cloth, nylon and mixed materials;
- Ignore distractions including food and toys;
- Pass single- and double-blind tests where even the handler and test administrators do not know where the accelerant is located;
- Differentiate between odours;
- Give a "final response" (sit, scratch, bite, stare, point, etc.) when he or she pinpoints an exact location where a sample should be secured; and
- Understand that not every time a search is conducted will he or she find a target odour (dogs are used to rule out arson, too).⁴

TRAINING IS REWARD- AND PLAY-BASED, AND TESTING FOR CERTIFICATION⁴ INCLUDES:

- ✓ PINPOINT ACCURACY
- ✓ OPEN AREA SEARCH
- ✓ BUILDING SEARCH
- ✓ VEHICLE SEARCH
- ✓ CLOTHING SEARCH
- ✓ SCENT DISCRIMINATION

On the job, health and safety are top priorities. Dogs have at least one complete physical examination per year. Handlers know canine first aid and are able to provide immediate care in the case of an injury. Handlers also ensure that fire scenes are safe before the dog enters, checking for sharp objects, structural stability, fall hazards and anything that might cause injury. Dogs are also bathed after every deployment.⁴ Accelerant detection dogs like Smoke are colleagues, team members and friends, and they are treated as such.

THE END RESULT: ACCURATE AND COST-EFFECTIVE CLAIM INVESTIGATIONS

Fire scene investigations are always based on physical evidence, and using a professionally-trained accelerant detection dog as a forensic tool greatly increases an investigator's ability to determine or rule out arson as the cause. The degree of efficiency and accuracy is unparalleled compared to any other investigative tool. And given the high cost of laboratory tests, using a dog to pinpoint areas of interest and minimize the number of required samples just makes good sense.

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¹ The use of scent-detection dogs by Clare Browne, Kevin Stafford and Robin Fordham, Irish Veterinary Journal (https://www.researchgate.net/profile/Clare_Browne/publication/261663456_Irish_Veterinary_Journal/links/00b7d534f1bf649291000000.pdf), February 2006.

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³ The Dog's Sense of Smell, by Julio E. Correa, Food and Animal Sciences at Alabama A&M University (<http://www.aces.edu/pubs/docs/U/UNP-0066/UNP-0066.pdf>), June 2011.

⁴ Standards for Accelerant Detection Canine Team (<http://cadafiredogs.com/wp-content/uploads/2014/11/Standards-for-ADC-Team-2014-Approved-June-3rd.pdf>) and Testing Standard for Certification (<http://cadafiredogs.com/wp-content/uploads/2014/11/Testing-Standard-for-Certification-2014-Approved-June-3rd.pdf>), Canine Accelerant Detection Association, 2014.