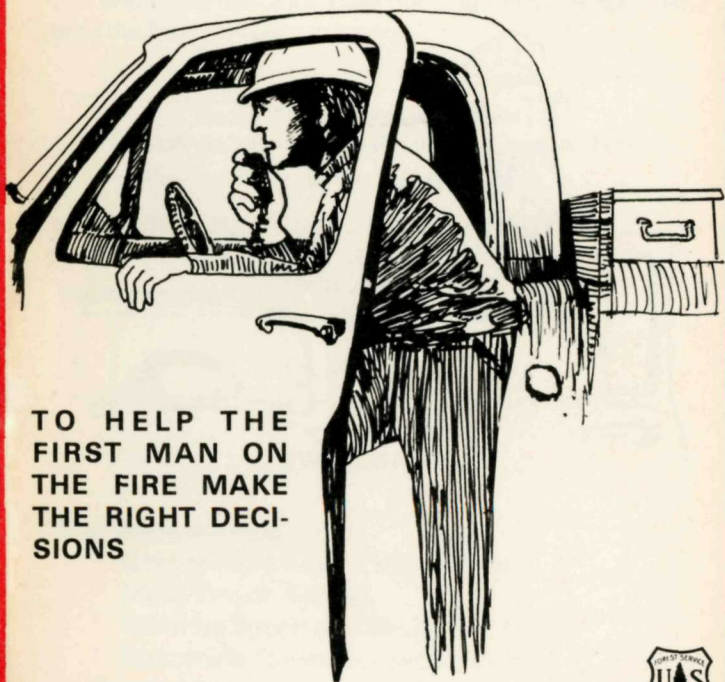


# Planning For INITIAL ATTACK



TO HELP THE  
FIRST MAN ON  
THE FIRE MAKE  
THE RIGHT DECIS-  
IONS



U.S. DEPARTMENT OF AGRICULTURE • FOREST SERVICE  
SOUTHEASTERN AREA • STATE AND PRIVATE FORESTRY

in cooperation with the SOUTHERN STATE FORESTERS

Forestry Report SA-FR 2

# PLANNING FOR INITIAL ATTACK

By Hugh E. Mobley, James E. Moore,  
Roy C. Ashley, Kenneth L. Burton, and H. Cary Peeples\*

Art by Barry Nehr

U.S. DEPARTMENT OF AGRICULTURE  
Forest Service, Southeastern Area  
1720 Peachtree Road, N.W.  
Atlanta, Georgia 30309

Revised May 1979

\* -Mr. Mobley is a Technical Specialist, Cooperative Fire Protection Staff, Southeastern Area; Mr. Moore, formerly of the same staff unit, is now with the Forest Service's Intermountain Region; Mr. Ashley is with the Tennessee Division of Forestry; Mr. Burton is with the Texas Forest Service; Mr. Peeples is with the Florida Division of Forestry.

## FOREWORD

The first person or crew to arrive on a fire must make some fast, important decisions. This booklet is designed to give you, **the initial attack fire boss**, some guidelines for making the **right** decisions. The basic concepts presented in this guidebook are applicable anywhere when integrated with local conditions and suppression forces.

Remember – this booklet will help you gather information and make decisions from the time the fire is reported **until** the first crew goes to work.



This Guide will help you to:

- Get the Right Kind of Information
- Make Proper Size-up
- Estimate Speed and Behavior of Fire
- Determine Forces Needed for Control

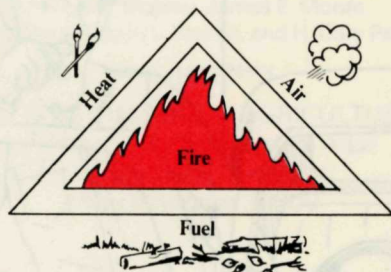
So you can—

**MAKE THE BEST INITIAL ATTACK DECISIONS**

**FIRE TACTICS will not be discussed in this booklet.**

**FOR A FIRE TO BURN,  
YOU MUST HAVE...**

**HEAT                      AIR                      FUEL**



**TO STOP A FIRE FROM BURNING,  
YOU MUST REMOVE EITHER...**

**HEAT                      AIR                      FUEL**

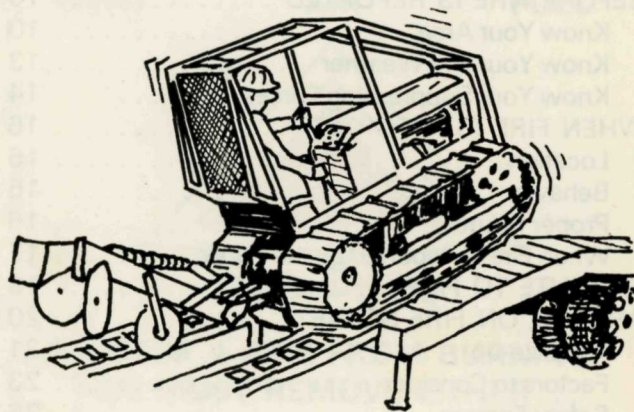
## TABLE OF CONTENTS

	Page
FOREWORD .....	1
TABLE OF CONTENTS .....	3
INTRODUCTION .....	4
A FIRE'S ENVIRONMENT .....	6
What Makes a Fire Burn "Hotter" or "Faster"? ..	7
BEFORE FIRE IS REPORTED .....	10
Know Your Area .....	10
Know Your Fire Weather .....	13
Know Your Suppression Forces .....	14
WHEN FIRE IS REPORTED .....	16
Location .....	16
Behavior .....	16
Proper Route .....	16
When Fire is Reported by the Public .....	17
ENROUTE TO FIRE .....	18
ARRIVAL ON FIRE SCENE .....	20
The Size-up .....	21
Factors to Consider .....	23
Safety Factors .....	26
ANALYZE SITUATION AND PLAN ATTACK ...	28
Step 1. Estimate Time Needed to Construct a Control Line .....	28
Step 2. Estimate Probable Spread and Behavior of Fire .....	29
Step 3. Determine Location of Control Line ...	30
Summary of Decision-making Process .....	32
FIRST ACTION .....	33
"WATCH-OUT" SITUATIONS .....	35
KNOW THESE TERMS .....	37
PARTS OF A FIRE .....	41



## INTRODUCTION

Most forest fires are suppressed by initial attack (first to arrive) forces. Most of these wildfires are controlled at less than 10 acres. A few become large, damaging fires. These few fires cause 90 percent of the damage. Some become large because of extreme weather, late detection, inaccessible areas, or delay in initial attack because there are more fires than there are forces to handle them. Many fires, however, escape initial attack and become large because of **wrong decisions** made by the initial attack fire boss.



The tractor-plow is the basic initial attack unit throughout most of the South. It is such an efficient piece of equipment on small fires that it allows us to make mistakes – to a point! On many fires, we take shortcuts in the size-up and calculation of where and how to attack. We just unload and start plowing, using the same techniques and tactics on every fire. Sometimes we get caught – we crowd the fire too close and get people and/or equipment trapped or we attack from the rear and lose it.

Line construction, both mechanical and hand, is slower and more difficult in mountainous areas and taking time to size-up a fire is most important. More abrupt changes in

topography and fuel will cause the behavior of the fire to change rapidly and drastically, leading to the failure of the initial attack if we have not considered these factors.

Oldtimers used to say, "The only way to learn how to suppress wildfires is to go out on the fire and absorb it along with the smoke and heat." However, a tremendous amount of knowledge has been gained over the years. This booklet is an attempt to give you a big jump on the "oldtimers" who had to learn it all the hard way – by experience.



As initial attack fire boss, you make key decisions on every fire.



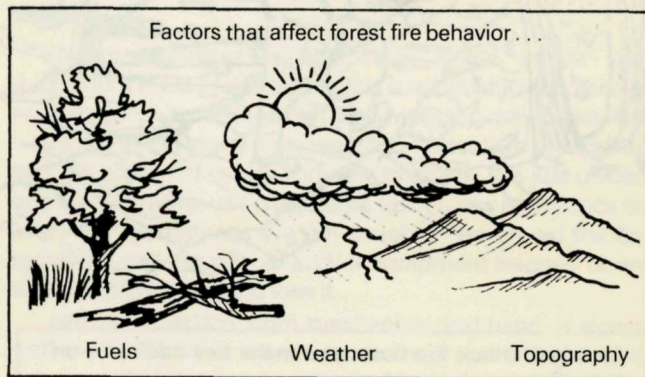
## A FIRE'S ENVIRONMENT

What makes some fires burn so hot? What makes fires spread fast one day and slow another? A forest fire behaves according to the environment in which it is burning. This environment consists of fuels, topography, and weather. These factors and their reactions with one another – and the fire itself – determine the behavior of the fire.

**Fuels** – The drier the fuel, the bigger the percent that will burn. The more fuel burning, the hotter the fire will be. Certain types burn hotter because of the flammable oils in them. Size and arrangement also affect the fire's behavior.

**Weather** – The faster the wind, the faster the fire spreads. Dry air and high temperatures cause the fuel to dry out quicker and, in turn, the fire burns "hotter" because more of the fuel is burning – and is burning more rapidly.

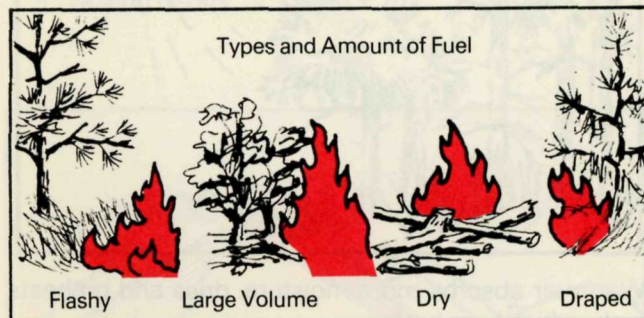
**Topography** (lay of the land) – The steeper the slope, the faster the fire spreads uphill. South-facing slopes are drier because they receive more sunlight. Winds are deflected and channeled by peaks and gaps. A change in the topography also causes a change in the behavior of the fire.



## What Makes a Fire Burn "Hotter" or "Faster"?

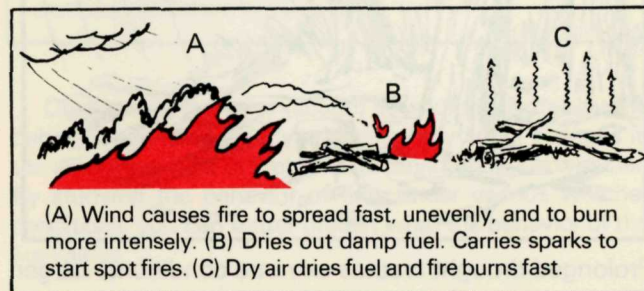
### 1. FUELS

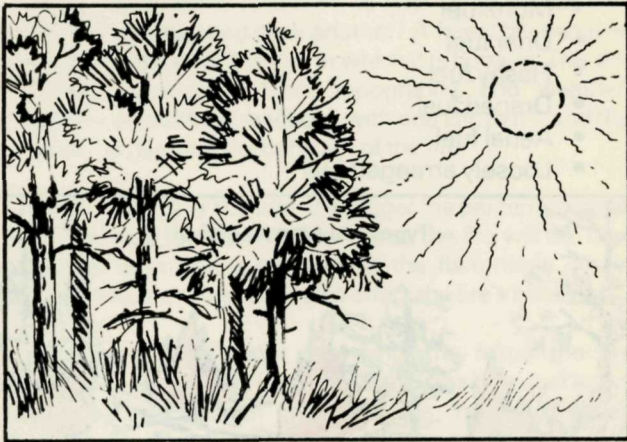
- More fuel
- Drier fuel
- Flashy fuel
- Draped fuel
- Aerial fuel
- Loosely arranged fuel



### 2. WEATHER

- Faster winds
- Higher temperatures
- Drier air
- Drought conditions
- Unstable atmosphere (Indicators: Gusty wind, dust devils, and good visibility)





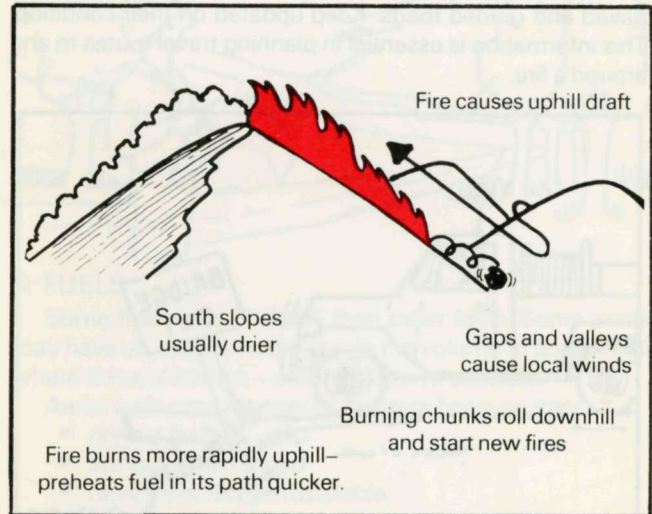
Warm air absorbs more moisture, dries and preheats fuels, which burn hotter.



Prolonged drought creates extreme conditions. Larger fuel dries out so there's more fuel available to burn.

### 3. TOPOGRAPHY

- Steeper slopes
- South and southwest-facing slopes
- Gaps or saddles
- Chimneys, canyons, coves
- Rolling debris



Observe the behavior (action) of wildfires. Note that the behavior can alter greatly with relatively small changes in the amount or type of fuel, or slight changes in the weather. By studying the behavior of fires under various weather conditions, you can better predict what the behavior of the fire will be.



## BEFORE FIRE IS REPORTED

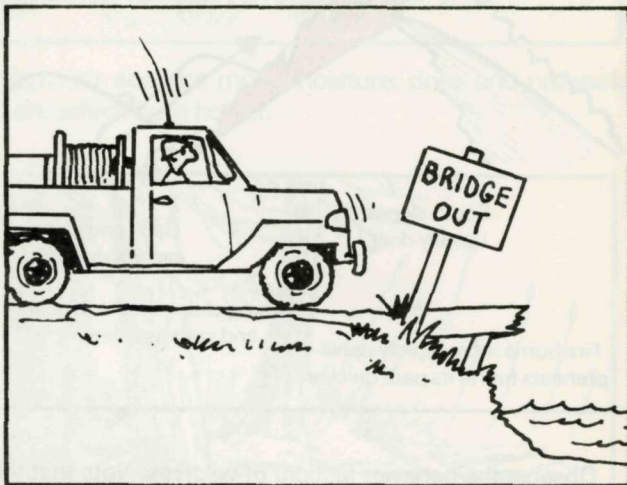
There are many things you can do **before** a fire is reported that can help you take the proper suppression action.

### Know Your Area

The better you know your working area, the easier your suppression job will be.

#### 1. ROADS

Know all the roads in your area – woods roads as well as paved and graded roads. Keep updated on their condition. This information is essential in planning travel routes to and around a fire.



#### 2. TRAVEL BARRIERS

Know which underpasses, bridges, and roads your initial attack unit cannot use. Be familiar with cross-country barriers such as creeks, swamps, and cliffs. Know access and exit locations on Interstate Expressways – and roads that they block.

#### 3. TOPOGRAPHY

Know the "lay of the land." Know all the trails and woods roads and the best access to any area. Know the location of steep slopes, ridges, swamps, and creeks that will affect the behavior of a fire, and your suppression tactics. Know where fire barriers are located; also good places to establish control lines.

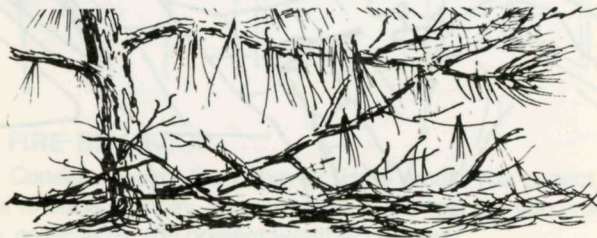


#### 4. FUELS

Some fuels burn "hotter" than other fuels. Some areas may have an excessive buildup in the volume of fuel. Know where these areas are – and map them if possible.

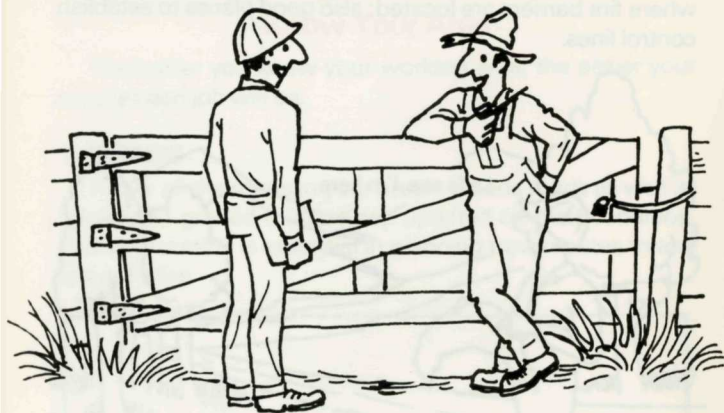
Aerial fuels can be a special problem because they:

- dry out fast
- are loosely arranged
- have more oxygen available
- are preheated by convection



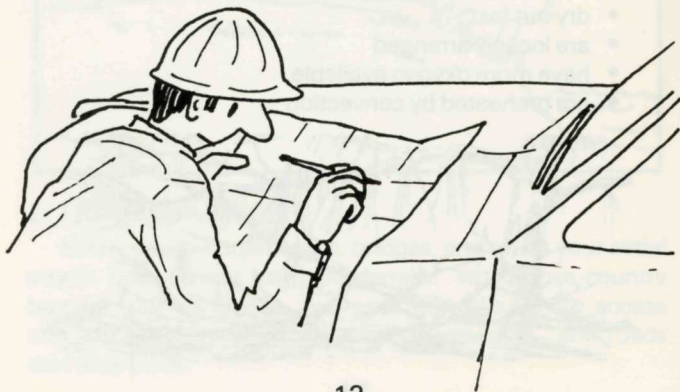
## 5. OWNERSHIP

Know who owns the land and their desires concerning fire. Do they want it to burn? How about locked gates, cooperative agreements, and assistance on fire suppression? Do they have equipment that can be used?



## 6. MAPS

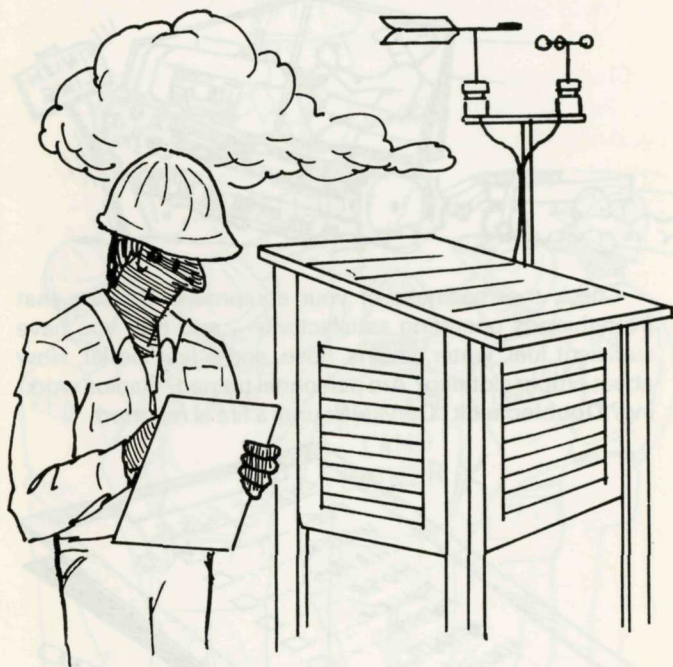
Be sure you have maps covering your area of initial attack responsibility and adjacent areas. Be sure you can use them. Update maps by adding unmarked roads, barriers to your equipment, dangerous fuel areas, and ownership boundaries.



## Know Your Fire Weather

### 1. WEATHER

Unlike "Fuel" and "Topography", weather changes by the minute. These changes directly affect the behavior of fire. Know what it was yesterday and what the forecast is for today – the higher the danger rating, the more important the current weather forecast will be. Consider the latest weather information. The more important factors are wind speed and direction, drought situation, and fuel moisture.



### 2. FIRE BEHAVIOR

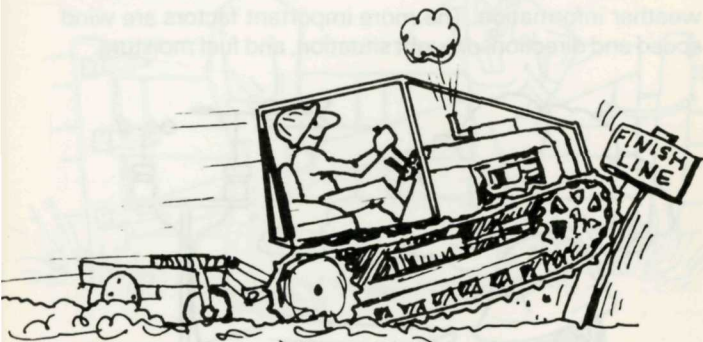
Consider recent fire behavior. How would you expect a fire to behave today, as compared to the last fire you were on, considering the present weather factors?



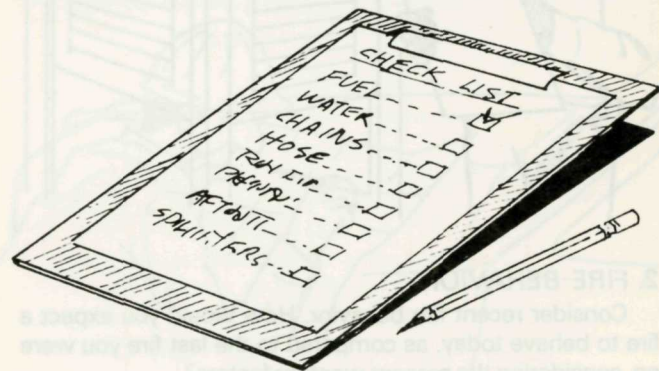
## Know Your Suppression Forces

### 1. EQUIPMENT AND PERSONNEL

Be sure you know how long it takes to construct and hold a specific length of line with your equipment or crew. If not, make some dry runs with your supervisor in different fuel and terrain situations to determine the average time needed.

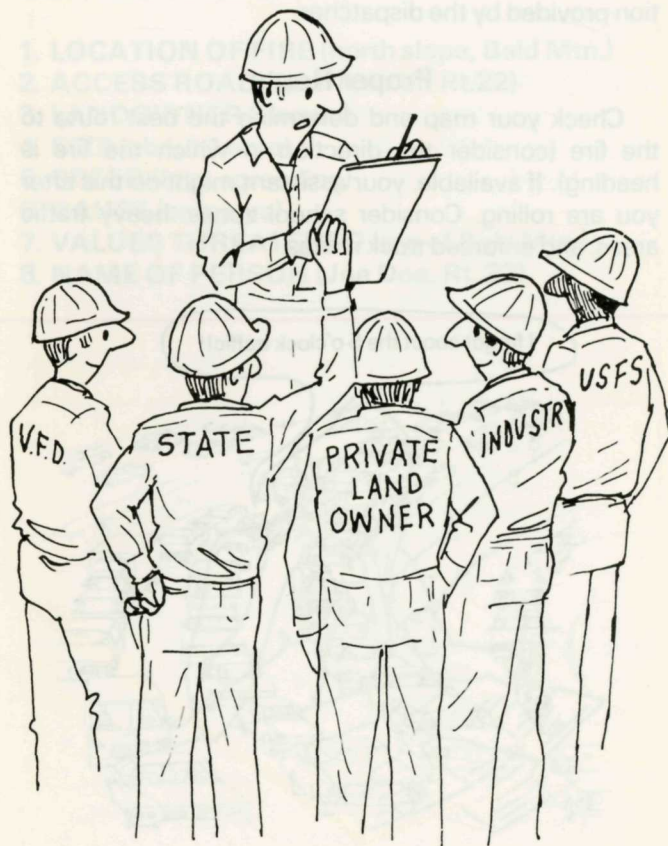


Check the readiness of your equipment. Be sure that everything is operating satisfactorily – and that you have sufficient fuel, water, chains, hose, and a first aid kit. How about proper clothing? Are personnel trained? Radios working? **Doublecheck!** Don't wait until a fire is reported.



### 2. BACKUP FORCES

Know where available backup forces are located – are they readily available? These forces include other State, industry, Federal, cooperating fire departments, and private landowners. Get to know your cooperators and local landowners. Discuss with them cooperation and assistance on fires.



## WHEN FIRE IS REPORTED

### Location

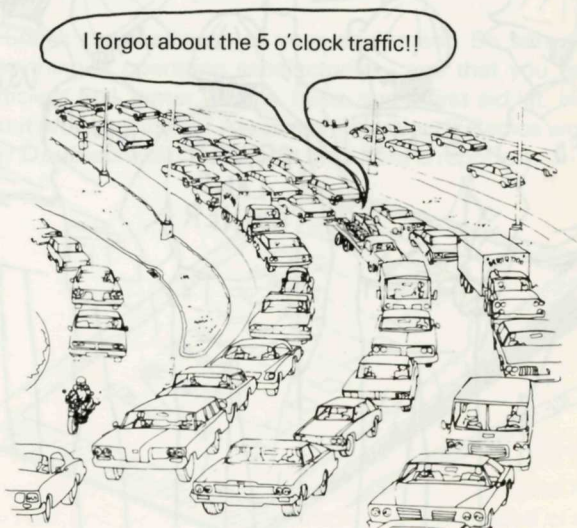
Be sure you understand the exact location. Use maps – write down.

### Behavior

Pay attention to all important fire behavior information provided by the dispatcher.

### Proper Route

Check your map and determine the best route to the fire (consider the direction in which the fire is heading). If available, your assistant might do this after you are rolling. Consider school zones, heavy traffic areas, and enforced truck routes.



## When Fire is Reported by the Public

If a fire is reported by the public, get all the following information.

If reported directly to you, advise headquarters or dispatcher before leaving or while on your way to the fire. **Travel Safely!**

### GET THE FACTS

1. **LOCATION OF FIRE** (north slope, Bald Mtn.)
2. **ACCESS ROAD** (farm road off Rt.22)
3. **LANDOWNER** (Brown)
4. **SIZE** (about 1 acre)
5. **SPEED** (fast, spreading)
6. **CAUSE** (campers)
7. **VALUES THREATENED** (top of Bald Mtn.)
8. **NAME OF PERSON** (Joe Doe, Rt. 22)





## ENROUTE TO FIRE

### 1. THINK ABOUT YOUR KNOWLEDGE OF THE FIRE AREA

- Fuels and terrain
- Access roads
- Fire barriers
- Ownership
- History of fires in area and cause
- Backup forces

### 2. THINK ABOUT RECENT FIRE BEHAVIOR

Considering fuels, terrain, and today's weather, how do you expect this fire to burn compared to recent fires in similar areas?

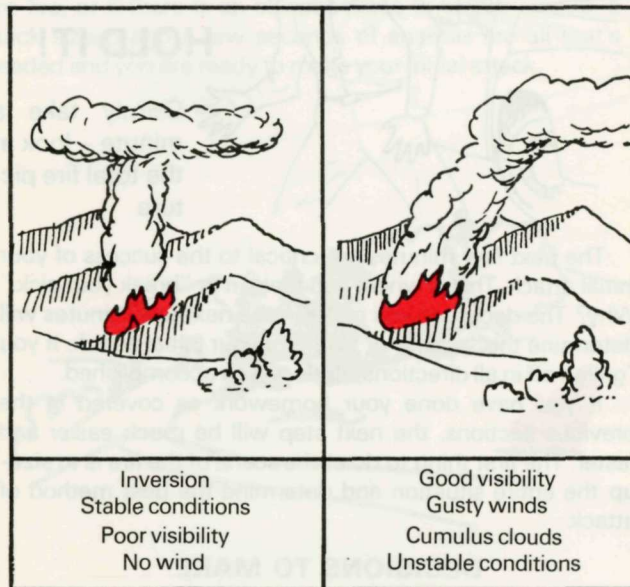
### 3. LOOK FOR LOCAL CURRENT WEATHER INDICATORS

- Wind. Is it faster or slower than forecasted? Is it from the same direction?
- Are there dust devils or gusty winds that would indicate erratic behavior?



### 4. AFTER SIGHTING SMOKE COLUMN

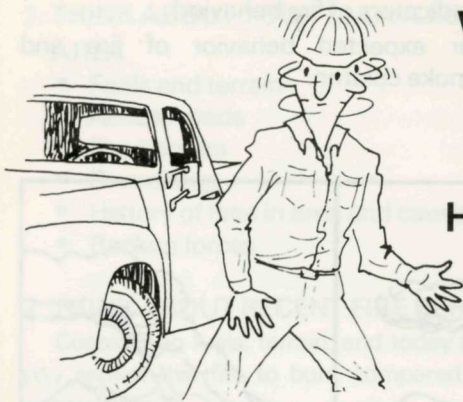
- Check size, height, color, direction, and shape (these are indicators of fire behavior).
- Verify your expected behavior of fire and resulting smoke column.



### 5. APPROACHING FIRE AREA

- Approach part of fire where you think (before sizing-up fire) initial attack should be made.
- Use caution in approaching head.
- Look for alternate routes.
- Look for people coming from the fire area and write down license numbers.
- Look for other evidence of how the fire started.

## ARRIVAL ON FIRE SCENE



**WHOA!**

**STOP!**

**HOLD IT!**

Calmly take a minute – look at the total fire picture

The next few minutes are critical to the success of your initial attack. This is where you make it or “break your pick.” Why? The decisions you make in the next few minutes will determine the success or failure of your initial attack. If you “gallop off in all directions,” little will be accomplished.

If you have done your homework as covered in the previous sections, the next step will be much easier and faster. The first thing to do at the scene of the fire is to **size-up** the entire situation and determine the best method of attack.

### DECISIONS TO MAKE

**WHERE** to attack fire (head or flank and location)

**HOW** to attack fire (direct or indirect – use of suppression firing)

**LOCATION** of control line

**TYPE** and width of control line needed

**FORCES** needed to make control line and hold it

**HELP** needed.

**REMEMBER THERE IS ONLY ONE INITIAL ATTACK**

## THE SIZE-UP

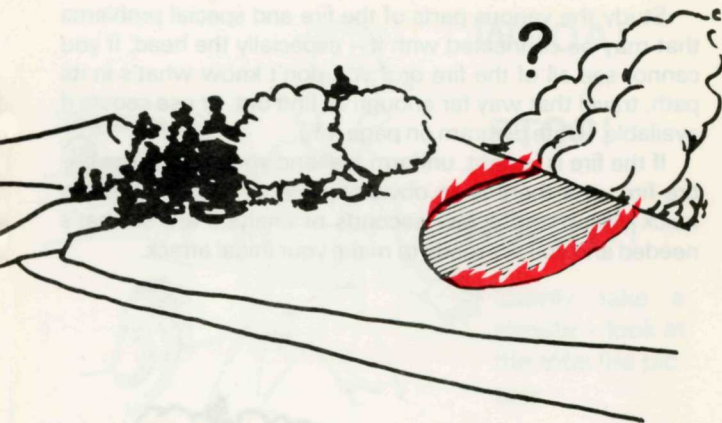
Study the various parts of the fire and special problems that may be connected with it – especially the head. If you cannot see all of the fire or if you don’t know what’s in its path, travel that way far enough to find out, or use scouts if available. (Note diagram on page 41.)

If the fire is in light, uniform fuel and you can see the entire fire, or if there is an obvious place to stop the head, a quick sizeup and a few seconds of analysis are all that’s needed and you are ready to make your initial attack.



At the other extreme, it may be a fast-moving fire that you cannot handle. You haven’t seen all of the fire and you don’t know what’s in its path. Your first size-up in this case should give you enough information to report the situation and determine what additional forces are needed. After requesting the help needed, you should then make a more complete size-up and analysis of the situation by scouting the fire to determine (1) rate of spread, (2) control time needed, and (3) location of control line.





These are two extremes; your best decision may be in between. Even if help is needed, you can do some productive work on the fire after the necessary scouting has been done.

## RED FLAG SITUATIONS

### IF YOU DON'T KNOW-

- Location of head
- Type of fuel in front of fire
- Location of improvements and other high values
- Location of natural barriers in fire areas

-THEN FIND OUT!

## CAUTION

Be sure you know what's in path of fire!

## FACTORS TO CONSIDER

### 1. Point of Origin and Cause

- Protect any evidence on how it started for investigation later.

### 2. Size of Fire

### 3. Location of Head

### 4. Improvement and Other Values in Path of Fire



### 5. Weather at Fire

- What is the windspeed and direction – Is it variable or steady?
- Are other weather conditions at the fire as expected?

## 6. Behavior of Fire

- How fast is fire spreading?
- How high are the flames?
- Is it spotting? If so, how far?
- Is it hotter than usual?

## 7. Fuel

- Type and arrangement of fuel?
- How deep or clean is the fire burning?
- Any aerial fuels involved (needle drape, brush)?
- Fuels in path of fire (do they change and if so, how will they affect the fire)?

## 8. Terrain or Topography

- Slope and aspect (direction it's facing)
- Hollows or chimney involved
- Ridges or saddles in front of fire
- Natural and manmade barriers
- Access roads and trails
- Swamps, creeks, fields, baygalls, etc.

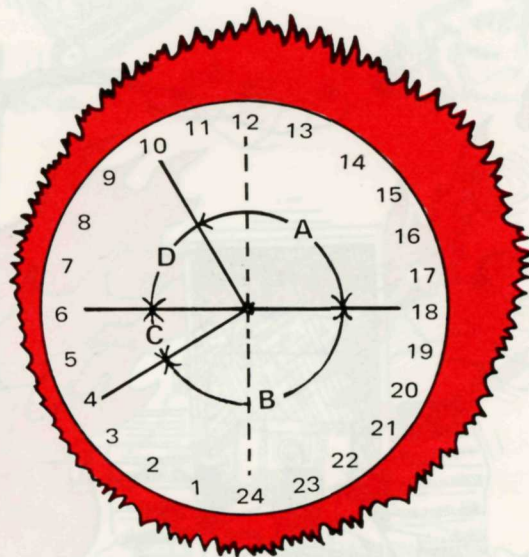
Report any unusual fire behavior to your supervisor or dispatcher!

## 9. Period of Day

Fires burn most intensely during the hottest part of the day. They slow down, burn less intensely and are easier to control at night.

**D—Fire speeds up;  
becomes more  
difficult to con-  
trol**

**A—Fire burns in-  
tensely; difficult  
to control**



The Fire Day

**C—Fire at lowest  
ebb; easier to  
control**

**B—Fire slows down  
gradually; be-  
comes easier to  
control**



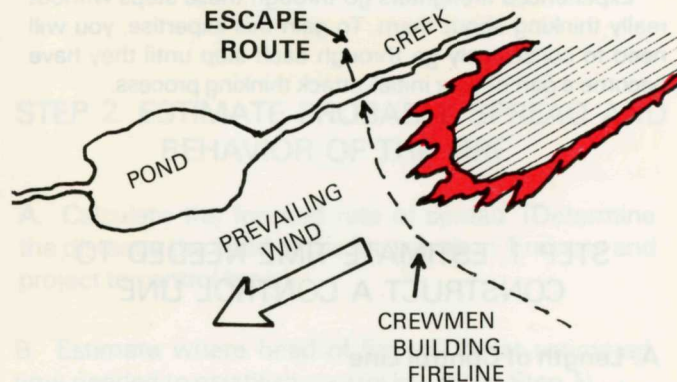
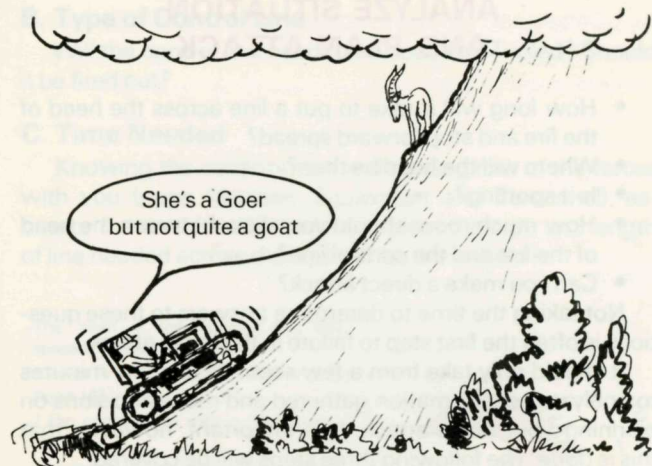
## SAFETY FACTORS

Fires should be suppressed aggressively, but consider safety first! Protection of personnel and equipment must be your first concern. Do not attack the head unless you know it can be done safely. Also, consider the safety and protection of vehicles. They should be parked in a safe location with windows closed and accessible to other drivers should emergency movement be necessary.

Be sure you have escape routes and that they are known to all personnel. Know and practice the "Ten Standard Firefighting Orders" (listed on back cover).



Note: If behavior of the fire is not as expected, report this fact to your supervisor.



Remember: Your initial attack should be directed toward stopping the head if it can be done safely.

## ANALYZE SITUATION AND PLAN ATTACK

- How long will it take to put a line across the head of the fire and stop forward spread?
- Where will the head be then?
- Is it spotting?
- How much room should you allow between the head of the fire and the control line?
- Can you make a direct attack?

Not taking the time to determine answers to these questions is often the first step to failure in the initial attack.

It should only take from a few seconds to a few minutes to analyze the information gathered and make decisions on planning your initial attack. It is important, however, that this is done. The following three steps will be covered.

1. Estimate time needed to construct control line
2. Estimate probable spread and behavior of fire
3. Determine location of control line.

Experienced firefighters go through these steps without really thinking about them. To gain this expertise, you will need to consciously go through each step until they have become a part of your initial-attack thinking process.

### STEP 1. ESTIMATE TIME NEEDED TO CONSTRUCT A CONTROL LINE

#### A. Length of Control Line

Look at the head of the fire and estimate the length of the control line across the head needed to stop its forward spread. (Be sure to allow enough line at each end so the fire can't outflank you.)

#### B. Type of Control Line

Will the control line need to be doubled? Tripled? Should it be fired out?

#### C. Time Needed

Knowing the construction and holding rate of the forces with you (page fourteen, Equipment and Personnel), estimate the time it will take to complete the type and length of line needed across the head of the fire to hold it.

-The head is too intense and fast spreading for direct attack.

-I need  $\frac{1}{4}$  mile of control line to stop head. (A)

-I can construct  $\frac{1}{4}$  mile in 15 minutes. (C)

-Single line should hold but will need to fire so - double time needed = 30 minutes. (B)

-Total time needed is  $\frac{1}{2}$  hour



### STEP 2. ESTIMATE PROBABLE SPREAD AND BEHAVIOR OF THE FIRE

A. Calculate the forward rate of spread. (Determine the distance the head of the fire travels in 1 minute and project to control time.)

B. Estimate where head of fire will be at estimated time needed to establish control line (from Step 1).

C. Consider behavior of fire at planned control line: Will it be hotter, spreading faster, etc?



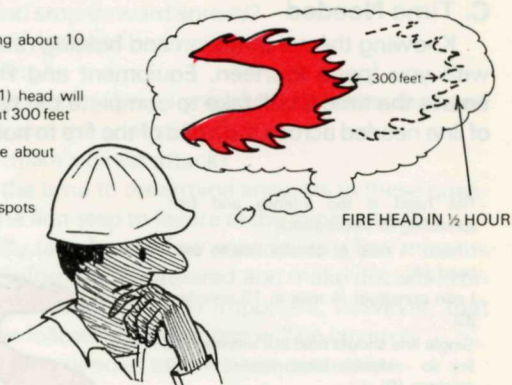
D. Determine possible danger spots. Look for areas with snags, large amounts of fuel, bogs, etc., in general area of control line.

-The head is moving about 10 feet per minute

-In 1/2 hour, (step 1) head will move forward about 300 feet

-Behavior should be about the same

-I see no danger spots about 300 feet in front of fire



### STEP 3. DETERMINE LOCATION OF CONTROL LINE

Now you have determined two things:

- (1) The **time needed** to construct and hold a control line across the head of the fire. (Example: 1/2 hour, p. 29).
- (2) The forward **rate of spread** and projected location of the fire's head at the time needed to establish the control line. (Example: 300 feet, top of the page.)

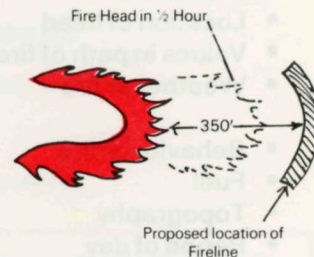
**Now**, allowing yourself some extra distance to take care of any unforeseen factors such as equipment hangup or increasing winds, determine the distance in

front of the fire the control line should be and **locate this place on the ground**. Avoid large volumes of fuel, steep drainage, or other possible danger spots. Consider an anchor point and areas of easy construction.

-Time needed to construct and hold line = 1/2 hour (step 1)

-Projected location of head = 300 feet (step 2)

-To give myself some extra distance and so I can tie into that bare spot, I'll locate control line about 350 feet in front of fire and anchor to that old woods road



You have now completed the three steps and made a decision on the type and location of your control line. You are now ready to take action on the fire.

If you determine from sizing-up the fire that you cannot **safely** make an attack on the head with present forces, you will have to back off to a barrier (such as a road) where you can safely make your initial attack. If no adequate barriers are in front of the fire, you will have to determine what additional forces are needed to make an effective attack and order them. In this case, your first priority will be to scout the area where you estimate an attack can be made on the head, to determine: access, topography, barriers that can be used, etc. Be sure you consider the time needed for the additional suppression forces to reach the fire, as well as the time needed for construction of control lines.

Your next priority will be to take action on the most critical flank, or even the rear of the fire, where you can safely build a line with the forces you have.

## SUMMARY OF DECISION-MAKING PROCESS

### Factors to Consider

- Point of origin and cause
- Size of fire
- Location of head
- Values in path of fire
- Weather at fire

- Behavior of fire
- Fuel
- Topography
- Period of day
- Safety

### Analyze Situation And Plan Attack

Step 1. Estimate the time needed to construct a control line:

- Estimate the length of the control line needed
- Determine the type of control line needed
- Estimate time needed to construct line

Step 2. Estimate probable spread and behavior of the fire:

- Calculate the forward rate of spread
- Consider the behavior of the fire
- Locate possible danger areas

Step 3. Determine the location of the control line:

- Determine how far the line should be in front of the fire.
- Locate this place on the ground
- Avoid dangerous areas
- Use areas of easy line construction
- Decide where to anchor the line

After you have decided where and how to stop the head of the fire (first priority), take a look and determine how you will handle the flanks and rear of the fire.

## FIRST ACTION

Now you have made some key decisions! You have determined:

HOW fast the fire is spreading

WHERE and HOW to attack the fire

LOCATION and TYPE of control line needed

FORCES needed

You are now ready to go to work!

**Remember: The situation is constantly changing!**

### Step 1. Report Situation

The first action is to report the situation to the dispatcher. Report how large the fire is, how the fire is behaving, and if you will need help. If you think help is needed, tell how much and what type. Be specific. Be sure to report unusual fire behavior

Fred, This is what we have—the fire is about 7 acres now and running fast; but we can handle it!

### Step 2. Brief Crew

Tell the rest of the crew what your plan of action is to stop the head and to control the fire. **Identify escape routes and special hazards.**





### Step 3. Make the Initial Attack

Fuel, weather, topography, and available resources will vary greatly from State to State and from area to area. Their different combinations determine the fire tactics necessary for success. Therefore, tactics are beyond the scope of this booklet. However, the following points should be kept in mind

–Keep dispatcher informed.

–Continue sizeup.

–Preserve evidence.

–Anchor control lines to:

- Roads
- Burned areas
- Other plowed lines
- Fields
- Creeks or streams
- Rocky areas
- Areas having little or no fuel

Note: TACTICS are not covered in this booklet.

### "WATCH-OUT" SITUATIONS

- Topography**
- Inaccessible areas
  - Unfamiliar country
  - Upper end of a cove
  - Chimneys or gaps
  - Steep slope
  - South-facing slope
  - Rocky slope
  - Bogs and swamps
  - Change in topography
  - Fire below you

#### Barriers and Obstacles

- Overgrown fences
- Ditches and gullies
- Pipelines (close to or on surface)
- Stumps

#### Fuels

- Windswept flashy fuels
- Cutover areas (logging debris)
- Dead snags
- Aerial fuels

## Weather

- Drought conditions
- High winds
- Low humidity
- Shifting and erratic wind

## Fire Behavior

- Fire burning intensely
- Spotting

## Operations

- By yourself
- No escape route
- Poor operating visibility
- Low or broken power lines
- Faulty equipment
- Unfamiliar with equipment
- Fatigue
- Unsupervised volunteers
- Children
- Elderly people
- Smoke on highway

Ask your supervisor what these items should mean to you.

## KNOW THESE TERMS

**Aerial Fuels.** Fuels not in direct contact with the ground – such as foliage or brush, branches, twigs, and draped fuels.

**Analyze.** To study or determine the nature and relationship of the various parts.

**Anchor point.** The point at which a control line is tied into a safe barrier that the fire cannot flank, such as a road, creek, open field, etc.

**Aspect.** The direction in which a slope faces – its exposure.

**Atmosphere.** The mass of air surrounding the earth. The air surrounding a locality influencing its weather.

**Attack.** To take action on a fire to slow it down or stop its spread by cooling, smothering, removing, or otherwise treating the fuel around its perimeter.

**Behavior.** See “Fire Behavior.”

**Buildup.** Cumulative effects of drying out of fuel over a period of time.

**Control line.** An inclusive term for all constructed or natural fire barriers and treated fire edges used to stop or control a fire.

**Critical burning period.** That part of each 24-hour period when fires will burn intensely and spread most rapidly – typically, from 10 a.m. to sundown.

**Crown.** A fire that runs through the tops of trees, shrubs, or brush, it may accompany, or be separate from, the surface fire.



**Direct attack.** All control action that is carried on directly against or near the fire's edge.

**Dispatcher.** A person who receives reports of discovery and status of fires, confirms their location, takes prompt action to provide the staff and equipment likely to be needed for control in the first attack, and sends them to the proper place. For additional needs, the dispatcher acts on orders from the fire boss.

**Draped fuels.** Needles, leaves and twigs that have lodged on branches or brush. A part of the aerial fuels.

**Environment.** Anything surrounding an individual or community of plants or animals, including man, that influences it in any way. (Example of a plant's environment: soil, air, weather, adjacent plants, animals.)

**Fire behavior.** The manner in which fuel ignites, flame develops and fire spreads and exhibits other qualities. The combined effects of the fire's environment on how the fire acts or behaves.

**Fire boss.** The person responsible for the suppression of a fire.

**Fire danger rating.** Both constant and variable factors which affect the start, spread, and difficulty of control of fires; expressed as a danger index.

**Fire intensity.** How hot the fire is burning; the more intense, the more difficult to control the fire.

**First attack.** The first suppression work on a fire.

**Fuel type.** An identifiable association of fuel elements of distinctive species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

**Fuels, flash.** Fuels such as grass, leaves, draped pine needles, fern, tree moss, and some kinds of slash which ignite readily and are consumed rapidly when dry. Also called fine fuels.

**Head.** Area of most rapid spread (See diagram, page 41.)

**Indirect attack.** Control action that is conducted at a distance from the edge of a fire to make a break in the fuel and halt further progress. It is sometimes widened by the use of fire.

**Initial attack.** The first action taken on a fire by the first suppression forces to arrive at a fire.

**Perimeter.** The boundary line of a fire; sometimes called the fire edge.

**Rate of spread.** Rate of increase of the total perimeter of the fire, or rate of forward spread of the fire front. It is usually expressed in chains or acres.

**Relative humidity.** The ratio of the amount of moisture in the air compared to the amount it could hold if saturated. Affects burning intensity of forest fires.

**Size-up.** A study of the overall fire situation for determining control action needed.

**Speed of attack.** Elapsed time from the start of a fire to arrival of the first suppression force.

**Spotting.** A fire spreading by the setting of spot fires.

**Spot fire.** A fire set outside the perimeter of the main fire by flying sparks or embers.

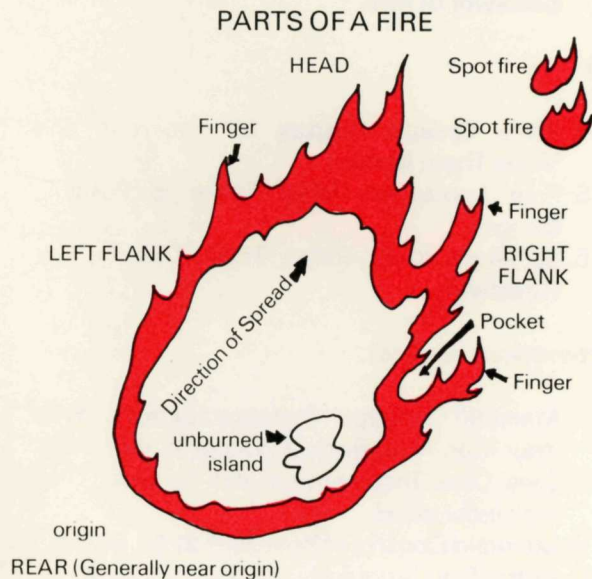
**Suppression firing.** The various applications or uses of fire to speed up or strengthen control action on wildfires. Many terms are used for various types of suppression firing: burning out, backfire, line firing, counter firing, burned strip, etc.

**Tactics.** The method of employing various suppression forces to control a wildfire.

**Topography.** The physical features of the land surface – both natural and manmade. Examples: rivers, mountains, roads, swamps, rock outcrops.

**Unstable atmosphere.** When air next to the ground tends to rise vertically. Heated air will rise very readily. Winds will be gusty and erratic. Fires will pick up and burn more intensely. They will be more likely to crown and cause spot fires. Indicators are cumulus clouds, dust devils, gusty winds, and good visibility due to haze and dust being lifted into the atmosphere.

**Weather indicator.** Anything that indicates the condition of any aspect of weather such as swaying trees and brush, the dispersion of smoke, dust devils, gusty winds, visibility, and clouds.





# STANDARD FIREFIGHTING ORDERS

## Fire Behavior

1. Keep Informed on **Fire-Weather** Conditions and Forecasts.
2. Know What Your **Fire is Doing** at All Times.
3. Base All Actions on Current and Expected **Behavior of Fire**.

## Safety

4. Have **Escape Routes** for Everyone and Make Them Known.
5. Post **Lookouts** When There is Possible Danger.
6. Be **Alert**, Keep **Calm**, **Think Clearly**, Act **Decisively**.

## Operations Control

7. Maintain Prompt **Communications** with Your Men, Your Boss, and Adjoining Forces.
8. Give Clear **Instructions** and Be Sure They are Understood.
9. Maintain **Control** of Your Men at All Times.
10. Fight Fire Aggressively, But Provide for **Safety First**.