

# Brush Fire Tactics



On brush fires the strategy is to control the fire by containing it or extinguishing the fire by either removing the fuel, heat, or oxygen. The fuel can be removed by digging or scraping a control line with hand tools. The oxygen can be removed by smothering the fire with dirt. The heat can be reduced by applying water.

Fire behavior will be influenced by the following factors:

**Weather**- Wind can cause a fire to change directions, increase in size, and increase the speed in which the fire moves. The fire will be moving the direction the wind is blowing. Relative humidity plays a large role in both ignition and rate of spread. When the humidity is lower, fire behavior increases. Watch out when the relative humidity drops below 30% or the winds are above 25 mph. An increase in air temperature may cause increased fire behavior. A spot weather forecast can be requested through the National Weather Service. A spot weather forecast will provide expected weather in the immediate vicinity of the fire.

**Fuel**- The type of material burning (fuel) plays a large role in the rate of spread and intensity of the fire. Tall dry grass can spread rapidly and with burn with great intensity in moderate wind while a woods fire would spread much slower under the same weather conditions. In a woods fire the surface fuels are cooler, moister and not impacted as much by the wind. Dry leaf fires can have high or low spread rates depending on the weather and moisture. Fuel moisture increases or decreases the burn potential respectively.

**Topography**- The terrain on which the fire is burning can affect the fire behavior. A fire moves much faster uphill than on flat ground and will only creep downhill unless a strong wind is pushing it there.

Knowing all this, the most dangerous scenario would be to attack the head of a fire in tall dry grass from the unburned side from an uphill and downwind position of the fire.

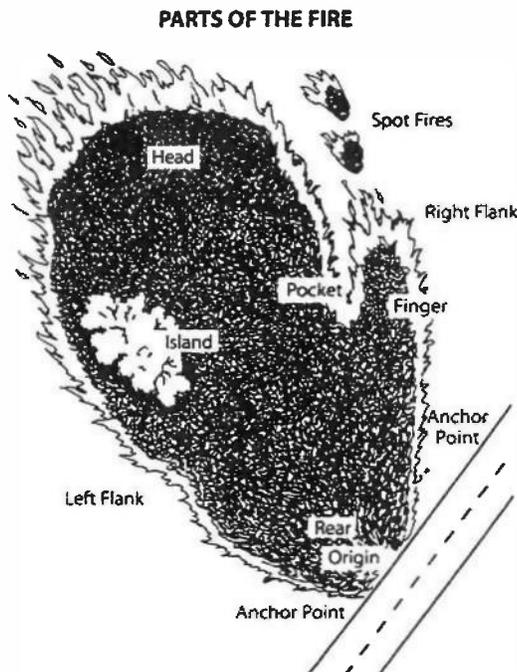
**Size up**- A tail gate briefing is essential before beginning the fire attack. It is OK to trade acreage for time. The following factors need to be considered before deploying resources:

**Weather**- What is the wind direction and strength? What is the relative humidity? What is the predicted weather? What time of day is it? (Fire behavior increases during the afternoon. From 1000 - 1800 is called the critical burning period.) Is there a red flag warning today?

**Fuel**- What fuels are burning? (grass/leaves/woods) A grass fire can move fast and have tall flames. Leaves can move quickly with medium height flames. A fire in the woods will move slowly and with small flame lengths. What fuel types are ahead of the fire? Are the fuels moist or dry?

**Topography-** What is the terrain involved in the fire? How will the topography affect fire behavior? What is the terrain ahead of the fire? Are there natural or man-made firebreaks that can be used as anchors for launching the initial attack? (roads, streams, trails, rocks, dirt fields) Use the topography to your advantage.

**Fire Behavior-** Is the fire large or small in size? Where is the head of the fire? Is the fire spreading rapidly? What will happen if the wind increases? Are the flames taller than four feet? When flame lengths are less than 4 feet, a direct attack could be possible at the head or flanks of the fire by personnel with hand tools and hose lines. If flames are taller than 4 feet, the fire is too intense for a direct attack by personnel on foot.



**Hazards-** Are there downed power lines? Are hazardous materials present? How many hazard trees have you identified? Who will flag the collapse zone around the hazard trees?

**Resources-** What apparatus and staffing were dispatched? What personnel and equipment will it take to contain the fire? What are the capabilities and limitations of these resources? Do we have sufficient water supply?

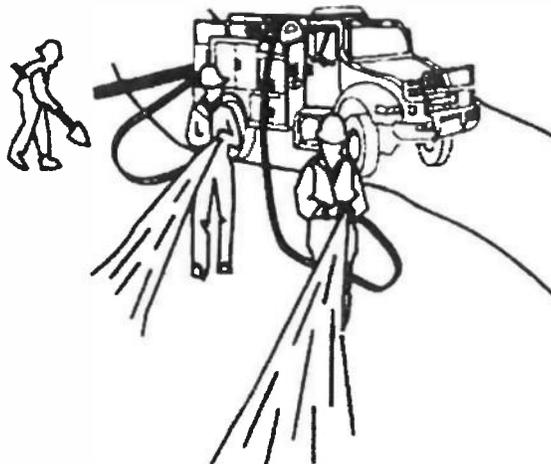
**Values threatened-** Is there a life safety hazard to the public? Are there structures or other valuable property that need to be protected? Is there a need to rush the fire attack?

**Tactics-** There are several functions a brush truck might perform on a brush fire including initial attack, mop-up, and fire line patrol. Although a brush truck can respond driver only, on the scene they need to be staffed with a nozzle person. When given an assignment, they should pair up with personnel with hand tools for most maximum efficiency.

**Initial Attack-** How aggressive should this fire be attacked? Where would this fire go if we did nothing? What tactic will work best?

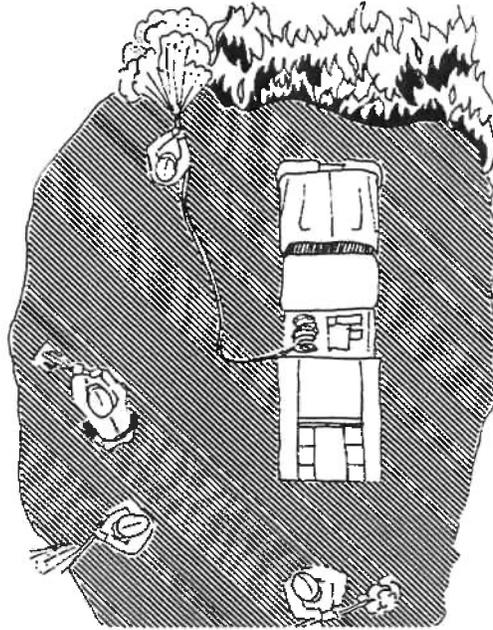
**Direct Attack-** A direct attack is an aggressive, offensive attack at the fire's edge from the black. It should be used when flames are less than four feet tall. It generally works best in light fuels, low wind speeds, and light intensity fires. The major advantage of direct attack is the immediate availability of the burned out area ("the black") as a safety zone. An anchor point must be used to launch the attack. The disadvantages of this tactic are that personnel are exposed to heat and smoke and that it is ineffective for fast moving fires.

Brush trucks are invaluable when used for direct attack, especially in light grassy fuels. Personnel with hand tools should work closely with crews using hose lines. This coordination can reduce water use significantly. Water should be used sparingly and wisely by applying it in short bursts. The brush truck operator and nozzle person must be in constant communication over progress, water supply, and fire behavior. Use Class A foam or surfactants if available. Dish detergent can be added to tank water to act as a surfactant. Surfactants improve the penetration of water, reduce friction loss, and absorb more heat by reduced surface tension. Brush trucks should be rotated out as their water supply is diminished.

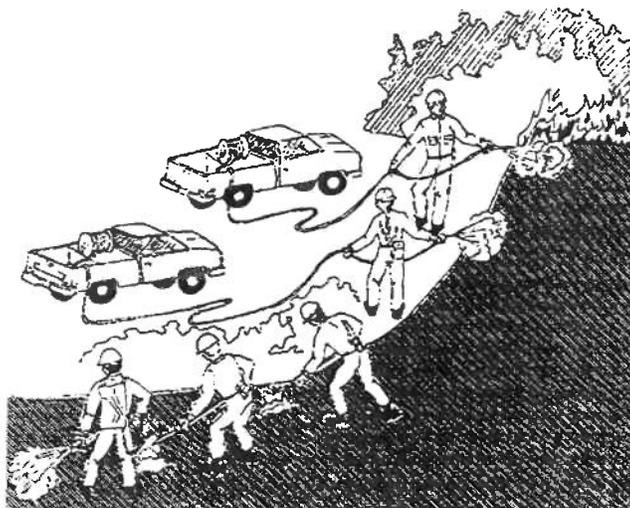


**Mobile-** When terrain and fire behavior allow, this tactic is the fastest and most effective method. The brush truck is driven in the black along the fire's edge while the nozzle person knocks down the flames. Personnel with hand tools

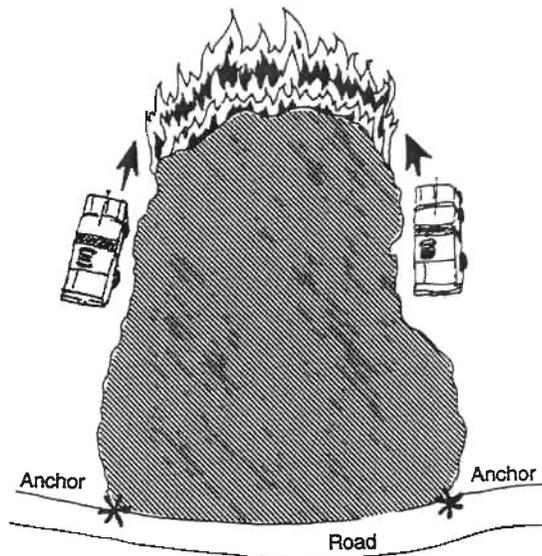
follow behind and contain the fire. Never allow personnel to ride on the outside of the apparatus during a mobile attack. The brush truck driver must have the nozzle person in view at all times when using a mobile attack. If the nozzle person is out of view, the driver must stop the vehicle until the nozzle person comes back into view. The hose line should be kept as short as possible to prevent this.



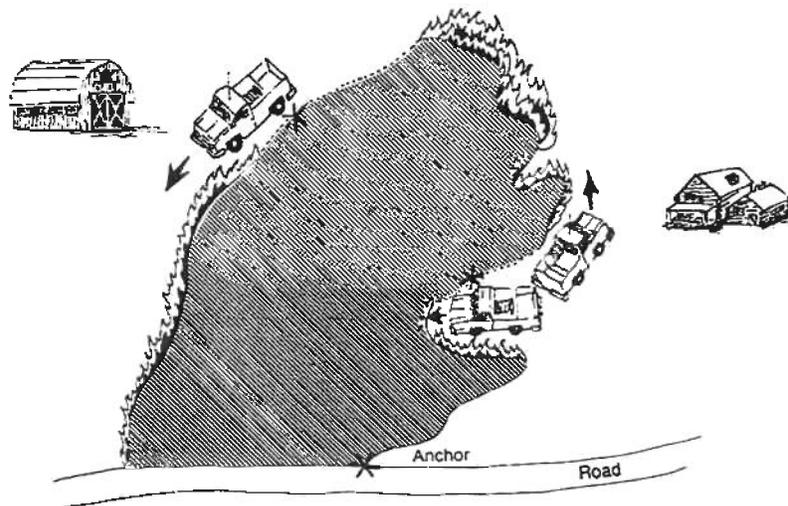
**Tandem-** Two engines are used in series a mobile attack. From the back, the first brush truck hits the hot spots and the second one follows up extinguishing the fire. Hand tools are used to ensure containment.



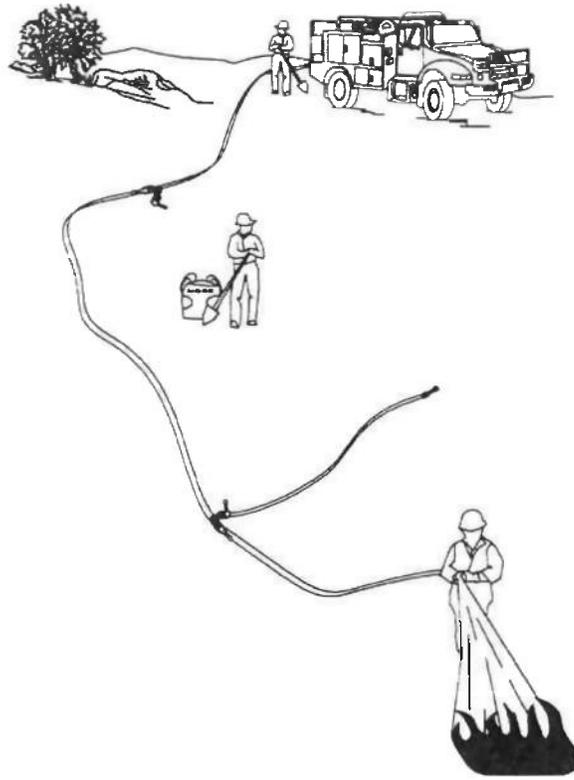
**Pincer-** This tactic uses two or more brush trucks in the back to attack the flanks and continue toward the head of the fire in an attempt to pinch it off.



**Envelopment-** The envelopment tactic involves attacking multiple critical segments or structures around the fire area at the same time. Establishing anchor points for the different attack locations is required to keep from being outflanked or overrun by the fire. Critical areas are attacked first using the hot spotting technique. From the back, the brush trucks move towards each other, tying their control lines together. This tactic requires good communication and coordination.



**Stationary-** Uses an attack line from a parked brush truck to reach areas inaccessible for a mobile attack. The attack should be made from the back.



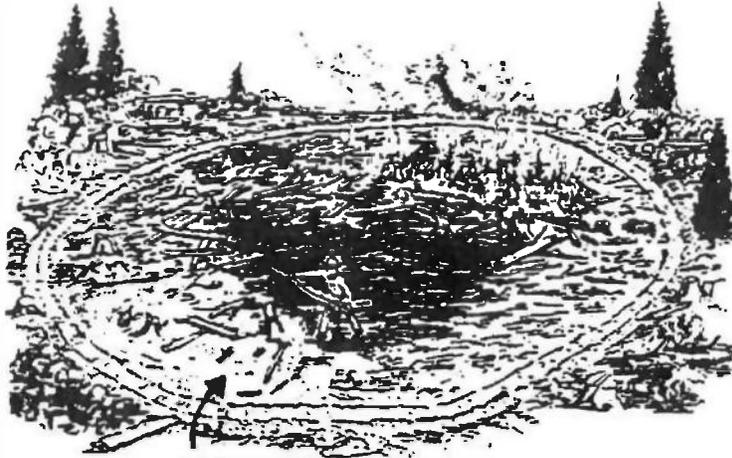
Size up questions- What barriers can we use as anchor points?

**Parallel Attack-** This attack strategy works by constructing a control line parallel to but farther away from the fire edge than in direct attack. This may shorten fireline construction by cutting across unburned fingers. This strategy places firefighters in the path of the fire with no “black” as a safety zone. For this reason, the fuel between the fire and the control line needs to be burned out by firefighters igniting the fuel along the control line. This is called “dragging the black” with you. Although unlikely, it is possible that this tactic could be used in Montgomery County.

**Indirect Attack-** This strategy is similar to the parallel attack only the control line is built much farther away from the fire edge. This technique is unlikely to be used in suburban areas such as Montgomery County.

**Mop-up-** This important task can be slow and tedious. The goal is to insure that the fire is extinguished and will not escape the control line. Spot fires outside the line are extinguished. All hot spots inside the control line must be dug out and cooled with water. If the fire involved heavy fuels such as logs and brush piles, the overhaul/mop up work may take hours. Smoldering debris can be piled together (bone yarding) and allowed to

burn. Light fuels such as grass will not usually take extensive efforts. Hand tools and backpack pumps work well for this task.



BONE YARD IN CLEARED AREA

Brush trucks may be used to provide water for backpack pumps. Surfactants work exceptionally well during mop up. Be sure to flush the tank and pump with clean water at the conclusion of firefighting operations. Be alert for hazard trees, burning stump holes, and fatigue. Appropriate PPE must be worn during mop up operations. Eye protection is extremely important due to amount of dust and ash present. The goal is to mop up the entire area until the burn area is cold.

**Fireline Patrol**- After overhaul/mop up it is often necessary to police the area for smoke and hot spots. This is especially true of deep-seated ground fires. Peat fires are particularly troublesome.

**Safety**- The danger of changing fire behavior makes these precautions necessary when performing initial attack on brush fires.

Always wear and use appropriate PPE. Turnout gear is not appropriate for brush fires.

**LCES**- This acronym should be memorized to help the brush truck operator recall the fireground hazards.

**Lookouts**- Assign knowledgeable and experienced lookouts or safety officers to watch for:

- Inappropriate PPE (structural PPE is inappropriate)
- Hazard trees/collapse zones (flagged in black and yellow striped ribbon)
- Increased fire behavior
- Changing weather conditions
- Inappropriate tactics
- Freelancing
- Crew locations and accountability
- Location of escape routes and safety zones

**Communications-** Miscommunication can mean disaster. A size up needs to be completed and a tailgate briefing held. Brush fires are rarely true emergencies and in Montgomery County almost never a threat to life of the public. Slow down and take the time to communicate the plan. Make sure the following things are communicated before making a fire attack:

- Size up findings
- Current and expected Weather
- Current and expected fire behavior
- Location of Escape Routes and Safety Zones
- Type of fire attack and strategy
- Radio talk groups to be used
- Ensure instructions are understood
- Radio designation of lookout/safety
- Hazards

**Escape Routes-** These are the designated trails that will be used to reach safety zones should the fire threaten personnel or brush trucks.

- May require change as the fire progresses
- Need to be scouted and flagged with high visibility ribbon
- Travel time is related to topography, fitness of personnel, and route length

**Safety Zones-** A safety zone is a nonflammable area of refuge where personnel can wait out unexpected increases or changes in fire behavior. A wind shift can necessitate the evacuation to safety zones. Multiple safety zones should be identified.

- May change locations as the fire progresses
- Must be close to where personnel are working
- Can be the black
- Located to avoid hazardous terrain features
- Must be large enough to protect from extreme fire behavior

Personnel should not work under overhead power lines. They can burn through and drop to the ground.

Personnel must take notice of hazard trees and stay clear of them if possible. Hazard trees should be marked with hazard ribbon.

When using a stationary attack keep a charged line at the brush truck for your protection.

The brush truck should keep 25% of its tank water in reserve for protection. Due to the limited water supply on a brush truck it is important to refill the tank at each opportunity.

If trapped in the path of an oncoming fire front, position the brush truck in the least amount of vegetation and take refuge in the cab of the brush truck. Keep the pump running and use an attack line to deploy a fog pattern over the cab. Deploy ground sweep nozzles if available. If the motor has choked out, there is not enough oxygen outside for you either. If the vehicle catches fire so will you if you go outside. The cab will normally burn last and may buy you time until things outside cool down. Stay inside the cab until it is safe outside.

**Limitations-** Brush trucks have restrictions such a woods and rugged terrain that may restrict their mobility. Stationary pumping can still be used. It's possible to have extreme fire behavior in tall dry grass that would prohibit any attack on the head of the fire. Water supply limitations will affect which tactics can be utilized.

**Decision time-** What are my options? What plan of attack is most appropriate? Will I need additional resources to implement my initial attack strategy? What quantity and type of other resources might I need? Where will you launch the initial attack? Is this a safe strategy? Do I have units in staging that might be needed?

**Re-evaluate-** Are the strategy and tactics working? Is it safe to continue our attack? What are my trigger points for switching to a defensive mode? Has there been a change in weather or fire behavior? What is plan B?

If this seems like overkill, consider these facts:

Downed power lines on brush fires have killed structural firefighters.

Structural firefighters have been killed from heat stroke on brush fires.

Structural firefighters have been burned over and killed on brush fires.

The four most common denominators of fire behavior on tragedy fires:

Most incidents happen on small fires or isolated sections of large fires.

Flare-ups generally occur in deceptively light fuels, such as grass and light brush.

Most fires are innocent in appearance before unexpected shifts in wind direction and/or speed result in flare-ups. Sometimes tragedies occur in the mop up stage.

Fires respond to large and small scale topographic conditions, running uphill surprisingly fast in chimneys, gullies, and on steep slopes.