How to Handle Fire-Damaged Vehicles

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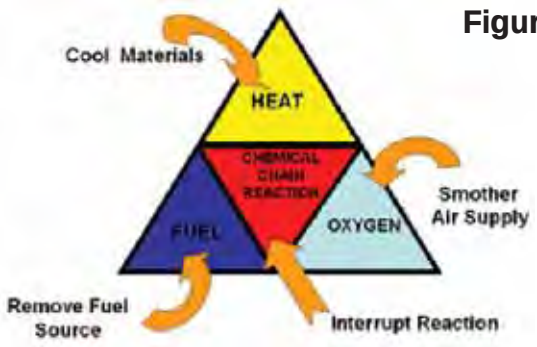
"Fire" is defined by the National Fire Protection Association as "a rapid oxidation process, which is a chemical reaction resulting in the evolution of light and heat in varying intensities" (NFPA 921). Fire science, the study of fire dynamics and development, uses the Fire Triangle to describe how fires develop and progress. The Fire Triangle, or what it really is, a tetrahedron (Fig. 1), is a representation of the four elements that must be present for a fire to exist. There must be oxygen (an oxidizing agent) to sustain combustion, heat (from an uninhibited chemical reaction or exposure to an alternate source) to raise the material to its ignition temperature, fuel to support the combustion and a chemical reaction between the other three elements. Removing any one of the four elements will extinguish a fire.

Figure 1



Although all fires have similar characteristics, it is important to understand what kind of fuel source you are dealing with, as different fuels require different types of fire extinguishing agents. In the collision repair field, we generally deal with four different types of fuels, ignition (heat) sources or fire damage. They are classified as follows:

1. Class A: Fires in ordinary combustibles such as wood, paper, cloth and plastics.
2. Class B: Fires in flammable liquids such as gasoline, petroleum oil and paint. They also include flammable gases such as propane and butane, but do not include fires involving cooking oils and grease.
3. Class C: Fires involving energized electrical equipment such as motors, transformers, alternators and batteries. Remove the power, and a Class C fire becomes one of the other classes of fire.
4. Class D: Fires in combustible metals such as potassium, sodium, aluminum and magnesium.

The most popular type of fire extinguisher in use today is the multipurpose dry chemical that is effective on Class A, B and C fires. The dry chemical fire extinguishers extinguish the fire primarily by interrupting the chemical reaction of the fire triangle. A dry chemical agent called mono ammonium phosphate is used in A/B/C multipurpose fire extinguishers. The chemical is non-conductive and can be mildly corrosive if moisture is present. In order to avoid corrosion, it is necessary to scrub and thoroughly clean up the contacted area once the fire is out. A dry chemical fire extinguisher (ABC) is usually used in schools, general offices, hospitals, homes, automobiles, etc.

Dry chemical extinguishers can be quite corrosive to metals - such as aluminum - and are also potentially abrasive. ABC extinguishers are much more corrosive than BC extinguishers because the ammonium phosphate agent can undergo hydrolysis to form phosphoric acid. Also, the molten agent flows into minute cracks, which we all know are prevalent in today's unibody vehicles. For this reason, dry chemical ABC extinguishers are not recommended for use on aircraft or electronics such as computers, MRI scanners and scientific instruments. Boeing has stated in a service letter that dry chemical extinguishers "can cause extensive corrosion damage to airplane structure, electrical systems and electronic equipment. Dry chemical fire extinguishers should only be used for airplane firefighting if there are no other extinguishers available and there is imminent danger to property or personnel." With that said, ask yourself how many computers and pieces of electronic equipment comprise today's vehicles.

It is paramount that as soon as the vehicle arrives at the collision repair facility, the following steps should be followed to ensure proper storage and personal safety until the vehicle is inspected.

Protective equipment list for personal protection is as follows:

- Respiratory protection: use N95 dust mask or air-purifying respiratory (APR) with high efficiency particulate air (HEPA) filters.

- Eye protection: wear chemical resistant goggles.

- Skin protection: use nitrile, latex or similar gloves and coveralls. Good personal hygiene practices are essential, such as avoiding food, tobacco products, or other hand-to-mouth contact when handling. Wash thoroughly after handling.

The following are general clean-up procedures once a fire-damaged vehicle arrives at the shop.

Take Photographs of:

- All four corners of the vehicle
- Area of fire damage (e.g. Underhood, Inside Trunk or Hatch, Interior, etc)
- Undercarriage
- Clean up procedures

Pressure wash, scrub or disinfect all exterior surfaces, including hood, fenders, doors, trunk lid/hatch, undercarriage, engine bay, rocker panels, all crevices, etc.

If the interior is damaged, dust or vacuum heavy accumulations of extinguisher residues. Wash and disinfect all interior areas (when appropriate) with mild soap or other similar cleaning solutions or products and rinse thoroughly. Don't forget inside compartments and isolated areas. Thoroughly dry any washed surfaces to prevent mold and staining.

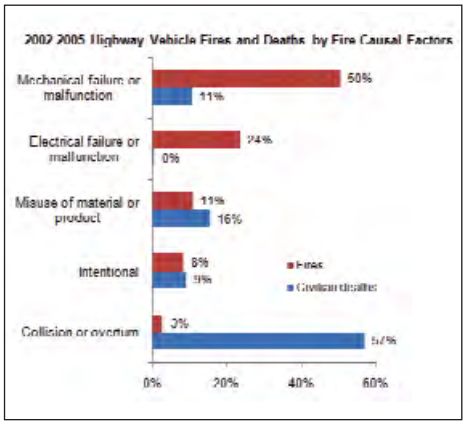
Disinfect and deodorize all carpets and windows with steam or other appropriate equipment.

Upholstery, fabric window treatments, etc. can be spray-treated with deodorizing products available at most supermarkets, but do not use odor-masking sprays.

Clean or replace all filters such as air, in-cabin, etc.

If firefighting foam residue is present on the automobile, use a mild detergent and brushes to scrub and dilute the dried residue and flush it from the surfaces; rinse with clean water. A follow-up with pressure washing may be beneficial but will not replace scrubbing to remove the residue.

With fire-damaged vehicles may come some form of litigation. Fires cause significant property damage for which the owner, insurance company or other party may want to be compensated. Before repairs begin, be sure the vehicle you are repairing is not "evidence" in a pending lawsuit. To get an idea of the effects of fire, below is a chart showing the Vehicle Fires and Deaths by Fire Causal Factors (courtesy of www.nfpa.org). If the vehi-



cle may be involved in a lawsuit stemming from the fire, make sure the owner and insurance carrier know the repairs are anticipated.

As always, take photographs of the stages of repair if you have concerns.

As you can see, there are a lot of factors to consider when you receive a fire-damaged vehicle at your shop. Please keep in mind that most of these vehicles will be deemed a total loss. This is often due to the damage that the fire-extinguishing chemical will cause over a short period of time. However, with proper handling and cleaning procedures, repair of fire-damaged vehicles can be profitable jobs.

Feel free to contact us at anytime if you have any questions.

Larry Montanez is a former I-CAR Instructor, and is co-owner of P&L Consultants with Peter Pratti Jr. P&L Consultants work with collision repair shops on estimating, production and proper repair procedures. P&L conducts repair workshops on MIG & resistance welding, measuring for estimating, and advanced estimating skills. P&L also conducts investigations for insurers and repair shops for improper repairs. P&L can be reached by contacting Larry at (718) 891 - 4018 or larrygoju@aol.com.

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