S-130 Unit 7: Suppression

Summary:

Suppression is defined as all the work to extinguish or limit wildland fire spread. This unit provides students with basic knowledge of wildland fire suppression strategies, techniques and skills in order to perform the position duties of an FFT2 on a hand crew, engine crew, or helitack crew.

Incident Position Description (IPD) Alignment:

This unit aligns with the following FFT2 IPD specific duties (https://www.nwcg.gov/positions/fft2/position-ipd):

- Serve as a wildland firefighter on a hand crew, engine crew, or helitack crew.
- Perform wildland fire and prescribed fire duties including suppression, preparation, ignition, monitoring, holding, and mop-up.
- Comply with all safety practices and procedures.

Objectives:

Students will be able to:

- Describe the three methods of breaking the fire triangle.
- Describe the two fire suppression strategies on a fire.
- Describe suppression techniques and explain their uses.
- Describe the concept of blackline.
- Describe four types of fire control line and four threats to existing control line.
- Describe the proper follow up procedures for securing Heavy Equipment fireline.
- Describe the safety procedures practiced when working around engines, heavy equipment, and aerial retardant/water drops.

Unit at a Glance:

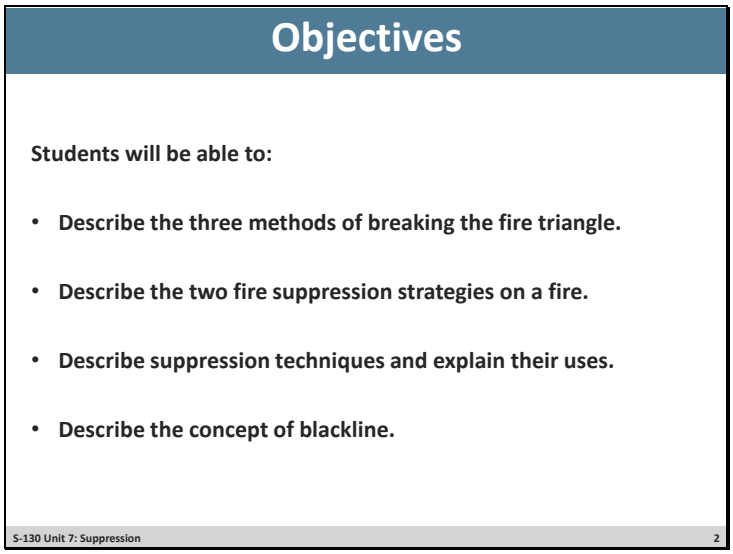
Topics	Method	Duration
Fire Triangle Review	Presentation	5 Minutes
Fireline Construction Standards	Presentation	20 Minutes
Strategies for Attack	Presentation	10 Minutes
Suppression Techniques	Presentation	15 Minutes
Fire Control Line	Presentation	10 Minutes
Threats to Control Line	Presentation	10 Minutes
Mechanical Control Line	Presentation	10 Minutes
Suppression Equipment Safety	Presentation	10 Minutes
Aerial Retardant Safety	Presentation	10 Minutes
Total Unit Duration		**1 Hour, 40 Minutes**

Materials:

- Incident Response Pocket Guide (IRPG), PMS 461, https://www.nwcg.gov/publications/461.
- NWCG Glossary of Wildland Fire, PMS 205, https://www.nwcg.gov/glossary/a-z.
- Notebook for participants.
- S-130 Student Evaluation Task Sheet.
- Ability to display images and video on large screen.
- White board or easel access for group breakout.

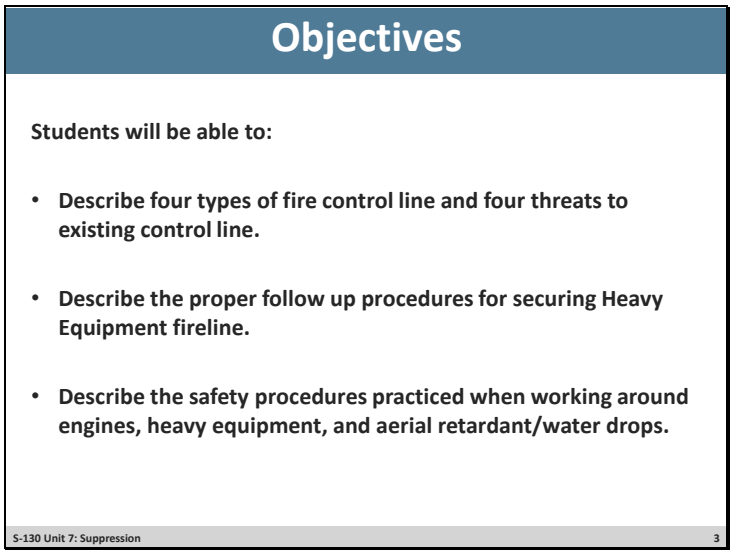
Slide 1

Slide 2



❑ Review unit objectives.

Slide 3



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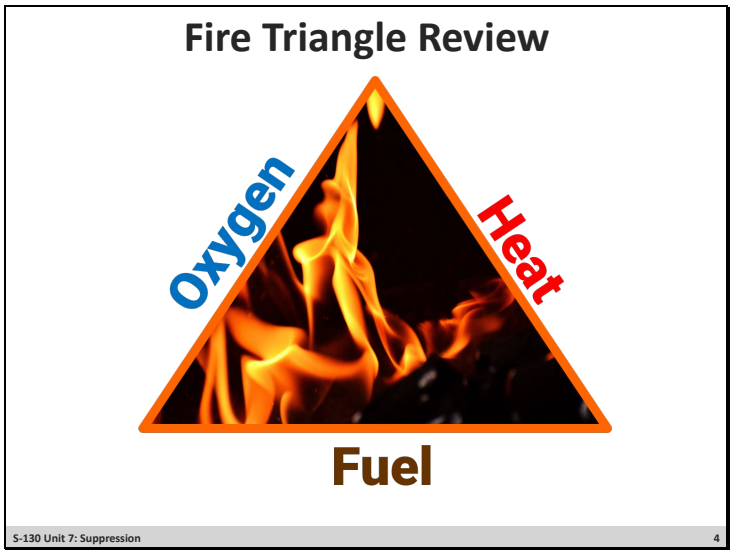
Slide 4



- ❑ Review the fire triangle: By breaking the fire triangle, you can control the combustion process (and extinguish the fire) by disrupting or removing one or more of the three required elements of the fire triangle.
  - Fuel – Separate the fuel to prevent combustion or remove fuel during fireline construction.
  - Oxygen – Suffocate the fire with dirt or water to rob the fire of oxygen.
  - Heat – Cool the fire by applying water, dirt, retardant, or a combination.

Slide 5

- ❑ Discuss fireline construction standards, or specifications, needed to adequately control the fire spread:
  - Width
  - Depth
  - Location
- Reference *NWCG Glossary of Wildland Fire*, PMS 205, https://www.nwcg.gov/glossary/a-z.
- In the context of breaking the fire triangle, line construction removes the fuel, thus preventing combustion and controlling the fire.

Slide 6

- ❑ Discuss fuel types as a key factor in determining the specific footprint of the control line and can vary in any of the following types of fuel:
  - Grass
  - Brush
  - Timber
  - Slash

Note to Instructor
Discuss important local fuel types and what fireline construction standards, or specifications, work best in those fuel types.

Slide 7

- The lower the fuel moisture the greater the chances for combustion and fire spread.

❑ Discuss the effect of fuel moisture on light and heavy fuels and how that impacts the width, depth, and location of fireline.

- Rule of thumb, the larger the flame length, the wider the scrape should be.

Slide 8

- The closer and more continuous the fuels, both horizontally and vertically, the greater the chance for combustion and fire spread.
- Heavy fuel loading and ladder fuels can increase combustion and fire spread.

❑ Discuss how fuel continuity and arrangement affect fireline construction standards or specifications.

Slide 9

- Discuss how temperatures can affect the fireline construction standards or specifications based on the following:
  - The higher the temperature, the lower the fuel moisture.
  - As a fire burns more intensely, more heat is produced and combustion and fire spread increase.
  - Generally, the more extreme the fire behavior and increased flame lengths, the wider the scrape will need to be.

Slide 10

- ❑ Discuss how the following may or may not affect the standards for fireline construction, depending on the fuel type and situation.
  - Increases in wind will increase the amount of oxygen available and preheat fuels, increasing the chances for combustion and increasing the rate of fire spread.
- A supervisor will provide the fireline construction standards, or specifications, that will be needed to control the fire spread.
- ❑ Provide examples of local rates of spread and typical fireline construction specifications in your area.

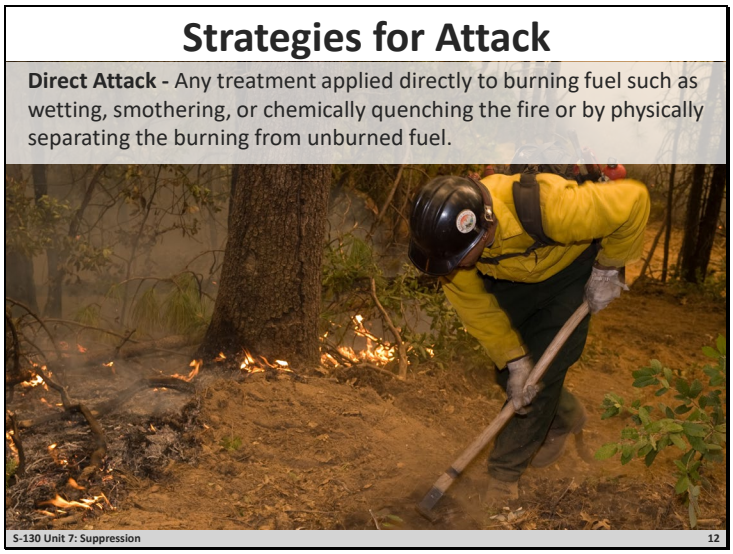
Slide 11

- There are two main attack strategies:
  - Direct attack
  - Indirect attack

❑ Discuss strategies for attack, or methods of attack, and how they relate to the location of firefighters constructing a fireline.

- These two attack strategies can be used independently or together when constructing fireline, alternating between direct and indirect depending on:
  - Fuel conditions,
  - Barriers,
  - Fire behavior,
  - Spread direction, and
  - Rate of spread.

Slide 12

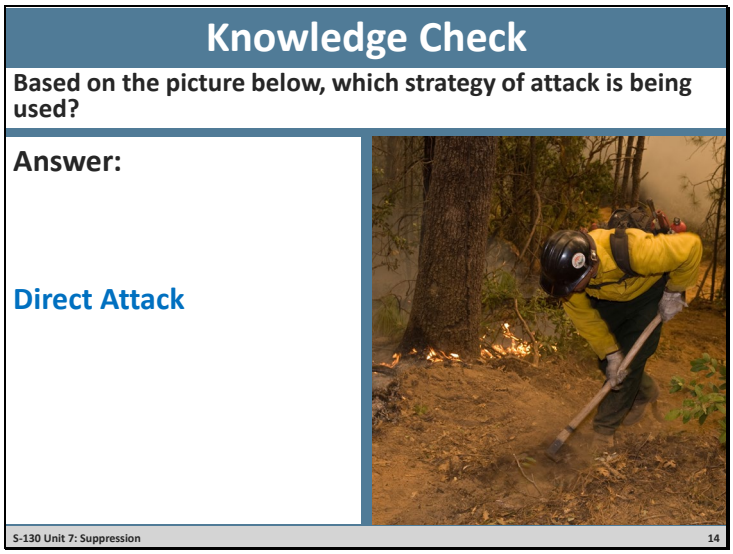


- ❑ Discuss the following actions related to direct attack:
  - Constructing a fireline directly on the fire perimeter.
  - Keeping one foot in the black and one foot in the unburned area.
- This method can be successful while flame lengths are 4 feet high or less. Flame lengths higher than 4 feet may require mechanized line construction equipment or aviation.
- ❑ Reference Strategy – Direct Attack in the *Incident Response Pocket Guide (IRPG)*, PMS 461, https://www.nwcg.gov/publications/461.
- ❑ Discuss advantages and disadvantages of direct attack.

Slide 13

- ❑ Discuss the following actions related to indirect attack:
  - Constructing a fireline some distance from the fire perimeter.
  - Using a barrier (natural or constructed) in fireline construction.
  - Creating a wide primary strip and burning out fuels.
  - Choosing appropriate time for burning out.
- Indirect attack is generally done in the case of a fast-spreading or high-intensity fire to utilize natural or constructed firebreaks, fuel breaks, and favorable breaks in the topography. The primary fuel is usually backfired, but occasionally the main fire is allowed to burn to the line, depending on conditions.
- ❑ Reference Strategy – Indirect Attack in the *Incident Response Pocket Guide (IRPG)*, PMS 461, https://www.nwcg.gov/publications/461.
- ❑ Discuss advantages and disadvantages of Indirect attack.
- ❑ Reference *Fire Behavior Hauling Chart* in the *Incident Response Pocket Guide (IRPG)*, PMS 461, https://www.nwcg.gov/publications/461.
- ❑ Discuss tactical implications from Flame Length.

Slide 14



Question: Based on the picture below, which strategy of attack is being used?

Answer: Direct Attack

Slide 15

- Suppression techniques are common practices used to control the fire edge directly, support line construction, or reinforce existing fireline.

Note to Instructor

The following slides (16 – 22) will provide examples of techniques used to strengthen the fireline and control the fire.

Slide 16

- ❑ Discuss the intent of hotspotting:
  - To cool the fire's edge enough to allow for direct line construction.
  - To prevent the fire from making a run.
  - To temporarily slow the rate of spread.

Slide 17

- ❑ Discuss the importance of cold trailing as it relates to controlling the fire edge.

Slide 18

- ❑ Discuss situations where a scratch line could be utilized to check fire progression.

Slide 19

- Discuss that aerial applications of water and retardant are also used to pre-treat and increase the fuel moisture content helping to resist ignition.

Slide 20

- Usually used with indirect fire line.

❑ Discuss an example of geographic area or agency-specific guidelines related to burning out.

Note To Instructor

Left image is of the ignition of a burn out on the fire's edge.

Right image shows early progression of the burnout backing towards the main fire's edge.

Slide 21

- ❑ **Play Video**

  Title Burn out example
  Summary Animated rendition of a burn out operation is conducted
  Time (00:09:17)
  No Audio

Post-Video Discussion

- ❑ Discuss examples of how a burn out is beneficial as a suppression technique.

Slide 22

- In suppression, a blackline denotes a condition where there is no unburned material between the fireline and the fire edge.
- Blackline ensures that fuels and heat remain inside the control line and prevents the fire from making a run at the control line.
- This action provides for safety of the control forces and security of the control lines.
- Often called cleaning up the fireline, this is done as line construction progresses to ensure fuels are consumed within the fireline.

Slide 23

- ❑ Discuss that effective fire control line should be down to mineral soil, permafrost, or water level.
- Fire control line can be either constructed or natural.

Slide 24

- Discuss the following examples of constructed control line:
  - Handline
  - Machine line (dozer, tractor plow, etc.)
  - Wet line
  - Retardant line
  - Blackline
  - Constructed barriers

Slide 25

- The following are examples of natural barriers:
  - Cold fire edge or fire scars
  - Bodies of water (streams, lakes, ponds)
  - Areas of sparse fuels (rockslides)

Slide 26

- Although control line is completed, the fire can still escape from control lines, and it must be monitored for various threats that could compromise the line.

Note to Instructor

The following slides (27– 30) will provide examples of threats to control lines.

Slide 27

❑ Discuss how spotting can threaten control line and hamper suppression efforts and safety.

- Wind gust or convection column can pick up embers and carry them across the control line.

Slide 28

- ❑ Discuss how rolling debris can threaten control line and hamper suppression efforts and safety.

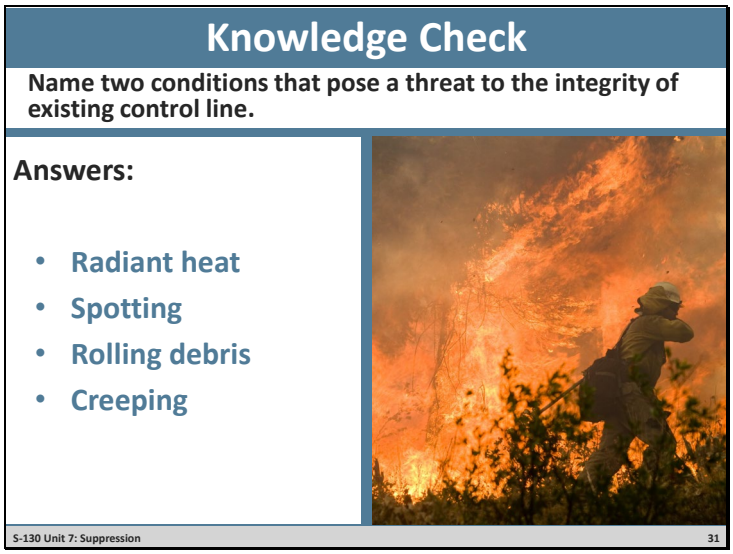
Slide 29

- ❑ Discuss how creeping can threaten control line and hamper suppression efforts and safety.

Slide 30

- ❑ Discuss how radiant heat can threaten control line and hamper suppression efforts and safety.

Slide 31



Question: Name two conditions that pose a threat to the integrity of existing control line?

Answers: Radiant heat, Spotting, Rolling debris, Creeping

Slide 32

- Using machinery to construct fireline is often much quicker than constructing handline.
- Similar to handline, there are certain procedures for fireline personnel to ensure the mechanical control line is secured once it is constructed.
- Like all control line, there are threats to mechanical line that must be mitigated for the line to hold.
    - Because of the amount of fuel that can be moved by machines, the need to mitigate these threats may be higher in certain fuel types.

Slide 33

- ❑ Discuss the various actions required to secure a mechanical control line:
  - Ensure the control line extends to mineral soil, permafrost, or water level.
  - Remove fuel jackpots, limb trees, and cut down snags that threaten the security of the control line from either side.
  - Break apart berms built on the interior side of the line.
  - If necessary, burn out along the control line to reinforce it with blackline.

Slide 34

- ❑ Discuss why it is important to break up machine piles and berms:
  - These may contain burning fuels that could smolder for weeks and start a fire at a later date.

Slide 35

- ❑ Discuss the purpose for daily preventative maintenance checks and how they relate to safety:
  - Pump
  - Chassis
  - Pump and vehicle motors
- ❑ Discuss safety procedures when working with and around engines:
  - Be alert when the engine is moving.
  - Be alert to the hazards of a charged hose line.
  - Wear eye protection, especially when operating nozzles.
  - Be aware of the potential for rolling material when working uphill or downhill of equipment.
  - Be extra cautious during night operations (drivers may not be able to see you).
  - Take extra precautions when visibility is low (smoke, fog, etc.).
  - Be alert to hazards when removing stuck vehicles or changing tires (winch cables, jacks, slipping, etc.).

Slide 36

- Discuss safety procedures when working around heavy equipment:
  - Be alert when the machinery is moving.
  - The dozer/tractor always has the right-of-way.
  - Work a safe distance away, depending on fuels and terrain.
  - In timber – minimum two tree lengths away.
  - In grass/shrub – minimum 50’ behind and 100’ ahead.
  - Be careful and maintain stable footing when working around winch cables.
  - Be alert and on the lookout for rolling materials when working uphill or downhill of equipment.
  - Take extra precautions when visibility is poor.
  - Be alert to soft spots or bogs.
  - Do not assume the operator knows where you are.
  - Be alert to the hazards of night operations.
  - Leave headlamps on.
  - Do not sleep on the fireline.

Note to Instructor
Consider discussing safety procedures for any equipment used locally.

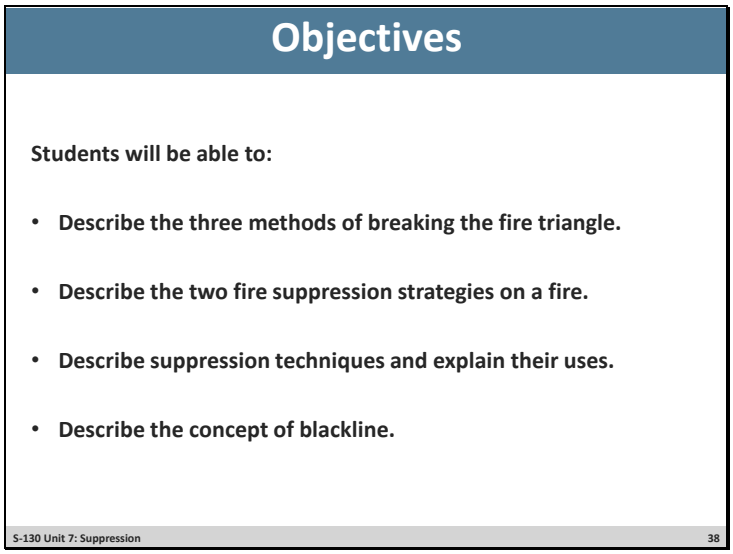
Slide 37

- Retardant and water are useful tools in the suppression of wildfire but can be dangerous to personnel working in the drop area. Retardants will reduce the rate of spread but rarely extinguish a fire. An airplane traveling at 130 knots and dropping thousands of gallons of retardant can do a lot of damage including uprooting and breaking trees and moving rocks and debris.

❑ Reference Aerial Retardant Safety in the Incident Response Pocket Guide (IRPG), PMS 461, https://www.nwcg.gov/publications/461.

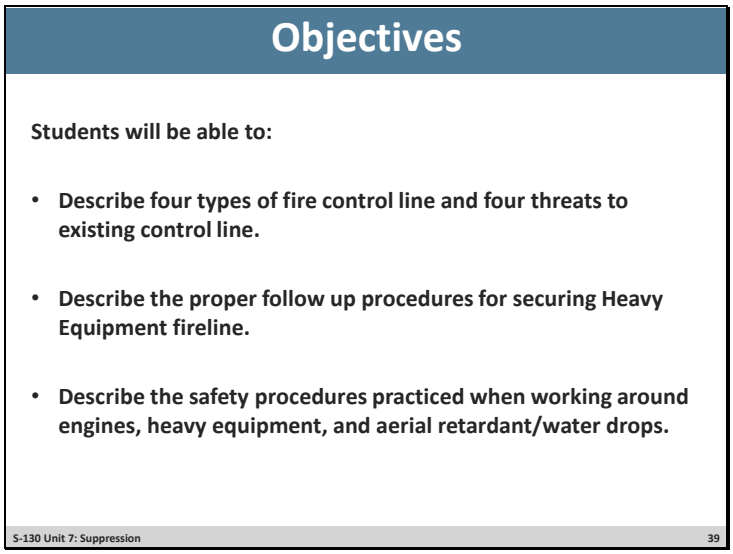
❑ Discuss aerial retardant safety procedures.

Slide 38



❑ Review unit objectives.

Slide 39



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