THE USE OF CANINES IN

ACCELERANT DETECTION

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April 1997

Use of Canines in Accelerant Detection

History

Accelerant is a substance which, when ignited gives rise to the rapid spread of fire. Common accelerants include petrol, kerosene, diesel fuel etc. and when found at a fire scene without logical explanation, can be proof of intent and preparation – thus good evidence to suggest arson.

The use of canines to aid the detection of accelerant in a fire investigation was first proposed in the early 1980's in the US State of Connecticut. Canines had been used successfully in the US for some time in drug detection and bomb detection and a feasibility study conducted on canines' ability to detect accelerant suggested success in this area also.

On 1st May 1986, a training program was initiated as part of a joint effort between three agencies; the Bureau of Alcohol, Tobacco and Firearms (BATF), the Connecticut State Police (CSP) and New Haven State's Attorney Generals Office. A black female Labrador retriever, "Mattie" was obtained from the Guide Dog Foundation and was trained by the CSP. In the first 38-day period Mattie was trained to detect various odours associated with flammable liquids. As the training progressed, Mattie was able to detect these odours at very low levels, and tests proved that she could identify 17 different odours.

The project lasted for one year and was an unmitigated success. Interest was expressed from throughout the United States and Canada, and the CSP and BATF began training of Accelerant Detection Canine Teams strategically located throughout the US.   All teams trained by the CSP and BATF are certified yearly and are attached to four BATF National Response Teams.

Other state, municipal and private organizations have implemented their own training programs and deployed their own Accelerant Detection Canine Teams   bringing the estimated number of operational Accelerant Detection Canine Teams to approximately 200 in the United States alone.

Selection and Training

It is important to select the right dog for the job at the very outset. There are various breeds of dogs used as accelerant detection canines - the Labrador is the most common, but other breeds such as the German Shepherd and Weimaraner are also used. Breed of dog however is not as important as its nature, ability to learn and its willingness to work. The dogs' character is carefully evaluated before it enters into training.

Dogs that promise to be successful accelerant detection canines are those that make few mistakes while learning a new problem and which display a strong desire to perform a task. This high degree of motivation, willingness to complete a task, is essential in a detector dog and may be increased through an effective reward system. This reward system may incorporate food rewards or "play time" with the handler.

Canines may be trained to respond either passively or aggressively, depending on the use of the dog, and its nature. A canine trained to respond aggressively will scratch and bark where the odour is located - this is the way that most drug detection dogs are trained. Accelerant detector canines are commonly trained to respond passively to an odour - they will sit (or "alert") until the handler commands "show me" and the canine will point its nose, or pat its paw where the odour is detected.

The training of canines for use in accelerant detection begins with the recognition of odours from different accelerants (the number of these varies between different states and training facilities). Eventually the dog is taught to recognize these odours from a 50% evaporated source. Accelerant detection canines are also trained to distinguish these odours from other extraneous hydrocarbons and from pyrolysis products at the fire scene.

The training of these dogs, although beginning with an intensive period (approx. 6 months), is ongoing. Everyday they are trained, tested and evaluated to keep their skills at the level needed to be effective. It is not only important to test that the dogs are identifying accelerant as required, but equally important to test that a dog is not alerting when there is no accelerant. Control tests, i.e. where there is no accelerant present, should also be run with the daily testing. A record of the dogs' success is kept and there are annual and periodic re-evaluations to ensure the dog is performing to a high standard. The dogs should be kept at 100% accuracy.

It has been recognised that the most effective operation of accelerant detection canines occurs when there is 'one dog - one handler'. This is due to the relationship which must exist between the dog and the handler (the handler is a member of the fire investigation section). The dog resides with the handler in his home when he is off duty and is a part of the family.

The National Fire Prevention Association (NFPA) is currently developing a set of guides in relation to the use and training of accelerant detection canines · to be published in the next edition of NFPA 921 (NFPA standards book). The Canine Accelerant Detection Association (CADA) has developed proficiency testing for accelerant detection canines.

Quality of training is extremely important in maintaining a high success rate in accelerant detection canine use. As more training programs develop, so does the risk of inferior training programs and the production of dogs that do not meet the high standards required. Once these dogs are in use, their lower level of performance could tarnish the good reputation that the accelerant detection canine has attained, therefore the importance of sound training procedures should be recognised and careful consideration of this should be made when selecting a dog for accelerant detection.

The Fire Scene Investigation

Upon arrival at a fire scene, the handler assesses the scene and the dog remains in the vehicle. The handler is primarily a fire investigator and will proceed to evaluate the scene by normal procedures and attempt to determine the origin and cause of the fire. If he suspects that accelerant may have been used, the accelerant detection canine will then be used.

Before the dog is introduced to the scene a two important things are taken into consideration:

1.   The fire has been extinguished and there is no danger. The safety of the dog is vital and if there is any likelihood of injury to the dogs' paws then paw protectors should be used.

2.   The search pattern and route of approach should be carefully considered and all possible precautions taken to reduce the possibility of cross contamination.

At the scene the dog is directed to commence by a command such as "seek" and it will search randomly until the odour of accelerant is detected. The dog then moves toward the source in a more concentrated search pattern until it is located.

Once the source is located the accelerant detection canine will "alert" his handler. The dog communicates this positive response by sitting by the site. This passive response is advantageous for this kind of work as it disrupts as little of the area as possible.

The handler then instructs the dog to show the exact source of the odour by a command such as "show me". The canine then points its nose, or pats its paw onto the location. The dog is then praised or rewarded for its efforts.

Two types of searches may be conducted at the fire scene - a free search and a directed search.   The free search is described above and the directed search involves the handler directing the dog to search areas that it missed during the free search.   If further odours are detected, then more samples can be taken.

Samples are to be taken from areas that the canine has indicated and a number of samples from other areas not indicated by the canine should also be collected. The canine can then be directed to "seek" the sample can containing the odour to ensure the sample has been collected.

It is possible for accelerant detection canines to detect the odour of accelerant up to 18 days after the fire has been extinguished and thus the dog and his handler do not need to be on call 24 hours a day.

ALEX+SIMON = ACCELERA NT
DETECTION K9 TEAM
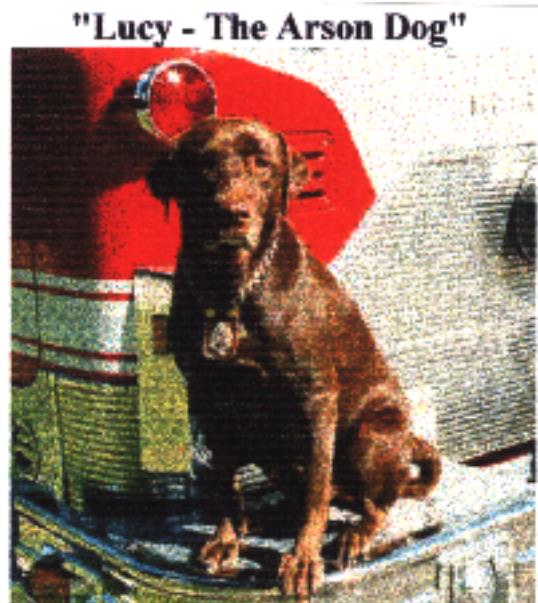
The Canine Firefighter

Other Uses of Canines in Fire investigation

Although the main use of a canine in fire investigation is in accelerant detection there are a number of other functions that a properly trained canine can perform. One such alternate use was described above - to ensure that the sample has been collected, by alerting to the correct container. The accelerant detection canine is a tool which can be utilized in other ways to assist a fire investigation including equipment searches, vehicle searches, crowd searches and clothing searches.

Equipment *searches:* In the collection of samples from any type of crime or crime scene it is paramount that the equipment used to collect the sample are not contaminated. It is essential that equipment used in sample collection, (e.g. tweezers, spatula, storage vial/container) has had any traces from previous use eliminated. After cleaning of equipment and/or before it used at the fire scene, an accelerant detection canine can be utilited to confirm that the equipment is void of any contamination (a negative response from the dog). The superiority of the canines' olfactory senses can be used to detect the slightest residual traces thus reducing the chance of cross-contamination.

Vehicle *searches:* Motor vehicles are also subject to arson attacks and thus the assistance of an accelerant detection canine would be most useful in this area of fire investigation also. Motor vehicles however contain many more intrinsic sources of hydrocarbons and other liquids that may alert a canine, e.g. petrol. In this situation it is important for the handler to realise that the canine is only a tool and he should make final decisions based on his own investigation and whether the presence of an ignitable liquid in the areas indicated by the canine would be common or uncommon.

Accelerant detection canines may also be utilized in searches of unburned vehicles i.e. a suspect's vehicle. Canines may be able to detect traces of

accelerant on seats or in the boot of such vehicles - but again there may be many sources of interfering odours and the handlers' own discretion should be employed.

Crowd *Searches:* Many times in the case of a deliberate fire, the arsonist may remain near the scene, on the scene or return to the scene in order to see the result of his work. As there are often a number of curious onlookers at a fire scene, the canine can be deployed to investigate these people and alert his handler if anyone has traces of accelerant on them. These dogs are well trained and of no threat to the public. Positive reactions are not positive identifications of an arsonist but give fire investigators good reason to question and further investigate a person.

A version of an identification parade may also utilize the accelerant detection canine to identify someone that has traces of accelerant on his person from a line of people who do not.

Clothing Searches: After a fire investigator has identified a suspect in an arson case, evidence such as clothing may be obtained and subject to a search by an accelerant detection canine. Again a version of the identification parade may be used whereby suspects clothes are placed in a line with clothing which have no traces of accelerant present. Convictions in the Branch Davidian fire in 1993 resulted from this type of search.

Accelerant Detection Canines in Australia

In the United States, Canada and the United Kingdom accelerant detection canines are in regular use in fire investigations.

In Australia however there is just one such canine currently in use in Australia. "Kova", a black male Labrador was acquired from Australian Customs and trained to detected flammable liquids. Kova became active on 9th December 1996 and has been used successfully at a number of fire investigations since then.

Case Study - 'Gus'

The Missouri Division of Fire Safety in the US currently uses 3 accelerant detection canines. Since they began using the dogs, the rate of positive samples taken has increased from 10% to 80%.

"Gus", a S-year-old yellow Labrador retriever and his handler, Investigator Greg Carrell were trained on the food rewards system by the Maine State Police and certified by the Maine Department of Criminal Justice. They are recertified every year. Gus was tested by the State Highway Patrol Laboratory and was found to be capable of detecting 2/100 ths of a microlitre of evaporated gasoline - lower than the detection limits of most of their machines.

1996 was a slow year for Gus, attending only 54 scenes. Of these, 43 were ruled to be incendiary and eventually 18 arrests were made. Gus lives at home with his handler and is a valued family pet as well as a working dog. The division is extremely pleased and sees all their dogs as valued assets in investigation and in public education. They plan to acquire 2 more dogs over the next 2 years.

Limitations   and   Disadvantages

It should be remembered that the accelerant detection canine is not infallible and although may have extremely high success rates, they are no substitution for laboratory analysis in confirmation of the presence of an accelerant. The processes used by canines in detecting and alerting to an accelerant are not fully understood and thus the fire investigator should use canines objectively. There are limitations to the use of canines in accelerant detection that need to be realised:

False Positive Alerts: The exact detection limit of the canine is not known but is considered to be in the order of 0.01 microlitres of accelerant.   It is conceivable that an accelerant detection canine may alert to accelerant present below the detection limits of the instruments used for confirmation, resulting in what appears to be a false positive alert by the canine. Canines may also alert to vapours of products such as insecticide solvents, carpet and plywood adhesives and cleaning solvents that are intrinsic to the scene. It is however possible that such products have been used as accelerant - highlighting the need for laboratory quantification.

False Negative Alerts: The fire investigator should collect samples from areas that, from his investigation, he considers may contain accelerant even if the dog does not alert to these areas. It is possible that the dog may follow other odours away from this area. It must also be remembered that not all arson or incendiary fires may involve the use of the type of ignitable liquids which the canine has been trained to detect. Other materials that assist the spread of fire and may be considered accelerants, including paper or newspaper and styrofoam, will not be detected by the canine and thus a negative result must not be interpreted to mean that the fire was not deliberately set.

There are many disadvantages of the dogs, the primary one being the hours spent on training and maintenance of the dogs. On average one hour a day, every day, all year is spent maintaining the dog. The dog has to work to eat, so the handler must work the dog on days off, holidays and sick days.

The second is paperwork. All daily activities, fire scenes and training are kept in a daily log. These log sheets are kept for the life of the animal. Expenses and sample verification by the lab is also logged.

The third would be the fact that the dogs are few and far between. This means that a handler may spend four hours driving to a scene to spend thirty minutes working the dog.

A fourth disadvantage would be that the investigators sometimes forget that it is their job to investigate the scene. Some will call for the dog before they have investigated in an attempt to get the dog do their work for them. It must be remembered that the dog only knows what it smells, it knows nothing about scene investigation.

Finally is the cost. The dog eats about $40 worth of food per month and veterinary bill run about $200 annually. Re-certification can cost around $500 a year and then there are the unknown costs of illness, injury or disease.

On the whole, however, the benefits far outweigh the disadvantages. This program is looked upon as an unqualified success by those who use accelerant detection canines and most have plans to acquire more dogs for this purpose.

Overview

Accelerant detection canines are an excellent aid to the fire investigation process but it is important to remember that the dogs' are only a tool and should never replace a full fire scene investigation. It is important for fire investigators to also note any physical evidence they observe which suggests an accelerant may have been used e.g. low burning patterns, trails on the floor, presence of containers or multiple points of origin. Ultimately the fire investigator will have to evaluate the results from the laboratory and the physical evidence at the scene to reach a conclusion on the cause of the fire.

Where dogs are not used, accelerant may be detected by hydrocarbon gas detector machines (or "sniffers"), or by the fire investigators own sense of smell. Hydrocarbon gas detector machines may be useful, but cannot discriminate between accelerant and pyrolysis products at the scene. Humans of course have much less acute olfactory senses than a canine and thus may not detect the accelerant odour. Canines have the ability to discriminate and detect scents at low levels.

Confirmation of the presence of accelerant at a fire scene for legal purposes can come only from the laboratory. One of the main advantages of accelerant detection canines is the reduced number of samples that need to be collected from a scene due to increased reliability in the samples collected. Time is saved by the fire investigator in searching for accelerant and collecting samples, and time is also saved in the laboratory due to fewer samples needing to be processed.

A study of Connecticut's three accelerant detection canines in 1992 showed that the dogs attended 184 fire scenes with a detection accuracy rate of 92%. It is approximated that they saved 1,472 man-hours and cut the number of samples submitted to the laboratory by 1,000. These figures show how valuable a tool the accelerant detection canine can be.

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