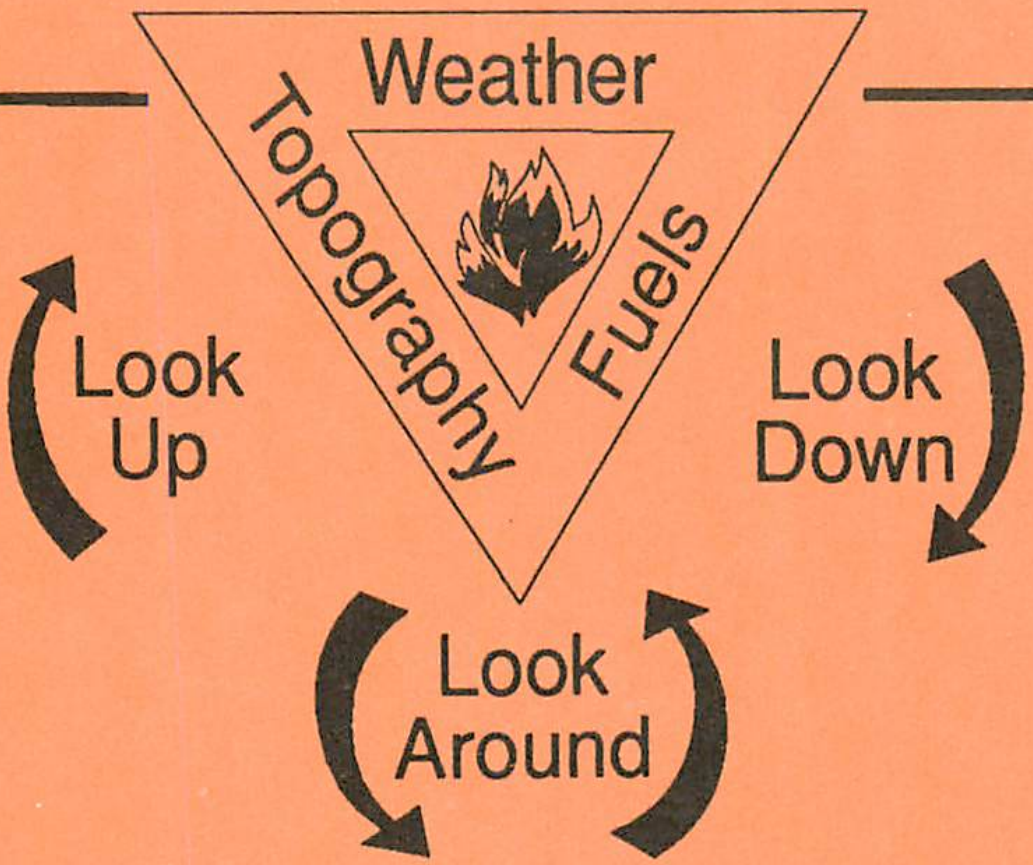

PMS 427
FIRELINE SAFETY REFERENCE
NOVEMBER 1993
NFES 2243

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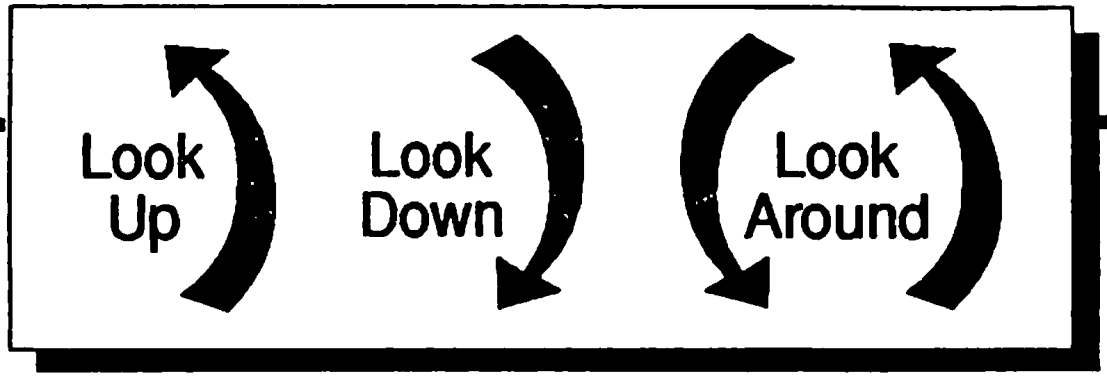


Fire Environment Factors	Indicators
Fuel Characteristics Assess	Continuous fine fuels CARRIER! Heavy loading of dead and down Ladder fuels Tight crown spacing (< 20 ft.) Special Conditions: Firebrand sources Numerous snags Preheated canopy Frost and bug kill Unusual fine fuels Hi dead to live ratio Urban/Wildland
Fuel Moisture Feel & Measure	Low RH (Dangerous < 25%) Low 10 hr FMC (Dangerous < 6%) Drought conditions Seasonal drying
Fuel Temperature Feel & Measure	High temps (above 85^{o} F) High % of fuels with direct sun Aspect with increasing fuel temps

Fire Environment Factors	Indicators
Terrain	Steep slopes (> 50%)
Scout	Chutes
	Box canyons
	Saddles
	Narrow canyons
Wind	Surface winds above 10 mph
Observe	Lenticular clouds
	High, fast moving clouds
	Approaching cold front
	Cumulonimbus development
	Sudden calm
	Battling winds
Stability	Good visibility
Observe	Gusty winds and dust devils
	Cumulus clouds
	Castellatus clouds in the a.m.
	Smoke rises straight up
	Inversion beginning to lift
	Thermal belt

Fire Environment Factors	Indicators
Fire Behavior Watch	Leaning column Sheared column Well developed column Smoke color changes Trees torching Smoldering fires picking-up Small firewhirls beginning Frequent spot fires

Remember to Expect Diurnal Changes!

• RH •

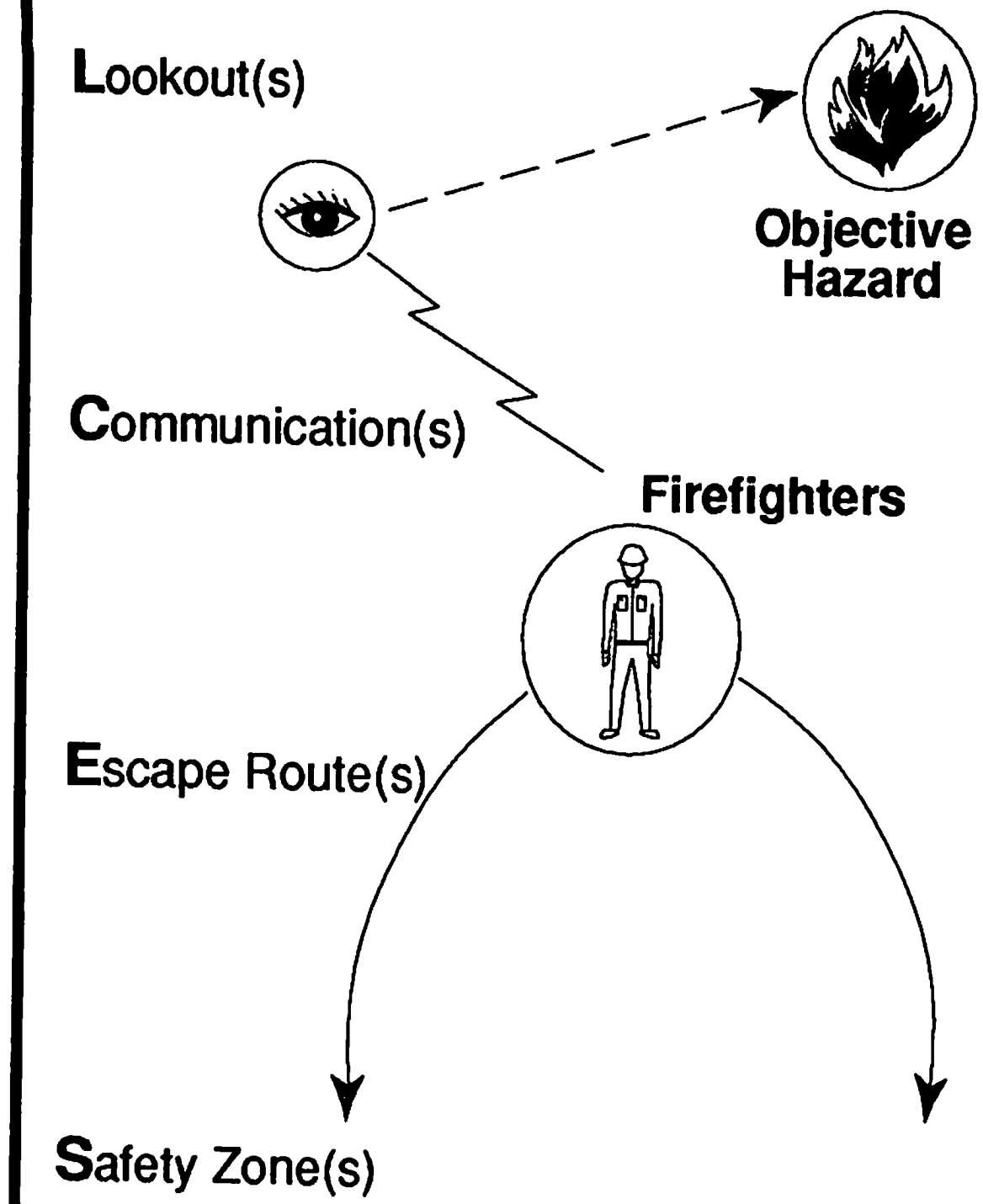
• Temperature •

• Winds •

• Stability •

- **Indicators may vary in different regions and fuel types.**
- **Ask questions in unfamiliar situations.**

LCES



LCES must be established & known to **ALL** firefighters **BEFORE** needed.

LCES Checklist

1. **All personnel need to be informed.**

2. **Update throughout the shift.**

3. **Lookouts / Communications**

   - Competent and trusted individuals(s)?
   - Radio and frequencies?
   - Watch or time piece?
   - Map and communication plan?
   - Knowledge of crew(s) location on division?
   - Good vantage and safe location?

4. **Escape Routes**

   - Scouted?
   - Walkable?
   - Timed?
   - Marked?
   - Away from fire head?

5. **Safety Zones (no shelters needed)**

   - Clean Burn / Natural / Man-made / Vehicles.
   - Scouted?
   - Timed?
   - Close enough? Anticipated ROS
   - Large enough? Consider number of people. Consider fuels / flame length.
   - Terrain? Avoid saddles; chutes; box canyons.
   - Snags or rolling rocks?

Standard Fire Orders

F Fight fire aggressively but provide for **SAFETY FIRST.**

I Initiate all action based on current and expected **FIRE BEHAVIOR.**

R Recognize current **WEATHER CONDITIONS** and obtain forecasts.

E Ensure **INSTRUCTIONS** are given and understood.

O Obtain current information on **FIRE STATUS.**

R Remain in **COMMUNICATION** with crew members, your supervisor, and adjoining forces.

D Determine **SAFETY ZONES** and **ESCAPE ROUTES.**

E Establish **LOOKOUTS** in potentially hazardous situations.

R Retain **CONTROL** at all times.

S Stay **ALERT**, keep **CALM**, **THINK** clearly, **ACT** decisively.

Watch Out Situations (Survival Checklist)

- ☐ 1. Fire not scouted and sized up.
- ☐ 2. In country not seen in daylight.
- ☐ 3. Safety zones and escape routes not identified.
- ☐ 4. Unfamiliar with weather and local factors influencing fire behavior.
- ☐ 5. Uninformed on strategy, tactics and hazards.
- ☐ 6. Instructions and assignments not clear.
- ☐ 7. No communication link with crew members/supervisor.
- ☐ 8. Constructing fireline without safe anchor point.
- ☐ 9. Building fireline downhill with fire below.
- ☐ 10. Attempting frontal assault on fire.
- ☐ 11. Unburned fuel between you and the fire.
- ☐ 12. Cannot see main fire, not in contact with anyone who can.
- ☐ 13. On a hillside where rolling material can ignite fuel below.
- ☐ 14. Weather is getting hotter and drier.
- ☐ 15. Wind increases and/or changes direction.
- ☐ 16. Getting frequent spot fires across line.
- ☐ 17. Terrain and fuels make escape to safety zones difficult.
- ☐ 18. Taking a nap near the fireline.

Downhill/Indirect Line Construction Guidelines

Downhill/Indirect line construction in steep terrain and fast burning fuels should be done with extreme caution. Direct attack methods should be used whenever possible. The following guidelines should be followed:

- The decision is made by a competent firefighter after thorough scouting.
- Downhill line construction should not be attempted when fire is present directly below the proposed starting point.
- The fireline should not be in or adjacent to a chimney or chute that could burn out while a crew is in the vicinity.
- Communication is established between the crew working downhill and crews working toward them from below. When neither crew can adequately observe the fire, communications will be established between the crews, supervising overhead, and a lookout posted where the fire's behavior can be continuously observed.

- The crew will be able to rapidly reach a zone of safety from any point along the line if the fire unexpectedly crosses below them.

- A downhill line should be securely anchored at the top. Avoid underslung line if at all practical.

- Line firing should be done as the line progresses, beginning from the anchor point at the top. The burned out area provides a continuous safety zone for the crew and reduces the likelihood of fire crossing the line.

- Be aware of and avoid the **"WATCH OUT SITUATIONS!"**

- Full compliance with **"THE STANDARD FIRE ORDERS"** is assured.

Common Denominators of Fire Behavior on Tragedy Fires

1. Most incidents happen on smaller fires or on isolated portions of larger fires.

2. Fires respond quickly to shifts in wind direction or wind speed.

3. Flare-ups generally occur in deceptively light fuels.

4. Fires run uphill surprisingly fast in chimneys, gullies, and on steep slopes.

9 Urban/Wildland "Watchouts"

1. Wooden construction and wood shake roofs.
2. Poor access and narrow one way roads.
3. Inadequate water supply.
4. Natural fuels 30 feet or closer to structures.
5. Extreme fire behavior.
6. Strong winds.
7. Evacuation of public (panic).
8. Structures located in chimneys, box canyons, or on steep slopes in flashy fuels.
9. Bridge load limits.

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