



Table Top Training Drills



Table Top Training Exercise-February 2012

Roadway Safety

In conjunction with the February 2012 Training Calendar Module on Roadway Safety, City of New York Fire Department (FDNY) has shared their Training Bulletin on Operations at Motor Vehicle Incidents and Emergencies. Please take the time to consider this document while assessing your department's guidelines. Thank you to FDNY for sharing this document. For another sample, reference Prince William County Department of Fire and Rescue (VA)'s Scene Safety-Apparatus Positioning at Roadway Incidents procedure from the [January 2011 Table Top Training Exercise](#).



**OPERATIONS AT MOTOR VEHICLE INCIDENTS
AND EMERGENCIES**

1. INTRODUCTION

1.1 The dangers associated with present day traffic conditions have demonstrated a need for this Department to reassess and modify its operations on all roadways, especially express highways and other high-speed thoroughfares, as well as many secondary roadways. Traffic hazards formerly associated with only a few dangerous locations are now encountered throughout the city. These hazards include, but are not limited to:

- Disregard for speed limits and other traffic regulations.
- Persons driving vehicles incapacitated by virtue of alcohol and/or drug consumption, or other impairments.
- Distracted drivers, (e.g., cell phones, audio and visual entertainment devices.)
- Tailgating.
- Higher volume of traffic.
- Construction and road repair on many roadways.
- Tourists and others traveling unfamiliar routes making sudden stops, lane changes or other unexpected maneuvers.
- Rubbernecking.
- Inexperienced drivers performing faulty evasive actions.

2. PURPOSE

- 2.1 Improve safety for members and civilians.
- 2.2 Standardize operational procedures.
- 2.3 Identify problems associated with highway operations.

3. DEFINITIONS

- 3.1 **Express Highways:** Limited access highways and parkways, (e.g., Long Island Expressway, Belt Parkway, Cross Bronx Expressway, Staten Island Expressway.)
- 3.2 **Divided Boulevards:** Main primary routes, usually with service roads. The main road may have a physical center divider, or the center divider may be painted on the road surface, (e.g., Queens Boulevard, Grand Concourse, Kings Highway, Pelham Parkway.)
- 3.3 **Main Arteries:** Those with posted speed limits higher than 25 mph, such as Union Turnpike, Northern Boulevard, Hylan Boulevard.
- 3.4 **Secondary Roadways:** Other city streets, avenues, not falling into one of the categories above.
- 3.5 **Known Speedways:** Roadways where local experience shows frequent or regular disregard for speed limits. These "known speedways" may fall into any of the categories above.
- 3.6 **Secondary Collisions:** A "Secondary Collision" is one between a vehicle traveling in the vicinity of the fire or emergency and any other vehicle, object or person - happening at the time of the arrival of the Fire Department or thereafter.

4. CRITICAL FACTORS AFFECTING OPERATIONS

- 4.1 Some important points to be considered are: At a highway operation, the FDNY has an obligation to its members and to the civilian population to prevent further injury and to provide a safe working area, consistent with conditions.
- 4.2 Immediately upon arrival at an operation on a highway, the officer in command must take steps to prevent escalation of the incident in the form of a secondary collision.
- A. The cause of a secondary collision can be related to the original fire or operation.
- Examples:
- Civilian car strikes an apparatus; or,
 - Civilian car strikes a firefighter, because vision is obscured by smoke, etc.
- B. This may be avoided by completely stopping traffic flow in all lanes of the highway on the side where the fire or emergency has occurred, at least until arrival of the police department to control traffic. This should be done, when necessary, by using apparatus to stop traffic and then blocking traffic in the immediate working area. The Incident Commander shall coordinate which lane closures are necessary to control the scene with the ranking police officer.

- C. On arrival, the officer in command must assess the potential for secondary collision based upon:
- Traffic flow: the volume and speed of the moving traffic on the highway or street. The greatest danger of secondary collision occurs during periods of light to moderate traffic volume with the usual accompanying high speed.
During this type of traffic flow we can expect speeds of 70 mph or more, despite posted speeds of 50 mph on express highways.
 - Visibility of roadway: Weather conditions, topographical layout, curves and hills, buildings, overpasses, shrubbery and trees as well as smoke from the fire all affect the ability of oncoming drivers to perceive a dangerous condition in the roadway ahead in time for them to take proper and timely evasive action.
 - A very important fact which must be considered is that on DRY pavement with GOOD brakes a fully loaded tractor-trailer combination will need over 500 feet to stop at 50 mph AFTER THE DRIVER PERCEIVES THE DANGER! Unfortunately, many trucks of this type do not have good brakes. A passenger car traveling at 70 mph will need over 500 feet to stop. Wet pavement and other weather factors can double the stopping distance!
- 4.3 Severity of Incident: Does the incident involve:
- Motor Vehicle fire?
 - Hazardous materials?
 - Collision of vehicles?
 - Injuries or entrapment of civilians?
- 4.4 Police Assistance: Upon arrival at the scene of the incident on a highway, the dispatcher shall be notified to request response of police department and if required, authorized tow.
- 4.5 Sanitation Assistance: During freezing weather, water should be used judiciously to minimize formation of icing conditions. Where necessary, Sanitation Department should be promptly requested through the dispatcher for spreading of salt or sand.
- 4.6 Other Considerations:
- "Rubbernecking" which may result in a secondary collision.
 - Smoke obscuring driver's vision, possibly resulting in a secondary collision.
 - Time of day, physical and traffic conditions such that high speed light traffic is present.
 - Eventualities such as fuel tank explosion, hydraulic cylinder rupture, bursting of tires, causing firefighters to react by inadvertently stepping out of the safe operating area into the path of traffic.
- 4.7 Where weather conditions (snow, rain, fog, sleet, etc.) or smoke blowing across highway limit visibility, highway must be closed.

5. RESPONSE

- 5.1 One engine and one ladder from **each direction**, and a Battalion Chief will be assigned to all express highway incidents. No fewer than two units shall operate at an incident on an express highway or other potentially dangerous roadway.

At least one vehicle, other than the pumper being used to extinguish the fire, shall be used to divert or block oncoming traffic for the duration of the operation or until the police department arrives on scene and assumes traffic control. There may arise occasions where additional units are necessary to establish a proper area of safety. Example: Both units operating, handline stretched and extrication tools in operation. High Visibility Safety Vests shall be donned as per Section 7.

5.2 ENHANCED RESPONSE TO HIGHWAY INCIDENTS:

Fire units will be automatically dispatched to EMS responses on highways involving accidents with injuries and/or pedestrians struck. Fire units shall position apparatus to protect both EMS and fire members operating on or near the roadway. The existing dispatch policy of one engine and one ladder from **each direction** and a Battalion Chief will be assigned.

When EMS units are on scene at any other type of highway incident and requests a fire unit back-up, then a single ladder company will be dispatched to the verified incident location to divert or block oncoming traffic. Members shall support EMS operations as needed. A ladder company shall remain on the scene to divert or block oncoming traffic for the duration of both fire and EMS operations. High Visibility Safety Vests shall be donned as per Section 7.

- 5.3 All fires and emergencies involving motor vehicles on other than express highways shall receive a minimum response of one engine company and one ladder company.

6. PLACEMENT OF APPARATUS

- 6.1 Apparatus shall usually be placed to the rear of the incident or emergency in a manner that reduces the chance of a vehicle being struck by oncoming traffic. The apparatus should be positioned to shield the operational area and place the pump panel in the protected area. Apparatus should be placed at an angle to the incident when feasible to maximize safety (between the fire or emergency and the oncoming traffic).

However, an obvious exception will be a fire in a flammable liquids tank truck or other hazardous material carrier located on a grade. In such a case, the highway will have to be closed at a sufficient distance from the incident to prevent civilian vehicles becoming involved if a container should rupture or develop a leak. Apparatus will have to be located uphill of the involved vehicles.

- 6.2 Where placement of apparatus will expose it to the possibility of fire extension, pumper may be placed beyond the fire vehicle, but second apparatus, and third if necessary, shall always be placed between oncoming traffic and the operating forces.

- 6.3 Where the fire or emergency occurs near a curve, or beyond a hill, the second apparatus shall be located where it will be visible to oncoming traffic and furnish a warning to such traffic in sufficient time to avoid a secondary collision.
- 6.4 At times, particularly when fire is small and a period of examination and overhaul is necessary, it may be possible to move the fire vehicle and the fire apparatus off the roadway to a safe location. Even when the operation occurs off the roadway, an apparatus must be placed to provide a safe working environment.
- 6.5 Blocking apparatus shall be placed at least fifty (50) feet behind the first operating unit to create a safe working area.
- 6.6 Members shall avoid standing on highway pavement to the rear of second apparatus, unless placing flares, cones or signs, and traffic is stopped.

7. HIGH VISIBILITY VESTS

- 7.1 Department policy requires all members to wear high visibility safety vests when operating on all highways at all times, day or night. This includes, but is not limited to, incidents such as vehicle collisions, extrications, fluid spills, dangerous conditions, vehicle fires, and at any operation that the Incident Commander deems necessary. The scene must also be protected from the hazards of moving traffic by utilizing apparatus blocking or total lane closure.
 - 7.1.1 Exemptions from wearing high visibility safety vests are for members directly involved and in the immediate vicinity of firefighting, hazardous material mitigation, or technical rescue. Some examples include:
 - Members operating with donned bunker gear and SCBA working in close proximity to a source of heat during fire suppression.
 - Members operating with donned hazardous material personal protective equipment.
 - Members operating with donned technical rescue PPE and/or equipment for a technical rescue incident.
 - 7.1.2 Once members complete their activities in fire suppression, hazardous materials mitigation, or technical rescue, or when they leave the immediate vicinity of the incident, they are required to don a high visibility safety vest.

8. USE OF FLARES AND CONES AT OPERATIONS

- 8.1 Flares and cones shall be used as follows:
 - A. Flares and cones have been issued to all Battalions for distribution to all Engine, Ladder, Rescue and Squad companies.

- B. Except as stated in subsection D, flares shall be used at night or periods of reduced visibility and cones shall be used during both day and nighttime operations.
- C. Flares and cones may be used at any time where, in the judgment of the officer in command, their use would add to the safety of operation.
- D. Flares shall **not** be used in cases of flammable or combustible liquid or gas leak where their use would create a danger of fire or explosion.
- E. Placing Flares and cones.
 - 1. Flares and cones should be placed to block one or two lanes or to completely block a roadway. At least 4 to 6 cones and/or flares should be used to build a lane closure or safety zone. Vests shall be worn as per section 7.
 - 2. Member should obtain required number of flares and or cones. Before leaving apparatus light one flare and, carrying the lit flare, walks the proper distance to place the furthest flare and or cone first.

Member should stay off the roadway and walk on the shoulder or divider facing traffic. The highest speed expected to be encountered should be estimated. Using this estimated speed, place flares and or cones at the distance indicated.
 - 3.

Fastest Speed Expected	Minimum Distance to furthest Flare
<u>mph</u>	<u>Feet</u>
20	100
30	150
40	220
50	310
60	420
70	550
 - 4. The furthest flare and or cone is placed about 2' from the edge of the roadway. The next flare and or cone is then lit and or placed equidistant back to the scene of the operation, moving the flares and or cones about 2 feet further into the roadway at each point. This is continued until the lane is completely blocked.
 - 5. When encountering curves in roadway, distance may have to be expanded or more flares and or cones employed to provide additional coverage.
 - 6. The distance mentioned in the above table takes into account, reaction time, of oncoming drivers as well as stopping distance or distance required for a safe lane change maneuver.
 - 7. When placing flares and or cones, member shall only step into roadway to place flare on pavement and then shall return to shoulder to walk to next flare location only when traffic is stopped. Never walk on pavement with back to traffic and never walk on pavement assuming that flares and or cones already placed will protect you! After traffic is stopped, two members should place flares and or cones. Flares shall be carried on apparatus in a secure dry compartment as they are not waterproof.

F. Lighting and Carrying Flares

1. When lighting flares or carrying a lit flare, care must be taken to point flares away from body at all times. Carry lit flares in a horizontal position to avoid burning wax or chemical from dropping onto hand or body. Never look directly at lit flare as this may cause temporary "night blindness" which will hamper your ability to see oncoming traffic. Avoid breathing fumes from lit flares. When placing flares on pavement, first bend wire stand to form a tripod with base of flare.
2. Flares burn for approximately 30 minutes. If operation will exceed 30 minutes, prepare to replenish flares in time to prevent burnout before replenishment is completed.

9. ACCESS TO EXPRESS HIGHWAYS/ PARKWAYS OPERATION

9.1 Fires or emergencies on express highways require prompt response to render aid to persons injured or trapped and extinguish fire. However, a safe route to the incident will often furnish this prompt response better than a "fast" one. A fast approach is often the most dangerous. Following safe access rules will greatly reduce the chance of injury to our members or others, and ensure our arrival at the fire/emergency.

- A. Where feasible, approach an express highway incident from the same direction as the traffic. By exercising this option the fire and the engine company occupy only the lane or lanes in one direction, and exposure to secondary collision is thereby lessened.
- B. Express Highway box assignments call for response of units from more than one direction. Often the company traveling in the direction opposite that of the incident will reach the scene first, and will have to commence operation across the center divider. As soon as possible, this unit should be released and its function taken over by one operating from the incident side of such divider.
- C. Normally, operating across a center divider shall be avoided. If absolutely necessary to do so, traffic shall be stopped in both directions and safety warning devices set up. As soon as practicable our apparatus should leave the opposite roadway. Experience has shown that in this type of operation we are particularly vulnerable to being struck by "rubber-necking" drivers.
- D. Also, at times the preferred route (in the same traffic lanes as the fire) will be unattainable because of the complete blockage of the roadway by vehicles. Therefore, an alternate will be taken.
- E. Where it is necessary to stop the flow of traffic, the dispatcher shall be notified to relay the information to the Police Department.
- F. Notification should include recommended response instructions.
- G. When response of EMS is requested, similar recommended response instruction should be offered.

- H. At times the practice of gaining access to an express highway incident from a service road, across a grassy slope, avoids placing the apparatus on the highway proper. However, firefighters operating on/from a service roadway must be extremely careful and warning devices have to be placed as soon as possible at both locations.
- I. Where access to an elevated or depressed roadway is obtained by use of ladders, extreme caution shall be observed in placing and using the ladders. Aerial or Tower Ladder shall not be extended beyond shoulder where they could be exposed to moving traffic. Aerial and/or tower ladder should be cantilevered parallel to the elevated roadway.

10. QUICK SAFETY TIPS AT MOTOR VEHICLE EMERGENCIES

- Do not trust moving traffic.
- Never take a partial lane.
- Never assume traffic will behave the way you expect.
- Proper apparatus positioning is the first step to providing safety of the working crews at the scene of an incident.
- Many motorists and truck drivers have no regard or respect for emergency vehicles or personnel on the scene. In many cases, they don't even slow down near an accident scene.
- Never allow traffic to come around both sides of an accident scene.
- Request police assistance ASAP.
- Company officers should be given the discretion to summon additional resources as necessary.
- Ensure scene is controlled before commencing operations.
- Start operations at highway incidents defensively.
- Do not allow personnel to "wander" around the scene.

The following is a summary of results taken from case studies conducted nationally of firefighter fatalities on highways.

- A. Reduced-vision driving conditions: Although firefighters may be struck by vehicles in virtually any condition, the chances of an incident occurring are greater during obscured vision conditions, including darkness, fog, rain, snow, and blinding sunshine.
- B. Lack of situational awareness: Responders fail to recognize the dangers associated with a particular roadway situation they are facing due to insufficient training or lack of experience.
- C. Careless, inattentive, or impaired drivers: Even when we try to do everything correctly, we must be cognizant of the fact that there are drivers out there who will not react correctly to the altered traffic pattern that occurs at a roadway incident. This may result in them driving into our workspace.

- D. Improper positioning of apparatus: Numerous cases have been cited where apparatus were not positioned to the fullest advantage of the incident. In some cases the apparatus was not positioned in a manner that protected the work area. In other cases apparatus was unnecessarily positioned in the roadway.
- E. Failure to use PPE and high-visibility apparel and safety equipment: Responders working in the roadway must wear appropriate protective garments and use all available traffic control devices in order to prevent being struck by oncoming traffic.
- F. Altered traffic patterns: Drivers may be confused by the traffic control measures used at an incident scene or those being employed in a construction zone.

11. FIREFIGHTING OPERATIONS AT MOTOR VEHICLE FIRES

11.1 Operational considerations for extinguishment include:

- Apparatus shall be properly placed. Both the apparatus and the motor vehicle should be chocked. Be aware autos can start and proceed under their own power.
- Full personal protective equipment (PPE).
- Only minimum members in danger area.
- Approach vehicle from the sides and upwind if possible.
- Position line between the motor vehicle and exposures.
- For a fire in the engine compartment, where the hood is difficult to open, pry up the side of the hood and operate stream through this opening. Do **not** attempt to operate through the front grill.
- Cool hydraulic bumpers, tires or gas tanks in vicinity of the fire. Some foreign vehicles have gas tanks in the front. (See reference 1)
- Use a coarse spray stream when magnesium parts are on fire.
- When victims are trapped in the vehicle, use a fog stream to drive the fire away from victim.
- Members not operating the line, such as door or control position, may be used to:
 - a. Search the passenger compartment.
 - b. Search the general area (victim may have wandered off or been ejected from the motor vehicle). Use of thermal imaging camera may aid in this operation.
 - c. Search the area for evidence of arson.
 - d. Open the trunk and search it for extension, victims, etc.

Note: Flashlights are mandatory at night. Members shall always face the traffic and have a prearranged area of safety.

- Ladder company members may be used to operate a second line to either protect victims or to protect extrication procedure.
- Exposures such as buildings or other vehicles should be checked for extension.
- The possibility of damage to overhead wires or downed wires from damaged utility poles should be considered.
- When opening the hood during fire operations utilize the following guidelines:
 - a. A charged line should be in place during this operation.
 - b. Try the passenger compartment hood release first.
 - c. Use vise grips if the handle is burned away.
 - d. Pry up the side of hood for access to fires in engine compartments.
 - e. Operate handline streams through hood openings to extinguish the fire.
 - f. Stand back when opening the hood. (There may be a burst of flames).
 - g. Bolt cutters may be needed to cut locks or chains.
 - h. Use a 6' hook to support the hood once it is opened.
- Vans.
 - a. Engine cover in the passenger compartment should be removed after the fire is knocked down.
 - b. Stand to one side of the cover when removing it. Do not open it from the rear. (A sudden flare up could cause burns to the face and neck area.)
- Pneumatic pistons, which are used to hold up the hood in the open position, have become a serious danger at vehicle fires. The danger is the result of exploding hood pistons. When heated due to a fire in the engine compartment the rods have become projectiles penetrating the hood and grill. This could cause serious injury to anyone standing in front of the vehicle.
- The trunk must always be examined for victims or extension. Hazards which may be found in trunks include gas cans, pressurized containers, booby traps, glass containers, ammunition / guns, etc.
- The methods of opening the trunk include:
 - a. Drive in the cylinder with the point of a halligan tool, and unlock the trunk with a screwdriver.
 - b. Pull out the cylinder with a Bam-Bam tool and use a screw driver to turn the lock.
 - c. Cut around the bezel ring on the cylinder (with an ax or a screwdriver), then turn the cylinder with a screwdriver.

- d. If entry into trunk is difficult consider the following:
 - Entry via rear seat.
 - Extinguishment of trunk fire via tail-light. Use a tool to break plastic tail-light housing.
- e. The striker plate should be bent with the back of an axe after the trunk has been opened. This will prevent the trunk from relocking and prevents children from being locked in trunk after units leave the scene.

11.2 Additional hazards at motor vehicle fires:

- A. The battery must be disconnected to prevent: sparks, the starter from engaging, or power windows from operating and causing injuries to members or civilians. Some vehicles have two batteries which are remote from one another. The negative terminal must be removed first to eliminate sparks. Be aware that hydrogen gas from batteries could explode and spray acid. (See reference 2)
- B. Magnesium parts may be difficult to extinguish. Engine companies should use a coarse spray stream (partially open nozzle with tip removed) to extinguish these fires. Particles of molten magnesium may fly in all directions or steam explosions may occur, endangering members. Full PPE should be used, including eye shields.
- C. The hazards of the passenger compartment include: windows shattering, noxious fumes, PVC, gas cans, pressurized containers, flammable liquid storage, gasoline powered equipment, etc. (See reference 3)
- D. The hazards of the engine compartment include cooling systems that are under pressure and pneumatic hood pistons which when heated by fire become projectiles penetrating the hood and grill.
- E. Propane tanks which when involved in fire can BLEVE. (See reference 4)

11.3 Container ruptures:

- A. The gasoline tank location on most vehicles is in the rear but there are exceptions on foreign cars where they may be located in the front. On trucks, buses, and other vehicles location will have to be determined at the scene. The application of heat to a tank will cause a rise in internal pressure due to fuel vaporization causing a possible tank rupture. It is possible for an almost instantaneous ignition of vapors where a ball of fire can travel a considerable distance in any direction.
- B. Gasoline spillage from any cause can suddenly become a large area fire should vapors reach a source of ignition. Exposure problems in this type situation are intensified. Examples are gasoline running along street threatening other vehicles, flowing into sewers, gratings, cellars, etc. Be aware plastic high density polyethylene (HDPE) gasoline tanks have been known to fail and release their entire contents.
- C. Tires bursting are capable of dispersing particles in all directions. If fire involves these tires, these particles will be extremely hot. Serious burns or injury can result.

- D. Air conditioning or refrigerating systems on vehicles are located in different areas and require consideration because of possible rupture releasing noxious gases. (See reference 5)
- E. The application of excessive exterior heat on hydraulic or pneumatic pressure systems, such as hydraulic brakes, steering or confined pressurized systems, coolant systems and energy-absorbing units for bumper systems can cause them to rupture violently. Each of these, by itself, can cause serious injury if the pressure contained in that system is suddenly and unexpectedly released. The liquid contained in some of these systems (hot oil or water) is spewed in all directions, and small parts, breaking off from major components can act like projectiles.
- F. Pressurized containers for paints, flammable liquids, de-icing fluids, air for tires and others may be carried in any part of vehicle and their reaction to heat is well known.

11.4 Other hazards:

- A. Caution must be exercised when breaking windows of any vehicle, especially when heated, as there is possibility of glass being shattered throughout area when struck.
- B. When hoods are opened, members should stand back and be aware that a sudden burst of flame can occur. Similar precautions should be exercised by members when opening a locked trunk involved in fire.
- C. Electrical systems can cause sparks, shocks and burns. Short circuits can activate windows convertible tops, etc. But the most dangerous is the possibility of vehicle being in gear on a stick-shift transmission and the starting motor being engaged, moving vehicle. Always chock wheels to insure maximum degree of safety.
- D. Loss of brakes due to fire may cause vehicle to roll down incline. Chock wheels.
- E. When victims are trapped in vehicular fires, all attempts must be made for their removal and protection from fire by use of fog streams driving fire away from them. When removing victims, all precautions must be exercised to prevent further injuries especially where there is no fire involvement. In the latter case, stand fast with a charged line. Use wood or blocks when necessary to prevent slippage and possible production of sparks.
- F. Garbage truck fires. (See reference 6)

11.5 The ADV (Abandoned Derelict Vehicle)

- A. Extreme care should be taken, as accelerants used to start fires in ADV's are varied and at times suddenly flare when attempts are made to extinguish them.
- B. Vehicle may have wheels removed and placed on haphazard blocks which can collapse. Parts of vehicle may have been removed without regard for integrity of the whole vehicle. Attempts to remove parts when overhauling may cause adjoining sections to fall away and cause injuries.
- C. Live ammunition, explosives, fireworks and rubbish containing sealed bottles and pressurized containers have been found in these vehicles.

11.6 Hybrid Vehicles:

- A. Hybrid vehicles are becoming a more common sight on roads today. In some hybrids, the car starts out in a full electric mode to save gas, then starts the engine and switches to gasoline mode when the vehicle reaches a certain speed. Other hybrids do not have a full electric mode. Instead, they use their hybrid battery and electric motor primarily for the engine start/stop system that saves gas when the vehicle is stopped in traffic, or to boost engine power when accelerating or passing. Though hybrids get better fuel economy than conventional vehicles, they also present some unique hazards. The high voltage hybrid battery and hybrid powertrain components create a potential shock hazard.
- B. The voltage in most hybrid batteries can deliver a lethal shock, much like that of an electric chair. The voltage from a hybrid battery is Direct Current (DC). Hybrid vehicles can be rated between 144 and 330 volts DC. The threshold voltage where DC becomes dangerous can be as low as 55 to 60 volts, compared to 110 volts for AC.
- C. Hybrid Vehicle Safety Considerations:
- To avoid being in the path of a moving vehicle do not approach from the front or rear until the vehicle has been disabled. Hybrids may appear as if they are shut down but may actually be in “Ready Mode”. Never assume the vehicle is off simply because it is silent. The vehicle makes virtually no noise when the drive system is powered.
 - **NEVER** cut any high voltage cables. High voltage cables in hybrid vehicles are usually color-coded to warn you of their potential danger. On most, the high voltage cables are color-coded ORANGE. Although some cables are color-coded BLUE. Avoid contact with these cables unless the high voltage battery in the back of the vehicle has first been disconnected.
 - All hybrid batteries have a safety switch or disconnect mechanism to disconnect the battery from the vehicle's electrical system. The location of the battery disconnect safety switch and the disconnect procedure will vary from one application to another.
 - Many hybrid vehicles use a keyless start system. Make sure the ignition is OFF and the key or key fob is at least 15 feet away from the vehicle.
 - Make sure the READY light is not on. If the power is on, the high voltage system is live and poses a shock hazard should you come into direct contact with any of its uninsulated electrical components (such as the inverter under the hood).
 - At a hybrid vehicle fire, **ALWAYS** make sure that the high voltage battery case is cooled down to prevent re-ignition.
 - Always chock the vehicle, put transmission in park, shut off ignition, remove key, and engage parking brake.

12. CONCLUSION

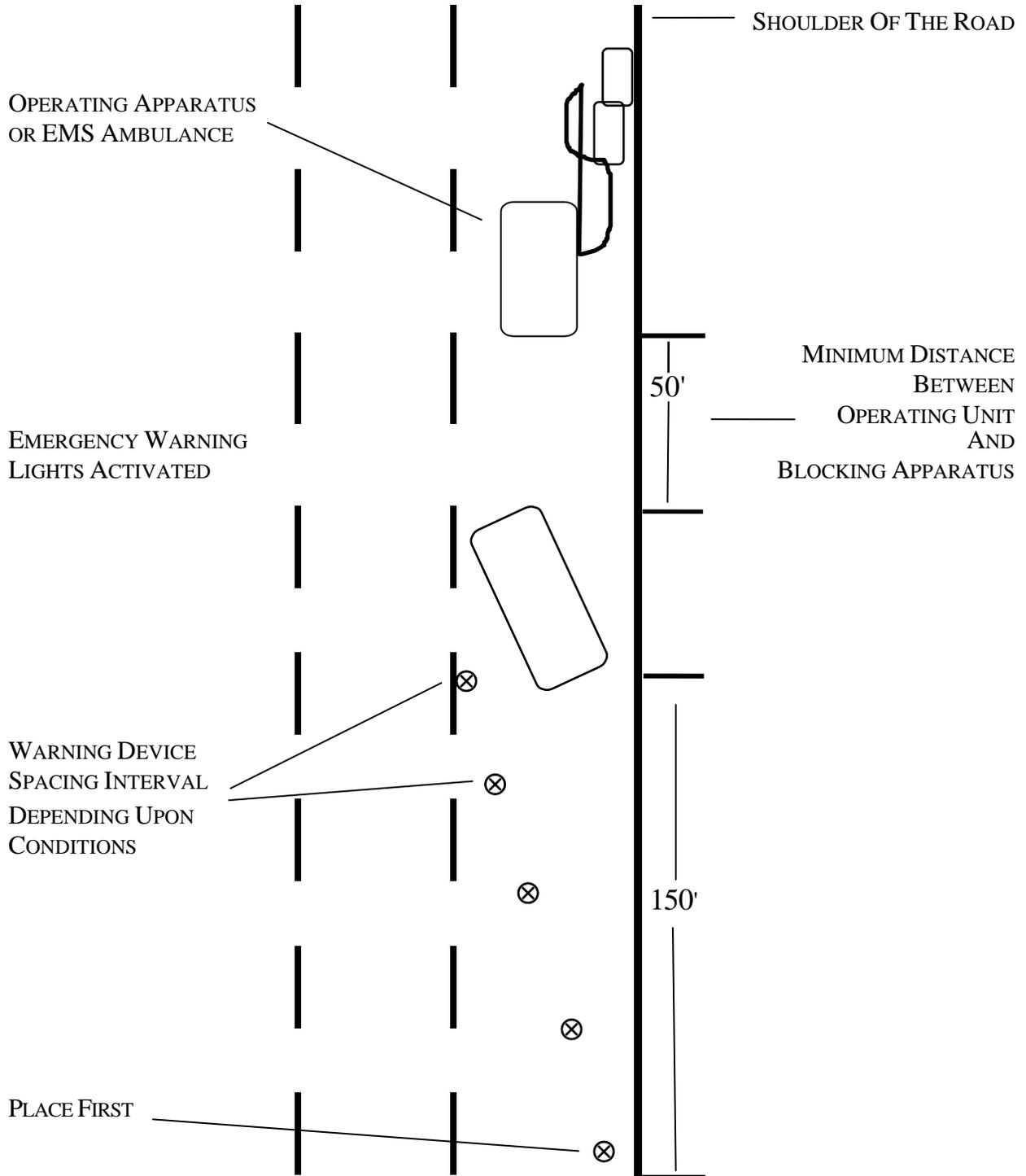
- 12.1 When operating at incidents (especially on highways), all personnel must be continually alert to the ever present danger of oncoming traffic, and must be vigilant and ready for the unexpected. The collective safety of the entire fire force depends on the individual safety contributions of each member. If one member should let down his/her guard, all members may be jeopardized in a moment.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

Figure 1

GENERAL PLACEMENT OF WARNING DEVICES

(WARNING AND CHANNELING DISTANCE REQUIRED FOR TRAFFIC TRAVELING AT 30 MPH)



NOTE: ACCIDENT IS IN THE RIGHT LANE OF A MULTI-LANE HIGHWAY

Reference 1

1 Motor Vehicle Gasoline Tanks

It has been reported that in order to sell junk cars to be crushed and sold as scrap metal, automotive junk yards must remove the gas tanks. Consequently, some unscrupulous automotive junk yard owners are indiscriminately dumping the gas tanks in vacant lots on streets and just about anywhere. Often, these tanks still contain varying amounts of gasoline. Incidents have been reported involving as many as forty of these tanks in ADV vans. Should these vans or any vehicle or container holding these partially filled gas tanks take fire, they are potential bombs.

Units responding to large vehicle or rubbish fires shall approach the fire with caution using the reach of the hose stream to their full advantage as well as the shielding effect of any object between the fire and the nozzle.

2. More Dangers at Motor Vehicle Fires

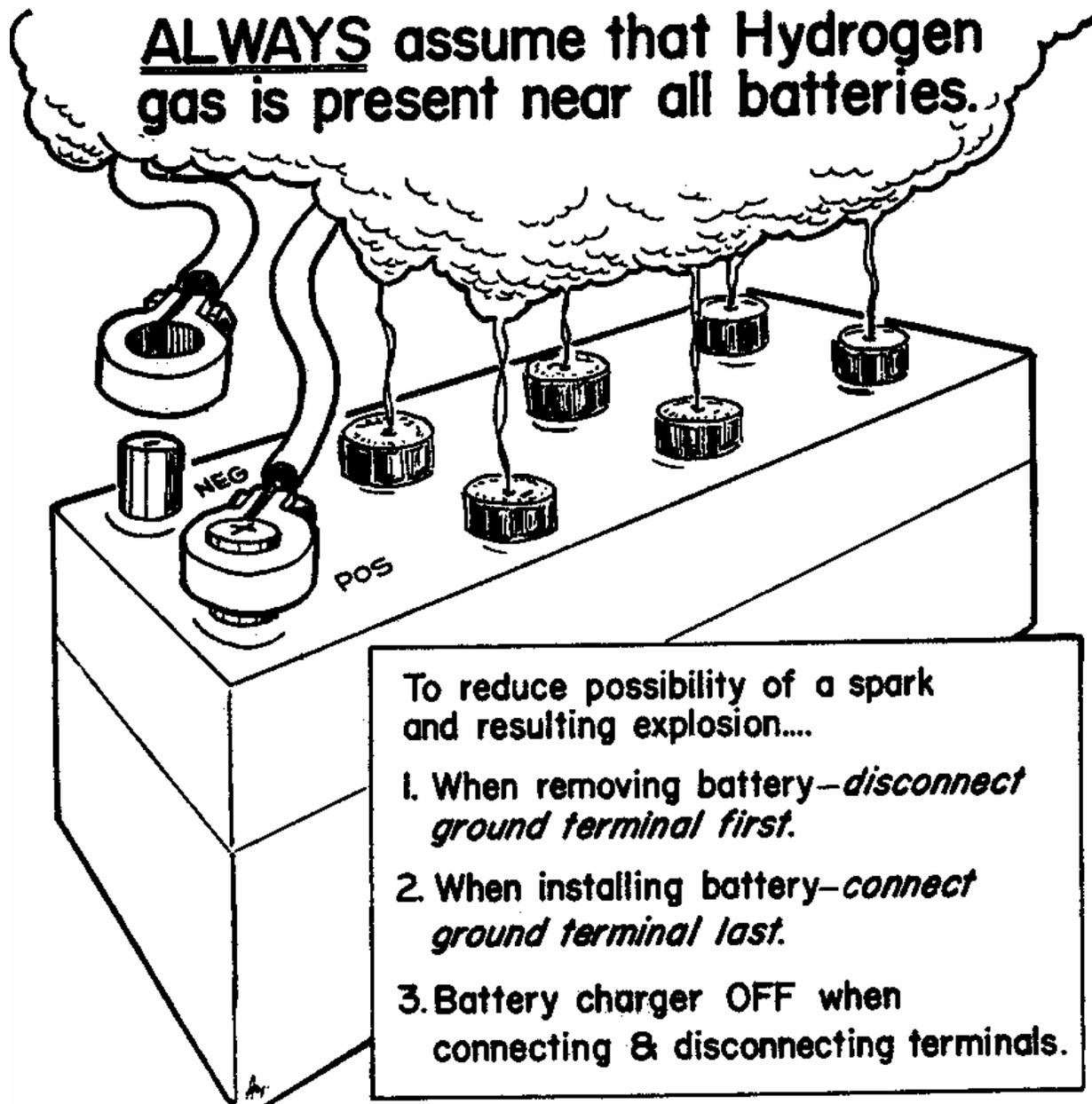
Members should be aware of the dangers present at car fires equipped with shock absorbing bumpers. The heat of the fire increasing the pressure in the shock absorbing mechanism could reach a point where the bumper is actually blown off the car.

We recently received a report of a similar mishap at an operation involving three ADV's. Both bumpers were missing from one of the vehicles. As the fires were being extinguished, an explosion was heard from one of the vehicles. At the conclusion of the operation, an inspection of the vehicles revealed that the vehicle missing both bumpers was also missing one of the front bumper supports. Further investigation revealed that the missing support was embedded in the grill assembly of one of the other vehicles, twenty feet away. This projectile weighed three pounds and its leading edge was a 1/2" inch piece of steel measuring three inches by five inches.

The above incident indicates that cars that have had their shock absorbing bumpers removed could be more dangerous than those with bumpers still in place. The shock absorbing mechanism could become a bullet-like projectile capable of inflicting very serious injury.

The recommendation to use the reach of the hose stream to its full advantage is reinforced in this type situation. Whenever possible, avoid standing directly in front of or in the rear of vehicle fires. Attack from the flanks. Keep onlookers from standing in front of or to the rear of vehicle fires for a distance of at least one hundred feet.

Reference 2



Reference 3

1. HAZARDOUS SITUATION – Motor Vehicle Fires

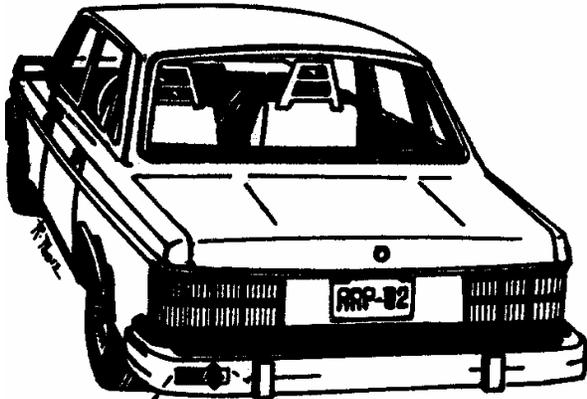
- 1.1 At a recent motor vehicle fire, units encountered a potentially hazardous situation. The fire began in the engine compartment and extended through the dashboard into the interior of the vehicle. The fire was extinguished without incident. During overhaul, a six gallon can of kerosene was found between the seats.
- 1.2 The vehicle contained a machine for steam cleaning carpets. The machine is fueled by the kerosene. Vehicles used as dog grooming services may also contain a heater fueled by kerosene. The purpose is to warm water for bathing pets.

2. PRECAUTIONS

- 2.1 It should be noted that the above-mentioned vehicle was not marked, and members were unaware that the vehicle was used for such a purpose.
- 2.2 When a fire occurs in these types of vehicles, exercise extreme caution.
- 2.3 As a final note, members should also be cognizant of vehicles that are used to carry power washing machinery, tree services, stump grinding, etc. These vehicles may house machinery containing gasoline as fuel. They may also be carrying a can for refueling.

Reference 4

THIS PASSENGER CAR IS.... PROPANE POWERED



IF INVOLVED IN FIRE
BEWARE OF

BLEVE

Boiling **L**iquid **E**xpanding
Vapor **E**xplosion



LOOK FOR THIS REFLECTORIZED WARNING
STICKER ON THE LEFT SIDE OF THE BUMPER

Reference 5

1. INTRODUCTION

- 1.1 “OZ-12” is a product which is presently being sold in our area as a replacement for auto freon (R-12) in automobile air conditioners. Unlike R12 Freon which is non-flammable, and non-toxic, OZ-12 is extremely flammable and toxic. OZ-12 is a compressed hydrocarbon mixture that is composed of 70% LP gas. OZ-12 is manufactured by OZ Technology, Inc. of Post Falls, Idaho.
- 1.2 Despite the fact that on July 13, 1995, the U. S. Environmental Protection Agency declared the use of OZ-12 as a replacement for R-12 (auto freon) in automobile air conditioners illegal, the sale of such product was not. OZ-12 is used as a replacement for refrigerant in industrial processes.
- 1.3 The use of OZ-12 in automobile air conditioners is very desirable to the user for reasons of convenience and economics. OZ-12 is significantly less expensive and requires no retrofitting of the auto’s air conditioning system.

2. SAFETY OPERATIONAL CONSIDERATIONS

- 2.1 Based on the above, it is apparent that the use of OZ-12 in an automobile air conditioning system is likely to be found.
- 2.2 Units operating at automobile fires shall exercise extreme caution when fire is confined to the engine compartment, especially when a unit is opening the hood for extinguishment
- 2.3 Officers of units operating at such incidents are reminded that automobile fires shall not be taken as routine. Strict control and proper supervision are the keys to a safe operation.

Reference 6

Incidents involving garbage truck fires have been reported the Safety Command for information and dissemination to field units. The following is one account:

PARTICULARS:

An Engine and Ladder Co. responded to a fire involving a "commercial" garbage truck. On arrival, the trash container of the truck was found to be fully involved. The truck was parked in the garage. In order to preclude extension to the structure, the truck driver was ordered to drive the truck onto the street. This was done. Without the knowledge of the officers and members operating at the scene, the driver then attempted to raise the back portion of the truck. In doing this, he placed pressure on the hydraulic system of the truck. He was unaware of the possibility that the hydraulic lines may have been burned. In this case, they were. When hydraulic pressure was applied, it forced fluid out of the burned lines. Two bursts of fluid passed through the burning trash, out of the rear of the truck, and were ignited. In both instances, a fire ball, similar to that from a military flame-thrower, was hurled approximately forty feet.

CORRECTIVE ACTION:

If the truck is not equipped with a 2 1/2" female inlet coupling then the rear of the truck will have to be raised in order to extinguish the fire

Certain precautions should be used when using a hydraulic system to raise the rear of the truck.

- A. No one should be allowed within 50' of the rear of the truck.
- B. Position the truck so that the rear does not face an exposure that could cause additional problems
- C. Brakes and chocks should be used to prevent truck movement.
- D. All members shall have on full protective equipment.
- E. No one shall be allowed to work or stand under a raised section of the truck.
- F. No one shall be permitted to enter the garbage storage section of the truck.
- G. Hydraulic systems are under pressure and usually contain flammable oils.
- H. Garbage storage section could contain pressurized cans that could explode.
- I. All vehicles contain a multiple of pressurized cylinders, i.e., braking systems, bumper systems, air conditioners, etc.