

## Instructor Guide

Topic: Vehicle Firefighting

Level of Instruction:

Time: 2 hours

Materials: Appropriate visuals, water supply, fully equipped fire engine, PPE and SCBA for each participant, vehicles, Class A fuel if the vehicles are to be on fire, a least one instructor for each fire students, and a safety officer

References: Essentials of firefighting,. 4<sup>th</sup> ed., IFSTA

Preparation: Remove fuel tanks if vehicles are to be burned and chock wheels to prevent unexpected movement

Motivation: Vehicle fires are either a minor fire or a total loss. In either case, firefighters should take such fires seriously and not become complacent. There are inhalation and explosive hazards that must be considered when attacking vehicle fires.

Objective (SPO): Given hazards and extinguishment techniques, the student will be able to demonstrate the process to safely extinguish a vehicle fire.

Overview:

### Vehicle Firefighting

- \* Safety Hazards
- \* Extinguishment Techniques
- \* Fire Attack Practical

## Vehicle Firefighting

- SPO: Given hazards and extinguishment techniques, the student will be able to demonstrate the process to safely extinguish a vehicle fire.
- EO 1-1 Identify and describe the safety hazards associated with vehicle fires.
- EO 1-2 Identify and describe the proper extinguishment techniques for attack on a vehicle fire.
- EO 1-3 Demonstrate the proper extinguishment techniques for a vehicle fire.

## I. SAFETY HAZARDS (1-1)

- A. Types of Vehicles – discuss the potential hazards with each type of vehicle
1. Automobiles
  2. Small trucks
  3. Vans – service and passenger
  4. Buses – school and commercial
  5. Recreational vehicles = towed or self-contained
- B. Fuels – discuss the hazards associated with each type of fuel
1. Gasoline/gasoline mixtures – some jurisdictions now have gasoline with a 10% ethanol mixture
  2. Diesel
  3. LPG/CNG
  4. Solar or electric (alternative fueled)
  5. Hydrogen
- C. Vehicle components – discuss how vehicle components can contribute significantly to the spread of the fire as well as present additional safety concerns.
1. Fuel injection system – fuel vapor under pressure
  2. Drive shaft – closed hollow tubes
  3. Battery or batteries – explosive hazard with acid
  4. Coleman stoves/LPG tanks – additional fuel or pressurized vessel
  5. Cargo – could be explosive
  6. Struts/hatch back pistons – closed pressure cylinders
  7. Energy absorbent bumpers – pressurized shock absorbers
  8. Supplemental Restraint Systems (SRS)/Side Impact Restraint Systems (SIPS) – potential for airbag to operate or activation mechanism to explode
  9. Combustible metals – may require a special extinguishing agent
  10. Air conditioning systems – pressurized system with refrigerant gas
  11. Interior finishes and upholstery – plastics, foam, fabric
  12. Tires – pressurized container

13. Fuel tanks – fuel and pressure build-up
14. Windshields – explosion hazard when vehicle completely closed

D. Proximity to exposures

1. Service stations – especially if inside or near fuel islands
2. Structures – especially if vehicle is inside
3. Hazardous materials/explosives – may be ignition source for leaking vapors
4. Other vehicles – salvage yards, auto dealerships, or parking areas
5. Traffic – access as well as exposure
6. Crowds of people – life safety hazard

II. EXTINGUISHMENT TECHNIQUES (1-2)

A. Fire Attack

1. Full personal protective clothing and SCBA
2. Use at least one 1-1/2” attack line
3. Consider a backup line
4. Approach from upwind and uphill if possible
5. Approach cautiously and at the corners of the vehicle
6. Place stream between exposures and involved vehicle
7. Attack fire on ground first
8. Use chocks to prevent lateral vehicle movement
9. Use foam as the situation dictates

B. Application Strategies

1. Place stream through the grill or headlight assembly to reach the engine compartment
2. Place stream underneath the engine and aim upward to reach the engine compartment
3. Use Haligan bar or piercing nozzle to puncture hood and direct stream into engine compartment NOTE: The hood should not be opened until the fire has been knocked since fire will blow out the open area. Once the hood is opened, it should be held open with a tool to prevent accidental closing since the springs may have been damaged by the heat.
4. Direct stream to interior and dash areas
5. Use entry tool to make opening in taillights to direct stream into trunk
6. Use forcible entry tool to pry up hood near fender to direct stream into engine compartment

7. Use point of Haligan bar to remove trunk lock and use screwdriver to open trunk
8. Open doors and break windows to apply water directly on fire
9. Stream patterns will vary between narrow to wide fog patterns depending upon reach and penetration needed
10. Always assume presence of second fuel tank

C. Fire Behavior/Extension

1. Engine fires will radiate to passenger areas via steering column and ducts
2. Fires burn rapidly and spread to uninvolved areas via internal components

D. Overhaul

1. Search for hidden fires and smoldering materials
  - a. Pull interior walls
  - b. Cargo removed?
  - c. Seats removed?
  - d. Engine compartment/ components checked?
2. Rekindles may result if not done

III. FIRE ATTACK PRACTICAL (1-3)

NOTE: The practical activity can be conducted with or without fire but should involve the use of vehicles that can be used for this purpose. If the vehicles are to be ignited, fuel tanks should be removed prior to the session.

A. Safety Precautions

1. All personnel should be in full protective clothing and using SCBA
2. It may be necessary to review hose handling techniques prior to the start of any evolutions
3. There should be a continuous supply of water
4. Only Class A non-contaminated fuels should be used
5. At least one 1-1/2-inch or larger attack line should be used
6. The vehicle should be chocked to avoid unexpected movement
7. A safety officer must be appointed to oversee the training involving fire

B. Attack Methodology

1. Place attack line(s) in service with equal students on each and one instructor on each.
2. Rotate personnel as appropriate
3. Prepare to advance, cool, and extinguish

4. Charge and advance attack lines
5. Narrow streams to cool and knockdown vehicle body, wheels, wheel wells from a distance as you approach
6. Narrow nozzle pattern to push fire away from undercarriage of vehicle before attacking fire in engine compartment
7. Widen pattern when close to vehicle to increase heat absorption
8. Be cautious and alert for post extinguishment flare-ups
9. Retreat from vehicle while facing fire area
10. Overhaul vehicle if applicable

Review:

Vehicle Firefighting

- \* Safety Hazards
- \* Extinguishment Techniques
- \* Fire Attack Practical

Remotivation: While a vehicle fire may not have all the potential danger of a structural fire, it is still a fire involving many unknowns such as contents and vehicle components. It could also include an injured or trapped occupant. Be alert and think before you make a mistake.

Assignment: