



## CITY OF LOVELAND

### FIRE AND RESCUE DEPARTMENT

410 E. Fifth Street • Loveland, Colorado 80537  
(970) 962-2471 • FAX (970) 962-2912 • TDD (970) 663-5144

## **CONSTRUCTING FIRE LINE (WILDLAND) (1.1)**

Developed by Engineer John Sanfilippo  
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- National Wildfire Coordination Group (NWCG) – Incident Response Pocket Guide (IRPG) 2010 Ed.
- Standard Firefighting Orders (F.O.) and Watch Out Situations (W.O.)
- LFR Playbook – Wildland Fire Operating Guide (December 2006)

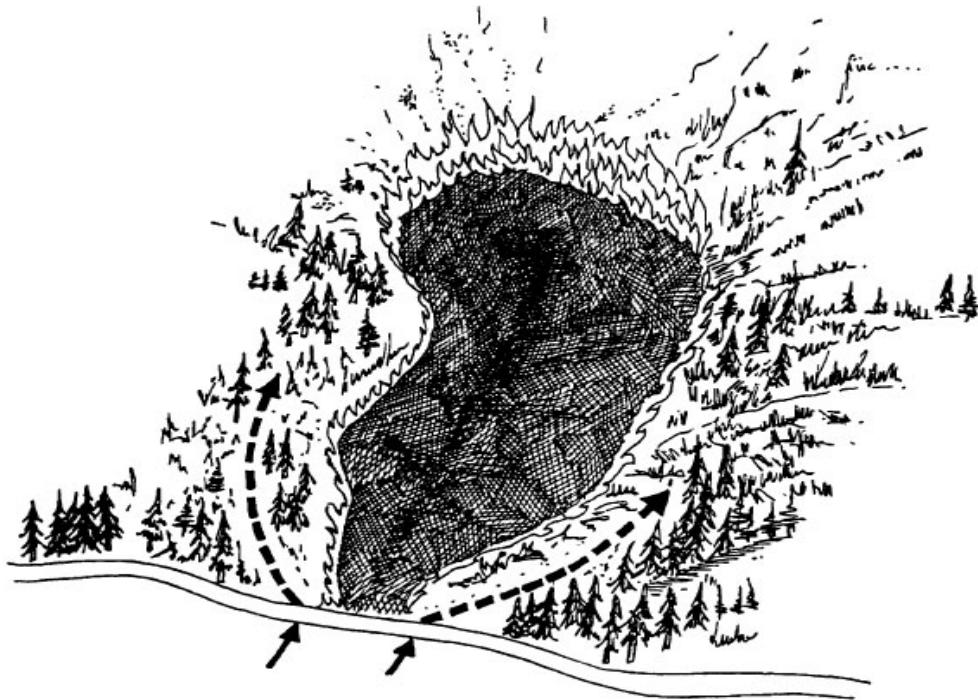
### **TASK SKILL DESCRIPTION AND DETAIL**

#### **Firefighter Safety**

F.O. #10 – Fight fire aggressively, having provided for safety first. First identify L.C.E.S. and brief all members to ensure they are known and understood (F.O.'s #4, #5, #7, and #8). Size up the fire and know what the fire is doing or get in contact with someone that can (F.O. #2). All fire line must begin with an adequate anchor point (W.O. #8).

#### **Fire Line Location**

Always start with an anchor point. Will the location of your anchor point keep the fire from hooking around behind you? Answer this question or make adjustments to answer it. Consider another point to begin if you can't answer it. Will some improvements work to answer the question? Usually, it is best to begin downhill of the fire. Look for natural features to help you; utilize wetlands, rock outcroppings, roads or trails to start with.



## Anchor Points

Once the anchor point is established (**Benchmark – Anchor Point Established**), time to build line on the fire flanks. Direct attack with one foot in the green and one foot in the black is safest and preferred. Try to keep the line as straight as possible and utilize natural features to lessen the workload. Consider topography and use easier features to your advantage and to lessen the work of the crew. This may move the line back and forth from direct to indirect which is acceptable.

### Types of Fire Line

Types of fire line may include: scratch line, hand line, wet line, firing line, retardant line, dozer or tractor-plow line.

- A scratch line is primarily built using hand tools. The focus is working the heavier pockets of fuel which allows quicker movement. You may have gaps in your line but the focus is to do the most with current resources and buy time for responding resources to arrive. It may be built moving dead and down fuels away from the line or stomping down higher grass to lessen the rate of spread once the fire arrives.
- A hand line is slower to build since you clear continuously to mineral soil, but ensures containment. It is more labor intensive. Once a hand line is built around the fire, you have containment. (**Benchmark – Fire Contained**)



Figure 1 - Handline



Figure 2 - Handline

- Wet line may be built using a pump and roll tactic with the nozzle men walking next to the engine while the engine drives the perimeter in the black. Another wet line can be accomplished using the progressive hose deployment adding hose to the stretch as you continue away from the pump engine (reference Progressive hose deployment chapter in Training Manual for further wet line information).



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- Firing line places fire on the ground using fusees or drip torches. Other specialized firing tools are used but are not part of the LFR inventory. Using fire in front of the head fire uses an indirect tactic and works best when burning off a roadway, natural rock feature, or large enough waterways when holding is possible and time permits the completion of the operation before the arrival of the fire front.



Figure 3 - Firing Operation





Figure 4 - Overhead view of a firing operation

- Retardant line pretreats fuels ahead of the main fire which helps buy time as well as knocks down intensity when the fire arrives. Aircraft are costly, but are good options to slow fire spread with larger flame lengths. They also give valuable intelligence from their aerial viewpoint. Availability, turn-around time, and added risks need to be considered.
- Dozer/plow line involves heavy equipment building massive amounts of fire line. In general our terrain is too rugged for using them effectively, plus the slow restoration of plants and the damage done by most heavy equipment we don't see a lot of them used in this area.

Both a scratch line and wet line are quick tactics used to slow fire spread and allow resources to gain the upper hand controlling the fire, but they must be followed up with hand line before containment can be announced. Often, a combination of different fire line tactics are used during suppression which may vary for terrain, access, fuels involved, and size of the fire. When using different tactics, work closely with all units involved to properly coordinate all suppression efforts.

### **Building the Fire Line**

We have established a good, safe anchor point. Next, begin the hand line up both flanks (left and right) until we meet and pinch the head creating fire containment. This requires enough firefighters on scene to work two flanks at the same time. To begin, you may have to focus on only one flank until more help arrives. Focus on the flank with the biggest spread potential or property value threatened first. This isn't absolute. The key is to do the most good while keeping all firefighters safe. This is priority number one.



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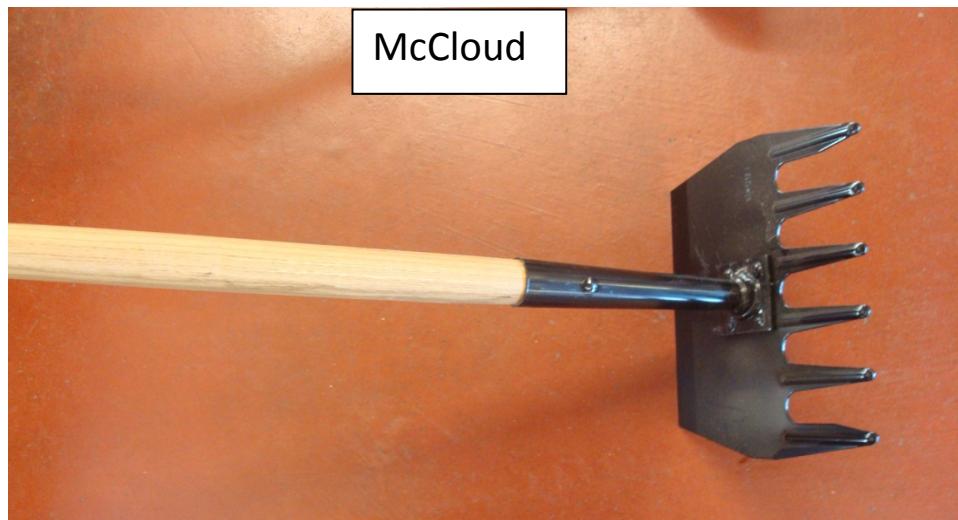
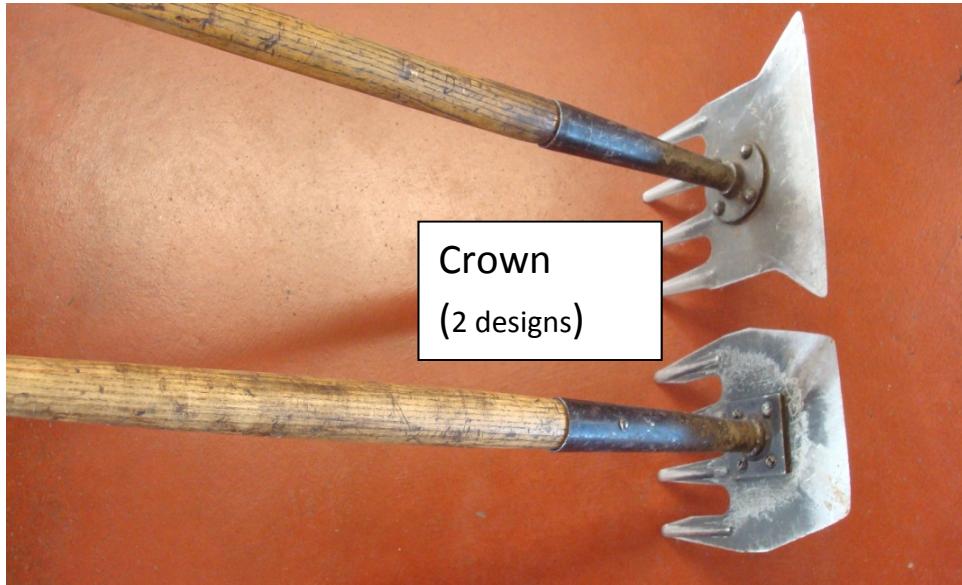
Besides each firefighter having worn all proper wildland PPE, carrying a fire shelter and enough personal supplies (water, food, etc.) for the work period; let's talk about hand tools that help us do work.

- The Pulaski is a good scraping tool and works in tight areas, but excels at chopping smaller limbs and roots. It also is good to break up the harder soil and compact ground or surface fuels. It can be used for small trees when no chain saw is around. Limbing tree branches near the ground is a good use.



- The Rhino, Ostrich, Crown and McCloud tools excel as scrappers. The Rhino is modified from the fire shovel. From the McCloud come the Ostrich (2 prongs) and Crown (4 prongs). They take larger swathes of material and are best for grasses, pine needle or duff. The longer handles help minimize fatigue during extended operations. They aren't good to dig with, but are best used to clear an area down to the soil when dirt is needed to cool a heat hole or for packing a smoldering stump. Scrap the surface and move out for the diggers to come







- The Fire Shovel is good for digging dirt when needed for cooling. They have a sharper angle to allow the sides to function like a scrapper with most of your leg muscles pushing the scrapper sideways. This works, but isn't as efficient as the Rhino or Ostrich at scrapping.



- The Combi - tool allows for several options since the head can be repositioned easily. Since the fire shovel has been phased out over time, now the combi is the best option for digging dirt. The pointed single point is handy in tight spaces in and around the rocky terrain prevalent in this area. The shovel can be used as an effective scrapper. The drawback for scrapping is the small surface area due to its size.





- The Flapper only works on grassy fuel types. It smothers the fire which doesn't have many BTU's because of the smaller grasses involved. It isn't very effective on rocky, brushy ground with large fuels burning.



- The Fire Rake also is limited to its' use. The tool is very hard to use in rocky terrain or smaller brush. It is designed for heavy litter areas with lots of leaves or dead timber litter several inches thick. Not what we find around here. We may find a use when overhauling haystack fires.



- The chain saw is a great tool when building fire line, but later helps with mop up and overhaul. A firefighter has to get additional training to operate and skill over time to use well. (Unlike when we use a saw for vertical ventilation, the operator when cutting in the wildland must understand forces associated with both standing trees and those on the ground. Any cut made to even small trees can release sufficient energy that can throw branches and limbs. The

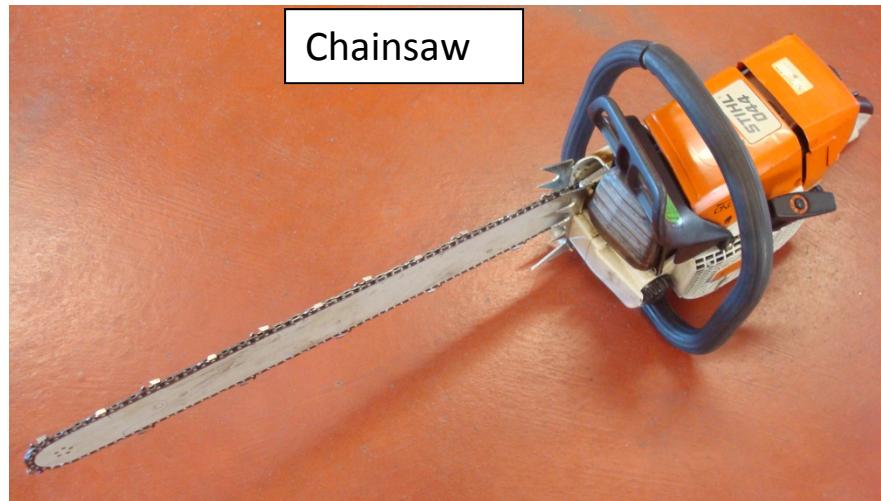


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additional training helps the sawyer anticipate all actions associated with every cut. Proficiency takes time using a saw). The added noises around the fire line make radio and normal communications difficult at best. There are added dangers when falling trees or cutting up large logs on the ground besides all the debris from an operating saw. The saw(s) usually are in front leading the crew when punching in line. They can clear brush and ladder fuels quickly which open up an avenue for the crew to work in.



Arrange your crew to accomplish the task of building hand line. We'll discuss a few configurations focusing on the size of the crew. A traditional handcrew is 20 members usually broken up into 3-4 squads. Each squad has a leader, Squad Boss (FFT1); and reports to the Crew Boss (CRWB). Like a normal span of control each supervisor can manage 3-7 members with 5 the optimal size. During initial attack (IA); our numbers grow as members arrive. For these examples; we will assume each squad is made up of a leader (FFT1) of designated member in charge plus 4 firefighters (FFT2). All the various tools compliment the other when building line. Generally you will want to have a variety in your squad.

Here are some example assignments for IA. The initial LFR companies arrive at a wildland fire in our jurisdiction. One member takes command and assigned the remainder to the first squad. They determine that the right flank is heading toward a steeper hillside with a large timber stand above. The fire is burning on the edge of a grassy meadow moving toward the hillside with scattered ponderosa timber. The briefing from command indicated the 1<sup>st</sup> squad will focus on the right flank anchoring at the stream going through the meadow near the fire. A good compliment of tools would include; (1) Chain Saw, (1) Rhino, (1) Ostrich, (1) Combi, and (2) Pulaskis. The second Pulaski is for the sawyer when he isn't cutting. The extra tool will be carried by another firefighter using one of the other tools mentioned.

A squad (5 FF's) from Larimer County arrives next and checks in with IC. The left flank remains unstaffed, but still isn't significant with minimal activity and nothing of value nearby. The squad on the right flank is working, but progress is slow. They report more work as they move further away from the grasses in the meadow. The terrain has more rocks and more amounts of scattered timber litter. The



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squad from the county should gear up for working in rockier terrain where less scrapping is needed and probably more chopping/cutting is needed. Discuss the tools this squad should bring.