WILDLAND FIRE TRAINING FOR LOCAL GOVERNMENT HEAVY EQUIPMENT OPERATORS

Eastern Oklahoma County Tech Center
Choctaw, OK
16 APR 14
Parts of a Fire
Head
Rear or Heel
Finger
Pocket
Island
Which flank is more active?

Where would you start to fight this fire?
What are these two fire parts called?
Smoldering

Fire burning without flame and barely spreading.
Creeping

Fire burning with a low flame and spreading slowly.
Running

Fire spread rapidly with a well defined head.

- [http://tinyurl.com/q55w84c](http://tinyurl.com/q55w84c)
  Running Fire Behavior in Tall Grass
  Hwy 33 – Central OK
Spotting

Fire producing sparks or embers that are carried by the wind or convection that start new fires beyond the main fire.
Torching
Crowning

Fire advances from top-to-top of trees or shrubs more or less independently of the surface fire.

- [http://tinyurl.com/pzcwr64](http://tinyurl.com/pzcwr64)
  Crowning Fire Behavior – Mannford, OK
  Summer 2012
Other useful firefighting terms

- Anchor point
- Control line
- Fireline
- Mop-up
- Contained
- Controlled
The Fire Triangle

In order for a fire to occur, the three things must be present:

• Enough oxygen to sustain combustion.

• Enough heat to raise the material to its ignition temperature.

• Some sort of fuel or combustible material.

• All three elements must be present at the same time to have a fire. Fire will burn until one or more of the elements is removed.
Fuels

- Any combustible material
- Live or dead plant material
- Houses, sheds, etc., can also be fuels
FM1 Short Grass
FM3 Tall Grass
FM4/FM5/FM6 Shrub Group
FM9 Hardwood Leaf Litter
FM11/FM12/FM13 Slash Group
Recognize and Identify Fuel Characteristics that Influence the Behavior of the Fire.
VERTICAL ARRANGEMENT OF FUELS

- Aerial Fuels
- Ladder Fuels
- Surface Fuels
- Ground Fuels
Surface Fuels

All materials lying on or immediately above the ground including:

- needles
- leaves
- grass
- downed logs
- stumps
- large limbs
- low shrubs

Important in terms of line construction and mop-up, most important regarding fire spread and fire behavior.
Ladder Fuels

Any fuels that provide a connection between the surface and upper canopy.

Important in terms of fire spread and fire behavior by providing a path for the fire to travel to the canopy. It can be linked to torching or crowning.
Aerial Fuels

All green and dead materials located in the upper forest canopy including:

- tree branches
- crowns
- snags
- moss
- high shrubs

Important in terms of fire spread and fire behavior due to torching, crowning, and spotting.
Air Temperature

The degree of hotness or coldness of a substance.

In weather we refer to this as air temperature or dry bulb temperature.
Relative Humidity

Relative humidity is the amount of moisture in the air divided by the amount the air could hold when saturated at the same air temperature; usually expressed in percent.
Thermograph

Temperature and RH Relationship

Thermograph depicting 24 hours of temperature and relative humidity.

Temperature

Relative Humidity

Note the diurnal relationship between temperature and relative humidity.
Winds

Wind’s Effect on Wildland Fire

• Wind impacts the fire environment by:
  – Increasing the supply of oxygen to the fire.
  – Determining the direction of fire spread.
  – Increasing the drying of the fuels.
  – Carrying sparks and firebrands ahead of the main fire causing new spot fires.
  – Bending flames, which results in the preheating of fuels ahead of the fire.
  – Influencing the amount of fuel consumed by affecting the residence time of the flaming front of the fire. The stronger the wind, the shorter the residence time and the less fuel is consumed.
Critical Fire Weather

Critical Wildfire Conditions Today

- 10-20% Minimum Relative Humidity
- 20-30% Relative Humidity
- Greater than 30% Relative Humidity

South Wind
5-15 mph...
Shifting to the Northeast

South Wind
15-30 mph
Gusts to 40 mph

Temperatures
65 to 78

1227 PM CDT
Wed Apr 16 2014
National Weather Service
Norman, OK
Critical Fire Weather
Thunderstorms
Critical Fire Weather
Dust Devils and Firewhirls

• http://tinyurl.com/n85z2t7
Firewhirl
Fire Weather Watches / Red Flag Warnings

• Issued when the combination of dry fuels and weather conditions support extreme fire behavior or ignition is occurring or expected to occur.
Fire Weather Watches

- Issued when there is a high potential for the development of a Red Flag Event.
- Normally issued 24 to 72 hours in advance.
Red Flag Warnings

- Used to warn of an impending, or occurring Red Flag event.
Monitoring Fire Behavior

Indicators occur that fire is transitioning to problem or even extreme fire behavior.
Problem vs. Extreme Fire Behavior

Problem Fire Behavior:
• Fire activity that presents a potential hazard to fire personnel if the tactics being used are not adjusted.

Extreme Fire Behavior:
• The highest level of problem fire behavior, described with:
  1. Rapid rate of spread
  2. Intense burning
  3. Spotting
  4. Crowning
Problem vs. Extreme Fire Behavior

Problem

case
behavior
Problem vs. Extreme Fire Behavior

Extreme fire behavior
Fuel Characteristics

**Indicators:** Continuous fine fuels
Fuel Characteristics

**Indicators:** Ladder fuels
Fuel Characteristics

**Indicators:** Tight crown spacing
Fuel Characteristics

Special Conditions: Firebrand sources
Fuel Characteristics

Special Conditions: Numerous snags
Fuel Moisture

Indicators: Drought Conditions and/or Low Humidity

U.S. Drought Monitor

April 8, 2014
(Released Thursday, Apr. 10, 2014)
Valid 8 a.m. EDT

Author:
Brian Fuchs
National Drought Mitigation Center

Drought Impact Types:
- Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g., agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g., hydrology, ecology)

Intensify:
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://droughtmonitor.unl.edu/
Fuel Temperature

**Indicators:** High Temps (>85°F)
Wind

**Indicators:** Surface winds above 15 mph
Wind

**Indicators:** High, fast moving clouds
Wind

**Indicators:** Approaching cold fronts
Wind

**Indicators:** Cumulonimbus development
Wind

Indicators: Sudden calm

Be alert for wind change
Wind

Indicators: Battling or shifting winds
Stability

**Indicators:** Cumulus clouds
Fire Behavior

**Indicators:** Well-developed column
Fire Behavior

**Indicators:** Changing column
Personal Preparedness

• Ready for 24+ hr assignment
• Food
• Clothing
• Medications
• Physical and Mental Fitness
Equipment Preparedness

- Preventative maintenance checks
- Fuel
- Extra fluids
- Grease gun
- Tools
- Fire extinguisher
- Backup alarm
- Lights
Communications
Escape Routes and Safety Zones
Fundamentals of ICS for Equipment Operators

- Don’t “self dispatch”
- Wait for orders to respond
- Locate the Incident Command Post (ICP) and/or Incident Commander (IC)
- Get a briefing on the situation
- Get an assignment
- Identify who you are working for and a means of communication
Tactics

• Utilize the “path of least resistance”
• Adhere to the national standard of always rolling the berm to the outside (away from the oncoming fire)
Hazards

- Fences
- Bluffs
- Septic tanks!
- Night time operations

- [http://tinyurl.com/kc7hhns](http://tinyurl.com/kc7hhns) “Inside the Iron”
Direct Attack vs. Indirect Attack

- [http://tinyurl.com/mhmtxke](http://tinyurl.com/mhmtxke)
  “Direct Attack with a Motor Grader”

- [http://tinyurl.com/kefj6tl](http://tinyurl.com/kefj6tl)
  “Direct Attack vs. Indirect Attack”
Indirect Attack
Structure Protection
Equipment Operator
“Watch Outs”

• [http://tinyurl.com/nx8qreq](http://tinyurl.com/nx8qreq)
  “Operator Safety”
Risk Refusal Protocol

• Everyone has the right to a safe fire assignment
• Overhead are expected to give safety concerns serious consideration
• A “turn down” is a situation where an individual has determined that they cannot safely undertake an assignment and they are unable to negotiate an alternative solution
Risk Refusal Protocol (cont’d)

• Assignment turn down must be based on assessments of the risks and ability to control the risks

• Is there a violation of safe work practices?

• Environmental conditions make it unsafe?

• Defective equipment is being used.

• They lack the necessary experience.

• Be tactful and honest.
SAFETY FIRST!!!

QUESTIONS?

Mark D. Masters
Chloeta Fire
mmasters@chloetafire.com