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### Unit 9 Objectives

1. Describe three methods for breaking the fire triangle.
2. Describe three methods of attack on a fire.
3. List three suppression techniques and describe their uses.
4. Describe the blackline concept.
5. Describe four kinds of fire control line.

09-2-S130-EP

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### Unit 9 Objectives

6. Name four threats/hazards to an existing control line when fire is burning inside the line.
7. Describe the proper follow-up procedures for a dozer or tractor plow fireline.
8. Describe two kinds of coordinated crew techniques used for fireline construction and with at least four additional personnel, construct a fireline using these techniques.

09-3-S130-EP

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## Unit 9 Objectives

9. Describe safety procedures to follow when in an area where retardant/water drops are being made.
10. Describe five safety procedures to follow when working around engines, tractor plows, and dozers.
11. Demonstrate the proper use of appropriate hand tools during fire suppression activities.
12. Demonstrate the construction of a cup trench on a steep slope.

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## TERMS

- **Control Line** – Constructed and natural fire barriers and treated fire edges used to control the fire
- **Fireline** – Any cleared strip or portion of a control line from which flammable material has been removed by scraping or digging down to mineral soil.

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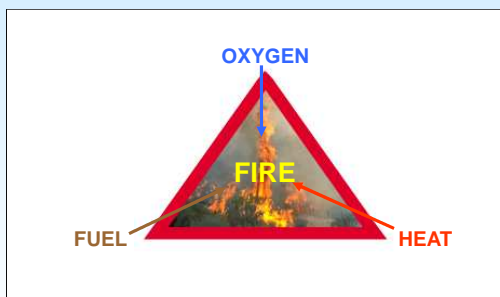
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## The Fire Triangle



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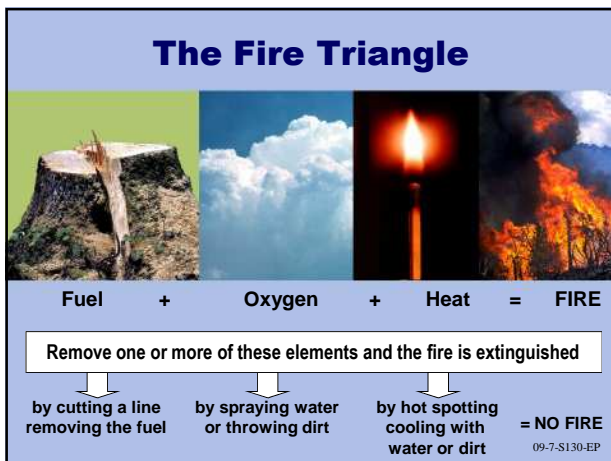
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### Fireline Construction Standards

- **Influencing Factors**
  - Fuel type
  - Fuel moisture
  - Continuity and arrangement of fuel
  - Temperatures
  - Wind

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### Methods of Attack

- **Direct Attack** – Construct Fireline on the fire perimeter.
  - 1 Foot in the Black
- **Indirect Attack** – Construct fireline some distance away.
  - Burn Out fuels.
- **Flanking/Parallel Attack** – construct fireline along the flanks. How close depends on fire intensity.
- Away from book

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## **DIRECT ATTACK Used When:**

- 1 a. Fire is small
  - b. in light fuels
  - c. ground fires in peat or duff
  - d. on the flanks and rear of larger fires
  - e. when heat, flames and smoke will allow



09-10-S130-EP

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## **Standards of Line Construction**

- Line is constructed on fire edge.
- Width will vary:
  - wide enough to stop fire
  - topography including slope/aspect
  - fuels
  - weather conditions
  - part of fire being attacked
  - size and intensity

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## **Standards of Line Construction cont..**

- Resources available to fight fire
- local tactics may control the characteristics of “good” fireline
- Constructed to mineral soil.
- Throw all unburned materials outside the fireline.

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### **Pro's of Direct Attack**

- Limits chance for fire to gain size or momentum
- Eliminates uncertain elements of backfiring
- Reduces danger of crown fires
- Firefighters can have “one foot in the black” for a safety zone

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### **Con's of Direct Attack**

- Firefighters work in heat and smoke
- There may be a need for more patrols and mop-up
- Increase chance of spot fires
- Control lines can be long and irregular
- Limits ability to use barriers

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### **Do's of Direct Attack**

- Take advantage of wind lulls
- Time attack to coincide with fire burning into lighter fuels
- Conserve water; cool edge so firefighters can get in close
- Scatter remaining heavy fuels inside the burn
- Fell snags adjacent to fireline
- HAVE A PLAN, WORK AS A TEAM!

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## Don'ts of Direct Attack

- Attack the head of a fast moving or erratic fires
- Waste water
- Place crew or equipment at risk

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## Indirect Attack

Fireline constructed at certain distances away from the fires edge.



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## INDIRECT ATTACK Used when:

- Burning conditions are intense
  - high heat intensity
  - high rates of spread
  - terrain or fire conditions are unsafe for firefighters
- Not enough firefighters
- Good barriers available

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### Used when :

- Extreme or erratic fire behavior, rapid R.O.S.
- Fireline needs to be straightened across pockets.

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### Standards of Line Construction

- To mineral soil.
- Width will vary:
  - a. wide enough to stop fire
  - b. topography including slope/aspect
  - c. fuels
  - d. weather conditions
  - e. part of fire being attacked
  - f. size and intensity

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### Standards of Line Construction cont..

- Resources available to fight fire
- Local tactics may control the characteristics of “good” fireline
- “ALWAYS START AT AN ANCHOR POINT”
  - Some point where the fire cannot circle around you
  - Road, rocks, streams

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### **Pro's of Indirect**

- Firefighters away from heat/smoke
- Take advantage of change in fuel types
- Permits taking advantage of topographic features & barriers

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### **Con's of Indirect**

- Sacrifice acreage
- May be outflanked by fire
- Backfire may go out of control
- Fire may change direction suddenly
- You must commit to the incident until the fire is out

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### **Do's of Indirect**

- Establish firelines in lighter fuel
- Make lines as straight as possible
- Keep heavy fuel concentrations outside of lines
- Use natural barriers
- Lines to mineral soil

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### **Do's of Indirect cont..**

- Maintain patrols of established lines
- Set backfires only when needed
- Establish periodic rest periods for personnel

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### **Don'ts of Indirect:**

- Don't over extend yourself
  - light only as much as you can hold
- Don't set unwatched burnout!
- Don't construct line next to tall fuels
- Don't take any chances with personnel and equipment!!!!

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### **FLANKING/PARALLEL ATTACK**

- Construct fireline along the flanks. How close depends on fire intensity.



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## Hotspotting (Back to Book P9.3)



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## Cold Trailing

09-29-S130-EP

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## Scratch Line



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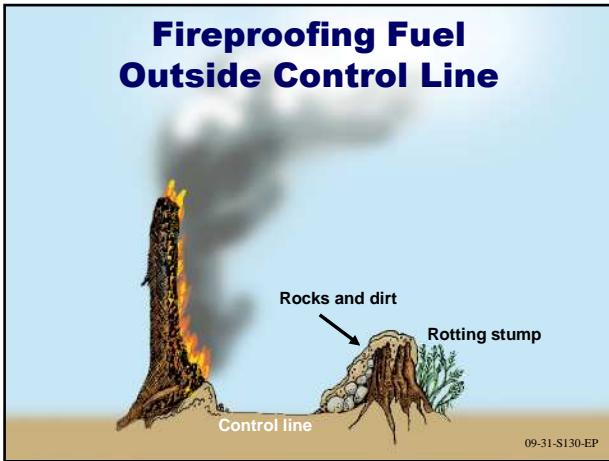
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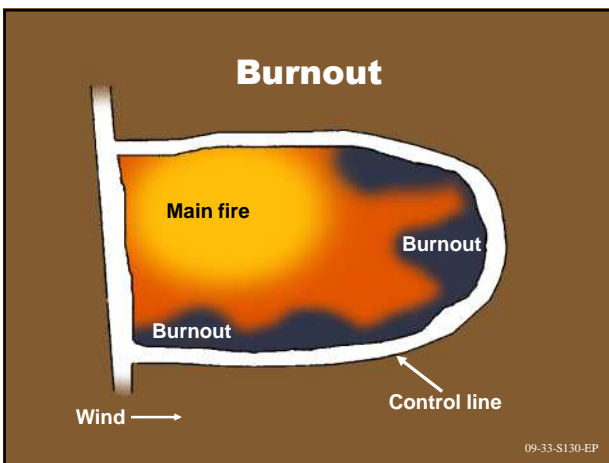
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## Black Line



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## Types of control lines



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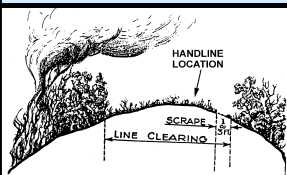
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## Constructed Fireline



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## Wet Line



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## Retardant Line



09-41-S130-EP

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## Detonation cord



09-42-S130-EP

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## Black-Line



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## Natural Control Line

- Cold fire edge
- Fuel break
- Previously constructed barriers



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## Natural Barriers



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### Cold Fire Edge



09-46-S130-EP

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### Fuel Break



09-47-S130-EP

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### Previously Constructed barrier



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### Threats to Existing Control Line

- Spotting
- Rolling Debris
- Creeping
- Radiant Heat




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### Dozer or Tractor Plow Follow Up

- Clean up
- Break up machine piles and berms
- Fireproof needed areas
- Prepare and burn out control line
- Secure the control line
- Mop up the interior
- Patrol the control line

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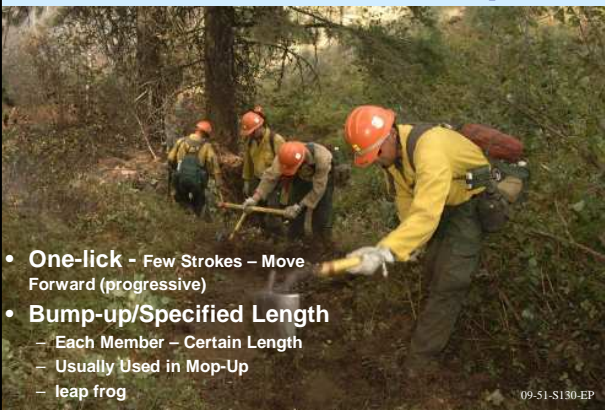
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### Coordinated Crew Techniques



- **One-lick** - Few Strokes - Move Forward (progressive)
- **Bump-up/Specified Length**
  - Each Member - Certain Length
  - Usually Used in Mop-Up
  - leap frog

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## ENGINE TACTICS

(Away from the book)

### COVER:

- Water Use
- Direct Attack
- Indirect Attack
- Engine Protection

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## Using Water Wisely

- Aim stream at the base of the flame
- Conserve water- on/off technique
- Straight stream for distance
- Fog for cooling and penetration
- Utilize foam



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## Remember

- High heat use straight stream for knock down, fog for cooling
- Apply fog parallel to edge
- Be certain the fire is knocked down before moving on - watch for flare ups behind you

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## Remember.....

- Again, straight stream for knock down
- Wet line may not hold, patrols and handline may be needed
- Accuracy counts. Use on/off to check effectiveness of water
- High pressure from hose may spread fire
- Use handtools w/backpack pumps

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## Indirect Attack with Engines

- Build wetline in light grass- lite fuels
- To reinforce existing firelines, dozerlines or roads
- To support backfire operations



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**Direct Attack is most effective in \_\_\_\_\_ fuels?**



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**Direct Attack is most effective in Light fuels?**



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### **Factors to consider**

- Terrain
- Point of attack
- Escape routes & crew safety
- Fuel types
- Rate of spread & intensity
- Capability of personnel & equipment

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## Mobile Attack



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## Stationary Attack



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## Inside-Out Attack



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## Tandem Attack

- Two or more engines
- Mobile Attack

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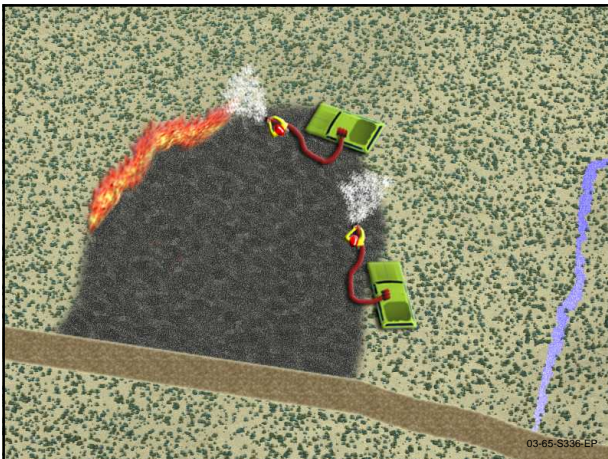
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**Hose lays would normally  
be used in \_\_\_\_\_**



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**Hose lays would normally  
be used in Stationary**



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**A primary concern to  
engine operators \_\_\_\_\_**



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**A primary concern to  
engine operators Eng Prot**



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## Engine Protection

- Always have a charged line available for engine PROTECTION.
- LCES



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## Engine Protection



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**Fire \_\_\_\_\_ is the most critical factor in deciding**

Method of Attack



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**Fire BEHAVIOR is the most critical factor in deciding**

Method of Attack



09-73-S130-EP

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**Retardant/Water Drop Safety Procedures**



- Back to Book P 9.6
- FLHB Page 73

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**Retardant/Water Drop Safety Procedures**



- Up root vegetation
- Break large trees
- Move rocks
- Throw firefighters a considerable distance

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## Retardant/Water Drop Safety Procedures



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## Retardant/Water Drop Safety Procedures



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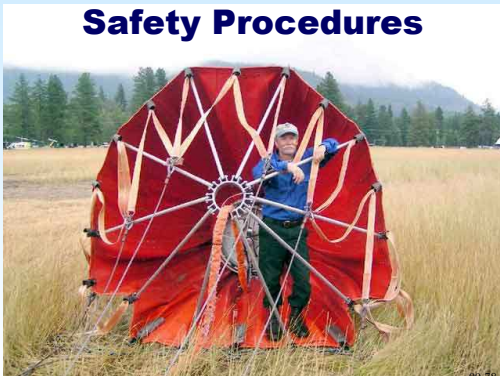
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## Retardant/Water Drop Safety Procedures



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## Retardant/Water Drop Safety Procedures




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## Fireline Equipment Safety Procedures

- Engine - FLHB P60
- Tractor Plow and Dozer – FLHB P61




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## Unit 9 Objectives

1. Describe three methods for breaking the fire triangle.
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5. Describe four kinds of fire control line.

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### **Unit 9 Objectives**

6. Name four threats/hazards to an existing control line when fire is burning inside the line.
7. Describe the proper follow-up procedures for a dozer or tractor plow fireline.
8. Describe two kinds of coordinated crew techniques used for fireline construction and with at least four additional personnel, construct a fireline using these techniques.

09-82-S130-EP

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### **Unit 9 Objectives**

9. Describe safety procedures to follow when in an area where retardant/water drops are being made.
10. Describe five safety procedures to follow when working around engines, tractor plows, and dozers.
11. Demonstrate the proper use of appropriate hand tools during fire suppression activities.
12. Demonstrate the construction of a cup trench on a steep slope.

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