Leadplane Training Lesson Plan

Operational Tactics

10-01-N9065-HO

Objective:

To develop the student's proficiency with operational firefighting and retardant tactics in a fire environment (Phase 2).

To develop the student's mastery of operational firefighting and retardant tactics in a fire environment (Phase 3).

Content:

10 Principles of Retardant Application

1. Determine direct or indirect tactics based on fire size up and resources available.
2. Establish an anchor point and work from it.
3. Use the proper drop height.
4. Apply proper coverage levels.
5. Drop downhill and down sun when feasible.
6. Drop into the wind for best accuracy.
7. Maintain honest evaluation and effective communication between the ground and air.
8. Use direct attack only when ground support is available, or extinguishment is feasible.
9. Plan drops so that they can be extended or intersected effectively.
10. Monitor retardant effectiveness and adjust its use accordingly.

There are certain factors that influence fire behavior that can be observed from the air. By observing these factors, a good idea what the fire behavior and rates of spread will be like can be determined. This will help in adjusting tactics for retardant application. Each factor, listed below, should be considered individually to understand how it affects fire behavior and rate of spread.

When flying over a fire and trying to anticipate how the fire will change over time, look to see how many of these factors cause the fire to trend towards higher rates of spread and more active fire behavior. The more factors there are, the greater chance of a fire with higher rates of spread and more active fire behavior.

Fire Behavior Factors

Time of Day

In the continental US, fire behavior and rate of spread generally peak in the midafternoon. To get a better gauge of how time of day affects a fire, look at the aspect of the slope the fire is burning on. Eastern aspects will peak during mid to late morning. Northern aspects will peak late morning. Southern aspects will peak early afternoon. Western aspects will peak late afternoon.

Aspect

The Southern and Eastern aspects will tend to be dryer and have flashier fuels. The Northern and Western aspects will tend to have higher moisture levels and heavier fuel loading. Fire behavior peaks during different parts of the day depending on aspect.

Fuel Type

Lighter fuels, like grass, tend to be flashier fuels and can have a high rate of spread but do not burn for long periods of time. Heavier fuels, like timber, tend to have slower rates of spread but can burn for longer periods.

Fuel Continuity

Fuels that are spread out will tend to have slower rates of spread and lower fire behavior, while continuous fuels have a greater ability for higher rates of spread and more active fire behavior.

Fire Location on the Slope

Fires that are burning at the bottom of a slope have a greater chance for higher rates of spread while fires burning at the top of a slope will more likely have lower rates of spread.

Degree of Slope

The steeper the slope, the greater chance for higher a rate of spread. Rates of spread tend to be higher when the fire is burning up slope and are lower when the fire is backing down slope.

Terrain

Steep canyons and saddles tend to funnel hot air from a fire and winds. Because of this, the fire will have higher rates of spread and more active fire behavior through canyons and saddles.

Wind

The stronger the wind speed the greater chance the fire will have higher rates of spread and more active fire behavior.

The following factors that influence fire behavior are not as visual as the previous and tend to be more difficult to determine from the air.

Temperature

There is not an accurate gauge of the temperature changes on the ground. A rough idea from the outside air temperature gauge can be used. Higher temperatures tend to cause higher rates of spread and more active fire behavior.

Humidity

Humidity tends to decrease in the afternoon and lower humidity's tend to cause higher rates of spread and more active fire behavior.

Fuel Moisture

Lower fuel moistures tend to cause higher rates of spread and more active fire behavior. Fuel moistures can change by the hour in lighter fuels and take days to make noticeable changes in heavier fuels. Fuel moistures in riparian areas tends to be much higher and will affect rates of spread but should not be relied on to stop the spread of the fire.

When it comes to tactics, anchor, flank, and pinch is the standard. An anchor is something the retardant line can be tied into giving a relatively good chance that that fire won't burn around the start of the retardant line. Examples of anchors are roads, rock outcroppings, scree slopes, areas with no vegetation and cold black parts of the fire. As the fire line progresses up the flanks and the fire behavior decreases, energy from the flanks that was feeding the head of the fire is removed and the intensity at the head will decrease. Once the fire line gets up to the shoulders of the fire, the fire line can be directed in front of the head or pinch off the head.

If there are long spans of time between tanker drops, angle the retardant line away from the fires edge. The fire will burn up to the retardant line by the time the next load of retardant arrives. If the retardant is not angled away from the fires edge, there is a good chance the fire will burn around the end or tail of the retardant line before the next retardant line can be dropped.

It is best to try and have the next several drops planned out ahead. Have a secondary use for the retardant just in case it cannot be dropped for the intended use. Coordinate the priorities with the ATGS or IC as appropriate.

On a turning drop the retardant will sling to the outside of the turn. Adjust the leadplanes flight path for the added “drift.” Depending on how coordinated the turn is, the retardant may have a heavier or lighter coverage level. The difference in coverage level is usually minimal and not much of a concern.

During a go around or a split load, where the tanker is going to follow the leadplane around, don’t turn too sharply or accelerate away from the tanker too much. Remember that the climb rate on some of the tankers is slow with a retardant load on board.

Ground forces should always back up the use of retardant. Consider placement of retardant based on whether or not ground resources will be willing to go into the area to reinforce the retardant. Retardant by itself should not be counted on to stop a fire, especially in heavier fuel types. A fire with a slow to moderate rate of spread burning in light fuels may stop at the retardant line but it is poor planning to rely on this tactic. Generally, retardant and gels can be used for direct or indirect line construction. Foam and water are used for direct suppression. Half in half out is a good use of the retardant when trying to reduce the chance of spotting by taking the heat out of the fire or cooling the fire down so crews can dig direct fire line.

If ground forces will not be able to back up the retardant within one shift period, consideration should be made to the effectiveness of the retardant. Reevaluate the strategies and tactics for a possible better use of the retardant.

Completion Standards:

The lesson is complete when the student can demonstrate operational tactics that support the fire management or ATGS objectives in a fire environment for Phase 2.

The lesson is complete when the student can demonstrate mastery of operational tactics in a fire environment for Phase 3. Safety will never be in question while determining or implementing operational tactics and will be done without the reliance on the evaluator.