

Unlocking the Vehicle Fire Investigation

In 2004, vehicle fires were responsible for 14% of fire fatalities, 8% of fire injuries, 13% of dollar losses, and 19% of all reported fires. U.S. Fire Administration / National Fire Data Center, *Fire in the United States: 1995-2004*, (14th ed., August 2007), FEMA. The good news is, however, the ten year period from 1995 to 2004, trends in highway vehicle fires, fatalities, injuries, and dollar loss show substantial decreases. *Id.* Nevertheless, fire departments still respond to about as many fires involving vehicles as they do fires involving one and two-family residences. *Id.* When with vehicle fire claims, it is important to keep several things in mind.

The Vehicle:

Motor vehicle fires involve the cars and trucks that you might typically think of, but also a variety of other types of vehicles such as heavy equipment or machinery, motorcycles, and recreational vehicles (motor homes). Identifying the vehicle is one of the first steps in the investigation. It includes describing and documenting the make, model, year, and vehicle identification number (“VIN”). The VIN provides a variety of information including: the manufacturer, country of origin, body style, engine type, model year, assembly plant, and production number.

The Investigation:

A vehicle fire poses unique challenges to the fire investigator. In fact, *NFPA 921 Guide for Fire and Explosion Investigations*, (2004 ed.), dedicates an entire chapter to factors related to the investigation of fires involving motor vehicles. *Id.* at Ch. 25. It is axiomatic that a thorough physical examination must take place to assess which potential ignition source was responsible for the vehicle fire. To do so, the investigator must be familiar with the composition of the vehicle and its normal operation. *Id.* at § 25.2.2. According to *NFPA 921*, if an investigator does not know how a vehicle’s systems operate, he or she will not be able to determine whether a malfunction or an alteration could be responsible for a fire. *Id.* at § 25.5.

As such, an investigator should learn as much about a subject vehicle as possible. He or she should examine the subject vehicle’s repair manual for explanations of the systems unique to that vehicle. *See id.* § 25.5. Further, he or she should be aware of all recalls relative to the subject vehicle. This means discovering any factory recalls on the vehicle, its component parts, and replacement parts, if any. Recalls of vehicle fluids should not be overlooked as well. While the existence of a recalled vehicle or component part does not necessarily mean that the fire was caused by the recalled product; it is important data for the investigator to evaluate. Complaints and public service bulletins obtainable through the National Highway Transportation Administration, the Insurance Institute for Highway Safety, or from the Center of Auto Safety, may also provide additional information and indicate a problem even if there has been no recall. *See id.* at § 25.7.3.

a. Electrical Fires^{*}

Even when an engine is not running, the battery can provide the electrical energy to start a fire. *Id.* at § 25.4.2. An alternator or ignition switch can fail and cause a fire even hours after the vehicle was last used. *Id.* Inasmuch as a vehicle contains literally dozens of energized circuits, arc mapping in the context of a vehicle fire is especially important data to be collected in the fire investigative process. *See NFPA 921* at §§ 25.4.2.3, 25.5.3 *et seq.* According to *NFPA 921*, “[m]any electrical components [in a motor vehicle] have the potential to malfunction and overheat. Many of these components also have a ready fuel source in their construction.” *Id.* at § 25.5.3.2. Lamp filaments of broken bulbs are a source of ignition energy, especially for gases, vapors, or liquid fuels in a spray or mist form. *Id.* at § 25.4.2.4. Unintended high-resistance faults in wiring can raise conductor temperatures to the ignition point of the conductors’ insulation, particularly in bundled cables such as the wiring harnesses or the accessory wiring under the dash, where the heat generated is not readily dissipated. *See id.* at § 25.4.2.2. Faults and mechanical failures of high-current devices such as power seat or window motors can result in ignition of insulation, carpet materials, or combustible debris that may accumulate under the seats. *See id.* at § 25.4.2.2.

b. Hot Surface Ignition

According to *NFPA 921*, the “hot surfaces” of a vehicle can serve as an ignition source for certain fuels. *NFPA 921*, at §§ 25.3.1, 25.4.3.1-25.4.3.2. Automatic transmission fluid, engine oil, and certain brake fluids can ignite on a hot manifold, and may ignite even after a vehicle is shut off. *See id.* A leak in the valve cover in the exhaust system may allow engine oil to contact the manifold, which may result in ignition. *See id.* at § 25.5.2.1. Typically, gasoline will not ignite by a hot surface, but can be ignited by an electrical arc or spark. *See id.* at § 25.4.3.2.

c. Mechanical Failure

For a vehicle with a complex internal combustion engine to operate properly, its numerous component parts must work together in synchrony. *See id.* § at 25.5.4. A mechanical failure of any one of these parts, whether due to defective design, inadequate lubrication or cooling, or misuse, can have a hazardous result. *See id.* Such engine failure can cause the pieces to be propelled and puncture or damage other components, causing escaping vapors and hot surface ignition. *See id.*

d. Arson:

Vehicle arson is a frequent problem that should not be taken too lightly. According to the U.S. Fire Administration, 20% of all arsons occur in vehicles. *Arson*

^{*} The sources of ignition in a motor vehicle and, in large part, are the same as associated with structural fires: arcs, overloaded wiring, open flame, and smoking materials. As such, this article provides only a few examples which may be unique mechanisms for ignition in a vehicle.

Awareness Week May 6-12, 2007 Vehicle Arson, Who Pays for this Crime?, U.S. Fire Administration, available @ www.usfa.dhs.gov/fireservice/subjects/arson/arson_awareness.shtm. Arson is the second highest cause of vehicle fires. *Id.* As with other arsons, the motives may vary, but one should be alert to expensive vehicles that are highly financed, antique vehicles, and leased vehicle situations.

Due to fact that a vehicle typically has some natural accelerants, numerous potential ignition sources, and a variety of fuel sources all in close proximity, a vehicle arson is difficult to investigate. Rapid growth of the fire does not necessarily indicate arson; the type and quantity of combustible materials found in vehicle and its small compartment size can account for this kind of damage. Further, fuels, such as gasoline and lubricating oils normally present in a vehicle may act as accelerants and may present multiple points of origin.

Although arson is typically ground for denial of coverage based on the intentional act of the insured, an arson involving a leased vehicle may present special considerations as policy terms may require payment to the lienholder irrespective of the actions of the insured. In such a case, it may be a better decision to pay the claim rather than incur the cost of an origin and cause investigation. In other cases, it may still than investigate the loss.

Where the damages are less the cost of investigating its cause, it becomes more cost-efficient to pay the claim. However, in cases where the value of the vehicle lost is large, or where the fire spread to other structures such as garages and homes, a thorough vehicle evaluation is indispensable.

In sum, vehicle fires are common and present a unique problem for claim adjusters and fire investigators. While the nature of vehicle fires makes an origin and cause investigation difficult, an investigation conducted in accordance with *NFPA 921* can reveal the precise nature of the fire and lead to a claim denial, subrogation, or simply a good defense.