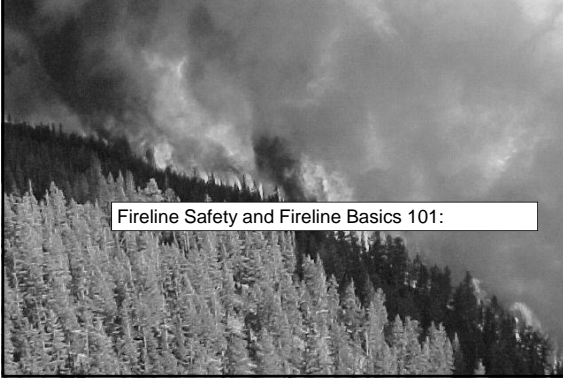
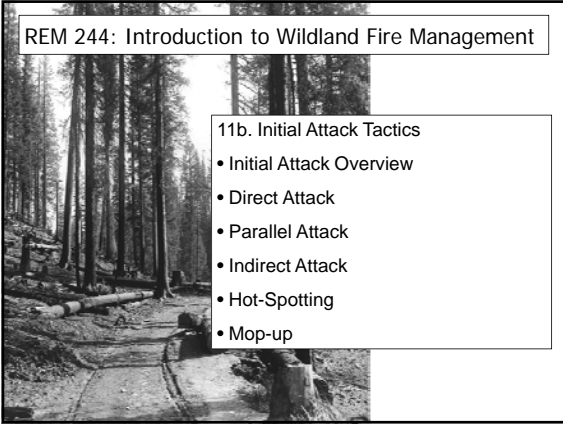


Introduction to Wildland Fire Management



Fireline Safety and Fireline Basics 101:

REM 244: Introduction to Wildland Fire Management

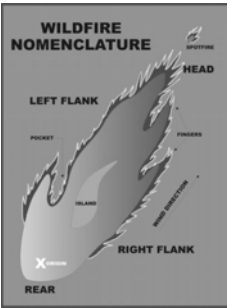


11b. Initial Attack Tactics

- Initial Attack Overview
- Direct Attack
- Parallel Attack
- Indirect Attack
- Hot-Spotting
- Mop-up

REM 244: Initial Attack Overview

On all incidents, it is important you understand the anatomy of a fire.



- Fingers: The long narrow extensions of a fire projecting from the main body
- Pockets: Unburned indentations in the fire edge formed by fingers or slow burning areas.
- Flanks: The parts of a fire's perimeter that are roughly parallel to the main direction of spread.
- Fireline: The part of a containment or control line that is scraped or dug to mineral soil.
- Backfire: A fire set along the inner edge of a fireline to consume the fuel in the path of a wildfire or change the direction of force of the fire's convection column.
- Head fire: A fire spreading or set to spread with the wind or topography.
- Spot-fire: Fire ignited outside the perimeter of the main fire by a firebrand or roll-out.

Sources: NWCG Glossary, Pyne et al (1996), TEIE (2005)

REM 244: Initial Attack Overview

Prior to deciding tactics to use on a fire, you first need to determine whether the situation demands offensive or defensive actions.



Point Fire Blowup (1985)

Offensive Actions: Confine and control the fire using perimeter control (i.e. fireline). Offensive actions can use direct or indirect attack strategies.

Defensive Actions: Used when offensive actions are too hazardous or when insufficient resources are available. Defensive actions are used to minimize effects and not control the fire.

Sources: NWCG Glossary, Pyne et al (1996), TEIE (2005)

REM 244: Direct Attack

Direct attack (or direct line) is defined as "any treatment applied directly to burning fuel such as wetting, smothering, or chemically quenching the fire or by physically separating the burning from unburned fuel". (NWCG)

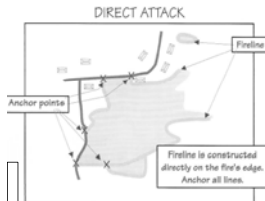


Figure 6.9. A direct attack focuses all of the actions being taken on the burning edge of the fire.

Sources: NWCG Glossary, Pyne et al (1996), TEIE (2005), <http://www.chaboffire.com> <http://www.coloradofirecamp.com>

Used:

- Light fuels or fuels with high moisture content.
- Low intensity fires (flame length < 4 feet)
- Small fires and on flank or rear of larger fires
- Safest, "One foot in the Black"

Disadvantages:

- Firefighters can be exposed to heat and smoke
- Lines can be long and irregular leading to more mop up and patrol

REM 244: Direct Attack

An anchor point is defined as "an advantageous location, usually a barrier to fire spread, from which to start constructing a fireline. The anchor point is used to minimize the chance of being flanked while the line is being constructed." (NWCG)



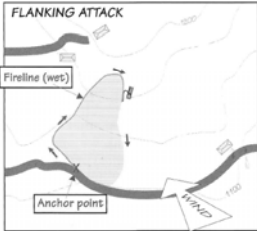
Advantages:

- Relatively safe tactic as firefighters can keep one foot in the black (i.e. fight from the black)
- No additional (unnecessary) areas are burned
- Full advantage is taken of burned out areas
- Comes with less uncertainties than backfiring

Sources: NWCG Glossary, Pyne et al (1996), TEIE (2005), <http://www.chaboffire.com> <http://www.coloradofirecamp.com>

REM 244: Direct Attack

The four main deployment strategies to achieve a direct attack are the flanking action, tandem action, pincer action, and envelopment action. These actions were originally developed by the military.



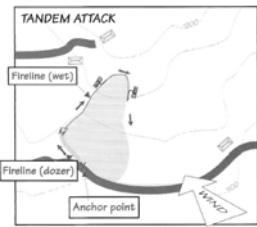
Flanking Action: The engine moves along the line as fast as the fire is put out.

The action starts at an anchor point and creates a fireline along one flank of the fire.

Sources: NWCg Glossary, Pyne et al (1996), TEIE (2005), <http://www.chaboffire.com> <http://www.coloradofirecamp.com>

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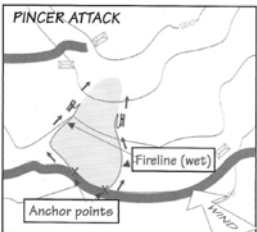
Tandem Action: Several resources move along the same line. The first crew creates the line and the second crew strengthens and secures the line.

Engines can hop past other engines to give crews a rest at the lead.

Sources: NWCg Glossary, Pyne et al (1996), TEIE (2005), <http://www.chaboffire.com> <http://www.coloradofirecamp.com>

REM 244: Direct Attack

The four main deployment strategies to achieve a direct attack are the flanking action, tandem action, pincer action, and envelopment action. These actions were originally developed by the military.



Pincer Action: Both flanks are attacked at the same time.

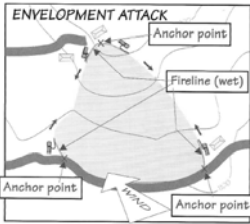
a.k.a. Anchor flank and pinch

Note: these engines could anchor into each other, if a road or other barrier was not available

Sources: NWCg Glossary, Pyne et al (1996), TEIE (2005), <http://www.chaboffire.com> <http://www.coloradofirecamp.com>

REM 244: Direct Attack

The four main deployment strategies to achieve a direct attack are the flanking action, tandem action, pincer action, and envelopment action. These actions were originally developed by the military.



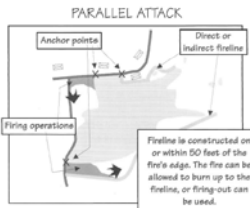
Envelopment Action: Fire is attacked at many places at the same time from several anchor points. Engines then move towards each other to connect the lines.

Envelopment actions need to be well coordinated to avoid the fire escaping a section of unfinished line.

Sources: NWCG Glossary, Pyne et al (1996), TEIE (2005), <http://www.chaboffire.com> <http://www.coloradofirecamp.com>

REM 244: Parallel Attack

Parallel Attack is defined as a "method of fire suppression in which fireline is constructed approximately parallel to, and just far enough from the fire edge to enable workers and equipment to work effectively, though the fireline may be shortened by cutting across unburned fingers." (NWCG)

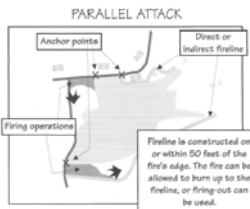


The unburned fuel is usually burned out as the line moves alongside the fire but can burn out with the main fire as long as there is no threat to the fireline.

Sources: NWCG Glossary, Pyne et al (1996), TEIE (2005), <http://www.chaboffire.com> <http://www.coloradofirecamp.com>

REM 244: Parallel Attack

Parallel Attack is defined as a "method of fire suppression in which fireline is constructed approximately parallel to, and just far enough from the fire edge to enable workers and equipment to work effectively, though the fireline may be shortened by cutting across unburned fingers." (NWCG)



Advantages:

- Reduced heat and smoke exposure
- Lines often straighter and shorter
- Line is placed to reduce chance of fire escape
- Line can be placed in lighter fuels
- Lines cut across fingers

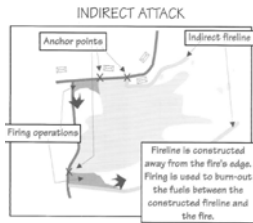
Disadvantages:

- No readily available safety zone !
- Increases the area burned
- Doesn't take advantage of already burned out areas

Sources: NWCG Glossary, Pyne et al (1996), TEIE (2005), <http://www.chaboffire.com> <http://www.coloradofirecamp.com>

REM 244: Indirect Attack

Indirect Attack is defined as a "method of suppression in which the control line is located some considerable distance away from the fire's active edge." (NWCG)



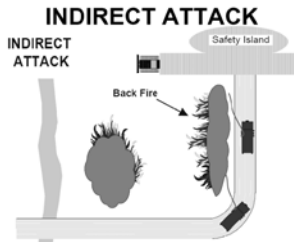
Indirect attack methods are used when direct attack is not possible or safe.

As in military strategy when fighting a stronger enemy, indirect attack is about selecting the best site on which to meet the fire and gain the greatest advantage.

Sources: NWCG Glossary, Pynes et al (1996), TEIE (2005), <http://www.chaboffire.com> <http://www.coloradofirescave.com>

REM 244: Indirect Attack

Indirect Attack is defined as a "method of suppression in which the control line is located some considerable distance away from the fire's active edge." (NWCG)



Indirect attack is typically used when dealing with fast-spreading or high-intensity fires and to take advantage of natural or constructed firebreaks, fuel breaks, and topography.

In indirect attack, the fuels are usually backfired.

Sources: NWCG Glossary, Pynes et al (1996), TEIE (2005), <http://www.chaboffire.com> <http://www.coloradofirescave.com>

REM 244: Indirect Attack

Burn out vs. Backfire

Backfire- a fire set along the inner edge of a fireline to consume the fuel in the path of a wildfire or change the direction of force of the fire's convection column. More complex, may involve multiple resources.



Burnout- setting fire inside a control line to consume fuel between the edge of the fire and the control line. Connecting fingers in the fireline.



REM 244: Indirect Attack

Fireline constructed using a dozer



Photo by M. Gilbert

Source: A. Stebleton

REM 244: Indirect Attack - Example

Backfiring off the line

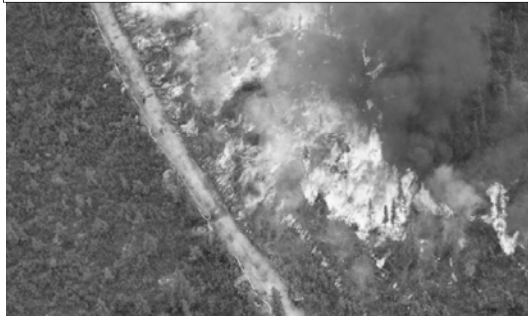


Photo by M. Gilbert

Source: A. Stebleton

REM 244: Indirect Attack - Example

Backfiring off the line (aerial view)



Source: A. Stebleton

REM 244: Indirect Attack - Example

Main fire pulls in backfire



Photo by M. Gilbert
Source: A. Stebleton

REM 244: Indirect Attack - Example

Main fire pulls in backfire (aerial view)



Photo by M. Gilbert
Source: A. Stebleton

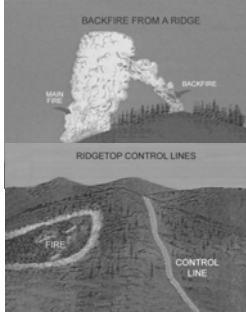
REM 244: Indirect Attack - Example

Completed backfire operation



Photo by M. Gilbert
Source: A. Stebleton

REM 244: Indirect Attack



Sources: NWCG Glossary, Pyne et al (1996), TEIE (2005).
<http://www.chabofire.com> <http://www.coloradofirecamp.com>

Advantages:

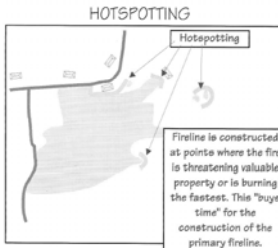
- Can locate lines along natural or man-made barriers: topography, lakes, reservoirs, roads, etc
- Reduced exposure to heat and smoke
- More time to construct fire lines and their location is not dictated by the fire
- Firelines can be constructed in lighter fuels

Disadvantages:

- Increased area burned
- Can have safety hazards as crews are working some distance from main fire and may not be able to observe fire conditions
- Burning out can leave unburned islands
- Backfiring can be dangerous – often considered an act of deperation
- Doesn't take advantage of already burned out areas

REM 244: Hot-Spotting

Hot-spotting is defined as a "Checking the spread of fire at points of more rapid spread or special threat. It is usually the initial step in prompt control, with emphasis on first priorities." (NWCG)



Hot-spotting usually occurs on the fingers of the fire. It is very dangerous. There is no anchor point and it occurs at the head of the fire.

Why do it ??? To slow/stop rapidly advancing fingers until a fireline is constructed.

It is primarily used to protect property or other highly valued resources.

Sources: NWCG Glossary, Pyne et al (1996), TEIE (2005).
<http://www.chabofire.com> <http://www.coloradofirecamp.com>

REM 244: Mop-up

Mop-up is defined as "extinguishing or removing burning material near control lines, felling snags, and trenching logs to prevent rolling after an area has burned, to make a fire safe, or to reduce residual smoke." (NWCG)



Mop-up is the most important phase of any fire suppression operation. Any remaining combusting debris near the fireline has the potential to rekindle the fire, causing an escape, and making all prior actions worthless.

In mop-up the goal is to separate burning and unburned material and to then extinguish hot debris.

Sources: NWCG Glossary, Pyne et al (1996), TEIE (2005).
<http://www.chabofire.com> <http://www.coloradofirecamp.com>

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Dry Mop: Using hand tools to divide material and dirt to smother and "bank" hot debris (i.e. with no water).

Wet Mop: Using mud, water, retardant, etc to cool hot spots.

- Water in fine spray is effective
- Mop from control line inwards, start with the most dangerous line first
- Spray, stir (with hand tools), and spray

The end result in both cases is to make the material cool enough that you can touch it.

Sources: NWCG Glossary, Pyne et al (1996), TEIE (2005), <http://www.chaboffire.com> <http://www.coloradofirecamp.com>

REM 244: Mop-up

In addition to water there are several wetting agents and chemicals that help with mop-up.



Wetting agents: These are chemicals that are added to water to reduce surface tension

Soaps and Detergents: Hydrophilic agents reduce evaporation of water

Foam: Sticks to fuel and acts like a sponge to water, while absorbing heat, and being a barrier to oxygen

Sources: NWCG Glossary, Pyne et al (1996), TEIE (2005), <http://www.chaboffire.com> <http://www.coloradofirecamp.com>

REM 244: Mop-up

Mop up can be done a bunch of different ways. But remember these things-

- You can not tell if something is cool just by looking at it.
- Touch it, just be careful.
- If it hasn't been touched you may not know if its out.
- In other words touch everything that is black.
- Spraying water and not stirring with a tool gets you no where. Water doesn't get everywhere.
- Don't bury hot items! It just encapsulates the heat.

- Mop-up is a slow tedious process, but fires have started again because somebody didn't take it seriously.
-

Sources: NWCG Glossary, Pyne et al (1996), TEIE (2005), <http://www.chaboffire.com> <http://www.coloradofirecamp.com>
