



Lauderdale-By-The-Sea Volunteer Fire Department

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Section: 606	
Subject: Vehicle Fires	
By Order of the Fire Chief: Steven Paine	

Section 606 - Vehicle Fires

Purpose

The purpose of this standard operating procedure is to maximize firefighter safety and efficiency while performing tactical operations at a vehicle fire.

Scope

All Fire-Rescue personnel are responsible for adherence to the procedures contained herein. In Addition, All fire rescue personnel shall use full PPE with SCBA on all vehicle Fires.

Definitions

1. Size-up – The mental evaluation of conditions at an emergency
2. Rescue – The removal of persons form immediate hazards at an emergency scene.
3. Exposure Protection – Protecting items of value form damage due to fire spread.
 - a. May involve a hazardous materials situation.
4. Confinement – Confining the fire to the area or vehicle involved.
5. Extinguishment – extinguishing the fire through available means.
6. Overhaul – Placing the property in a safe condition.
7. Ventilation – The removal of heated air and gasses from the fire area.
8. Salvage – Preventing unnecessary damage from water or fire. (see note below)
9. Investigation – Determine cause of fire and the need for a fire investigator.

NOTE: For vehicle fires, ventilation and salvage are performed as needed. For example, it may be necessary to ventilate the passenger compartment to allow fresh air to trapped occupants, or it may be necessary to remove extremely valuable cargo before the fire is extinguished.

Size-up

Size-up begins when the alarm comes in and continues throughout the duration of the incident.



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A. Considerations during response:

1. Dispatch information
 - a. Is there a confirmed need for rescue?
 - b. Are people injured because of burns or vehicle involvement?
 - c. Fire involvement?
2. Time of day
 - a. Is it during heavy traffic hours?
 - b. Will you be less visible to traffic?
3. Road conditions
 - a) Are roads wet, blocked by construction work areas and/or neighborhood
 - b) Road closures for security purposes
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4. Wind and Terrain Conditions
 - a. Is the incident on a hill or around a curve?
 - b. What is the best way to approach the incident?
 - (1) Always approach upwind and uphill, if possible.
 - (2) If it is not possible, approach from the safest direction that will protect you from having toxic products of combustion blowing towards you and protect you from leaking fluids.
5. Personnel resources to conduct necessary operations
 - a. Pump operation
 - b. Attack line
 - c. Back-up line if necessary
 - d. Medical
6. Water supply
 - a. A booster tank of 500 gallons or greater is usually sufficient for passenger vehicles.
 - b. Always have an alternative water supply plan.
 - (1) Know location of nearest hydrant.
 - (2) Additional apparatus

B. Considerations on scene

1. Apparatus location
 - a. Park apparatus a minimum of 75 ft from fire vehicle.
 - b. Attempt not to park directly in front or behind fire vehicle.
 - c. Use apparatus as a shield when you park.
 - d. Park at an angle so that the apparatus blocks traffic coming at you.



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2. Implement Incident Command Procedures/Quick Scene Tour and Survey.

NOTE: There may be situations where the company officer will not make a tour of the scene. For example, there may be an immediate rescue need or gross exposure problem.

- a. Location
 - (1) During scene survey, stay about 25 feet away from the vehicle.
 - (2) Use “V” pattern to get a three-sided view and maintain a safe distance.
- b. Preparation
 - (1) Quick tour of scene
 - (2) While the company officer is “sizing up the vehicle”, the rest of the company should be performing the company officer’s initial instructions.
- c. The arrival report should specify
 - (1) Type of vehicle
 - (2) Short description of the situation
 - (3) What initial action is being taken?
 - (4) Whether the company can handle the situation unaided or what other resources are necessary.

3. During the quick scene tour/survey, the company officer should establish

- a. Are there any dangers that will dictate a defensive attack?
 - (1) Hazardous materials
 - (2) Unknown cargo: “Don’t go before you know”
- b. Is there a need for:
 - (1) Rescue?
 - (2) Crowd control/
 - (3) Exposure protection/
- c. Where is the fuel tank located?
 - (1) Is it exposed to the fire?
- d. Does the vehicle have an alternative fuel system?
- e. Is fuel leaking or are vapors escaping?
- f. What type of material is burning?
- g. Is the vehicle stable?
 - (1) Will it roll?
 - (2) Will it tip?

C. Actions to take based on size up information

1. Clear spectators, if necessary
2. Call for help, if necessary
 - a. Medical
 - b. Police
 - (1) Traffic
 - (2) Crowd control
 - c. Additional units
 - (1) For additional personnel.
 - (2) For water supply



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- (3) For fire suppression
- (4) For exposure
- (5) Hazardous Materials Response Team

3. Devise and implement your strategy

Rescue

A. Important rescue points to remember

1. Rescue is always the **first** priority after size-up.
2. We rescue victims, not dead bodies.
 - a. Firefighter safety is the highest priority.
3. The Fire Department's function is to improve conditions and to minimize further injury(s).

B. Rescue tactic

1. When possible, quickly pull the victim from the vehicle.
 - a. under protection of a hose stream, when possible.
 - b. Consider C-spine precautions.
2. When necessary, knock down the fire to safely remove the victim.
3. In some cases, you may have to extinguish the fire so extrication operations can take place.
 - a. Deploy a second line to extinguish the fire.

Exposure Protection

Exposures must be protected as soon as rescue has been accomplished or determined not to be necessary. Exposures may include people, buildings, other vehicles, hazardous materials, grass fields or wooded area, LPG tanks and any other objects, that if exposed too long to fire, will result in loss of life or high monetary loss.

A. Exposure protection criteria

1. The minimum hose size is 1 3/4", but more may be needed depending on the situation.
 - a. For example, the minimum flow for a LPG tank is 500 GPM.
2. Water should be placed directly on the exposure



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- a. NO WATER CURTAINS, THEY DON'T WORK.
3. Sometimes, the best exposure protection is a quick fire knockdown; however, the exposure should be cooled as soon as possible.
4. If vehicle is inside or threatens a building, advise Dispatch to send a structure fire response and alter your actions appropriately.

Confinement

Once rescue and exposure protection have been accomplished or it is determined that they are not needed, the next step is to confine the fire. Most often in vehicle fires, confinement, exposure protection and extinguishments go hand in hand. Confinement may include applying water to exposures or the vehicle itself. It also includes any actions that need to be taken to confine other dangers, such as leaking liquid or gaseous fuel, the danger of the vehicle tipping or rolling and the danger of a BLEVE from a LPG or CNG tank.

A. Confinement Tactics

1. Apply Class "B" foam to leaking fuels such as gasoline or diesel to prevent ignition or to extinguish the fire.
2. **Never** remove a fuel tank cap because the tank's contents are under pressure and may spew out resulting in tragic consequences.
3. For gaseous fuels: (LPG and CNG)
 - a. If you have any concerns that you may not have enough personnel, equipment and/or water resources at the incident, call for help immediately.
 - b. Cool the tank with a straight stream.
 - c. Always approach the tank from the side or at an angle to the side.
 - d. When possible, approach under the protection of a fog stream and shut off the flow of fuel with manual shut-off valve at the head of the cylinder.
 - e. If fuel cannot be safely shut off, let it burn to avoid accumulation of vapors.
 - f. Use fog streams to disperse vapors.
4. Liquid fuel tanks – Gasoline and Diesel
 - a. The location of liquid fuel tanks for:
 - (1) Passenger cars are located at the rear under the trunk.
 - I. there is exceptions, such as VW.
 - (2) Pickup truck tanks are at the rear under the bed or midship under and/or behind the driver.
 - (3) SUVs, such as Explorers, Cherokees, Blazers, etc.; tank is at rear under the cargo area.
5. Stabilize vehicles
 - a. Chock vehicles that have potential to roll.



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- b. Stabilize vehicles that have the potential to tip, using cribbing, ropes, chains, come-a-longs, etc.

Extinguishment

Extinguishment is performed only after rescue, exposure protection and confinement is addressed. Extinguishment is best accomplished through an offensive attack, but defensive operations must remain an option if an offensive attack is not safe.

A. Extinguishment Tactics

1. Possible extinguishments agents

a. Water

- (1) Most plentiful
- (2) Least expensive
- (3) Most effective in most ordinary fires.

b. Foam

- (1) For liquid fuel fire and spills and high concentration of synthetic materials.

c. Dry chemical

- (1) Should be set off for use at serious fires.

c. Carbon Dioxide

- (1) Least efficient for serious fires

2. Attack Lines

- a. Recommended line sizes for minivans, light trucks, SUVs and passenger cars is 1¾" that has foam capability.

- b. A back-up line should be deployed as soon as possible.

- c. Portable extinguishers may be used for engine compartment fires, burning fuel or to cover fuel spills/leaks.

3. Special situations may require modified tactics. For example;

- a. High-rise equipment and procedures in parking garages.

- b. Power lines over vehicle.

4. Four basic types of passenger vehicle fires:

- a. Engine compartment

- b. Passenger Compartment

- c. Undercarriage

- d. Cargo/Trunk area

5. The main challenge with vehicle fires is gaining access to the seat of the fire.

- a. **“Try before you pry”**

B. Extinguishment Precautions

1. Do not get in front of the vehicle.

2. Do not stand directly in front of tires.



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3. Work in the area extending from the area between the front bumper and in front of the front tire.
4. Approach from upwind whenever possible.
5. Initial attack should be from a distance to knock down fire and, if necessary, cool the fuel tank and the surrounding area.
6. Only use attack lines with a foam capability.
7. Sudden deployment of airbags can injure firefighters.

WARNING

Modern automobile bumpers are equipped with impact reduction devices, which, under fire conditions, can rupture, and fly away from the vehicle at a high rate of speed. This can occur at the front and rear of the vehicle.

Engine Compartment Fires

8. In all but the smallest fires, the fire must be knocked down before attempting to open the hood.
 - a. Set off a dry chemical extinguisher to extinguish fuel spills and as a backup.
9. Extinguishing Methods
 - a. Make an opening for a fire stream
 - (1) Use a tool such as a Halligan Tool to lift a small gap between the hood and the fender.
 - (2) A straight stream or narrow fog can then be directed through the hole to knock down the fire.
 - b. Through the fender well
 - (1) Only works in some vehicles.
 - (2) Aim a straight stream through openings in the fender well.
 - c. through the radiator
 - (1) Stand at an angle to the radiator (not directly in front of the bumper) about 20 feet away.
 - (2) Aim a straight stream at the radiator.
 - i. A small amount of water will get through.
 - d. Break headlights
 - (1) Especially in older model vehicles, a direct pathway to the engine can be created by breaking/smashing the headlights to allow a straight stream to enter.
 - d. Should the use of water meet with little success, in an engine compartment fire, direct dry chemical through the opening made for the water attack stream.
10. After Fire Knockdown
 - a. Cool shock absorbing bumpers briefly.
 - b. Attempt to open hood.
 - (1) Be cautious of the possibility of remaining fires or flash fires.



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11. Opening Hood

- a. If the hood has a release inside the vehicle, attempt to use it, and then use the latch under the hood to open it.
 - (1) Some vehicles have both release mechanisms under the hood.
- b. If hood release mechanism fails, the cable has probably been burned through, but there are several options;
 - (1) Pry up driver's side of the hood, locate the cable and then use pliers to pull the cable.
 - (3) Use hydraulic spreader.
 - (4) Pry open the hood using a tool, such as a Halligan or pry bar.
- c. After the hood is opened;
 - (1) Prop it up with a tool, as the springs should not be trusted after being exposed to heat.
 - (2) Use 30-60 degree fog to extinguish remaining fire.
 - (3) Disconnect battery.

WARNING

Some newer vehicles are equipped with hydraulic/pneumatic devices designed to hold the hood and/or rear hatch/door open. The effects of fire can cause these devices to break apart (explode). The high pressure within the cylinder at the time of breakage can cause the device to become a high-speed projectile, which could result in injury to personnel and damage to equipment. As soon as the hood or rear door/hatch is opened, cool these devices during extinguishments, continue to cool the devices until they are cool. Do not let personnel stand close to the devices.

C. Passenger Compartment Fires

1. Approach vehicle from front corner with wide fog stream.
2. One firefighter attempts to open a door.
 - a. If owner or operator is available, get the key.
3. If door won't open, break out window with a tool.
4. Change to 30-degree fog and knock down fire using a circular motion.
5. Beware of a sudden deployment of air bags.

D. Undercarriage Fires: (three basic methods)

1. A straight stream can be used from a distance to reach under the vehicle.
2. Deflect a straight stream on/off pavement.
3. Put water through engine compartment.



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E. Cargo area/Trunk fires

1. Vehicle trunks and cargo areas must be checked for fire extension and hazards,:
 - a. Check for hazardous materials, firearms, ammunition, fuel containers, etc.
2. The cargo areas for trucks and SUVs are located in the rear.
 - a. Many SUV and light trucks are equipped with bed covers, rear doors, hatch lids, etc. that use hydraulic/pneumatic opening devices. (See WARNING on previous page)
3. The fuel tank for the vehicle may be an exposure and should be cooled.
4. Use caution when opening trunk lids, as a possible back draft situation may exist.
5. If the company officer cannot obtain trunk key, trunk can be opened in the following manner:
 - a. Use tools such as a Halligan and a flat-head axe or any other combination that has a spike that can be driven in.
 - b. Knock the lock barrel out of place.
 - c. Use screwdriver or oil dipstick to turn and release lock.
 - d. If possible, go through back seat.

F. Special Considerations

1. Some vehicles have magnesium components, which are water reactive when burning.
 - a. Class "D" extinguisher.
 - b. Dry sand.
 - c. If fire cannot be left to burn out, use large amount of water to flood the burning area.
 - (1) From a distance, use a 2 ½" line to place the water directly on the burning area.
2. Battery operated vehicles:
 - a. Treat the same as other vehicles, but beware of additional safety, environmental and health hazards.
 - b. No potential for electric shock.
 - c. Assistance may be needed for chemical spills.

Overhaul

As soon as possible after knockdown occurs, it is necessary to check for extension and hidden fires with consideration of evidence presentation.

A. Overhaul Tactics:



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1. As soon as possible:
 - a. disconnect battery
 - b. cool fuel tank.
 - c. Cool shock absorbing bumper mounts, hydraulic/pneumatic opening devices, etc.
2. Search for extension and hidden fires:
 - a. Use of foam may be helpful.
 - b. Check seats, cushions, dashboards, carpet, etc.
 - c. Open trunks and other cargo areas.
 - d. See section 8, F

Ventilation

Ventilation is address on an “as needed” and “where needed” basis and is usually not necessary except for special situations. For example, it should be done to give fresh air to a trapped victim while extinguishments and extrication are taking place.

Salvage

Salvage is also done on an “as or where needed” basis and is required in some situations and can be performed at any point.

A. Examples:

1. Getting a briefcase out of a car before it is damaged by fire, heat, smoke or water.
2. Retrieving items after extinguishments and returning them to the owner.

B. Keep in mind, that in many instances, a serious fire in a car or similar vehicle means a total loss.

1. Damage from some fires, such as a carburetor fire, is easily repairable.

C. Risking the lives, health and/or well being of firefighters for property that is already a total loss is neither smart nor justified.

D. Most often, a firefighter’s objective is to extinguish the fire to protect people or the surrounding environment.

Investigation/Preserving Evidence

- A. Most vehicle fires are at night and in deserted areas.
- B. Most vehicle fires that are set involve vehicles that are insured and/or not paid for.



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- C. Over 50% of total loss vehicle fires are arson.
- D. Initial investigation should begin immediately upon arrival.
- E. All personnel should note the following during operations:
 - 1. Is the owner or occupant of the vehicle on the scene?
 - a. Are they cooperative?
 - b. Do the initial statements of the owner or occupant fit the overall description of the fire and/or the situation at the scene?
 - 2. Did the fire occur in the passenger compartment or away from the engine compartment?
 - 3. Position of the vehicle in relation to the time or circumstances of the fire:
 - a. Abandoned in a warehouse district after hours.
 - b. Vehicle found under a bridge or within/around other type of obstructions, as not to arouse initial suspicions.
 - 4. Missing gas cap.
 - 5. Burned hands or singed hair on driver.
 - 6. Accelerant containers in the vehicle or nearby
 - 7. Empty glove compartment or trunk.
 - 8. Worn out tires on a new vehicle.
 - 9. Fuel lines disconnected or cut.
 - 10. Remains of match or lighter on top of engine or place of origin.
 - 11. Removed items, such as radar detectors, scanners, CB radios, cellular phones, etc.
 - a. Notice empty mounting brackets or where mounting brackets have been removed.
 - 12. Check for drained motor oil or water in oil.
 - 13. Remains of an accelerant, the odor of an accelerant or a trailer.
- F. Disturb nothing needlessly and report everything that is unusual to your supervisor.
- G. Follow operating procedures.



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1. Upon the recognized need for a fire investigator, the company officer, with the approval of the Battalion Chief, shall have Dispatch respond the police patrol unit for that area along with the on-call fire investigator.
2. The company officer at the scene shall secure the fire scene with fire scene tape prior to the arrival of the fire investigator to ensure its overall integrity and for preservation of the evidence chain.
3. The fire company shall remain at the scene until the arrival and release by the fire investigator.
4. The fire investigator shall release the fire company as soon as possible after the fire scene is completed

***** These Standard Operations Procedures should be considered guidelines for use at specific emergencies. Different situations may dictate alteration of the procedures, however, the safety of personnel and the public shall remain the highest priority. *****