

Rapid Lesson Sharing

Event Type: Using Air Curtain Burners for Slash Disposal

Date: August 2022

Location: Calf Canyon Fire
New Mexico

*What do you do with the mountains of slash
generated from mechanical fuels reductions from contingency line preparation?*

*This RLS documents the Southwest Area IMT 3 and 4's lessons learned while trying new
equipment—Air Curtain Burners.*

Background

More than 30 miles of contingency line were installed on the north end of the Calf Canyon Fire during suppression operations. This involved logging equipment used in the cutting, skidding, processing and decking of material that generated large amounts of activity fuel (slash) piled at multiple points along the contingency line.

Although common in the northwest, this tactic at this scale is relatively uncommon in the southwest. This presented the question: *What do you do with the mountains of slash generated from mechanical fuels reductions from contingency line preparation for the Calf Canyon Fire?*

Upon the arrival of Southwest Area Incident Management Team 3, slash was being used to cover dozer lines. It was clear there would be a large excess of material beyond that use.

The tactics being discussed for excess slash included scattering of slash at the landings and/or masticating the remnant piles. Both of these options presented challenges. Typically, mastication is best utilized when material is standing live. It can be difficult for some machines to deal with dead, down and piled slash due to intermixed dirt and debris which is hard on equipment. In addition, this would have left a thick layer of mulch that was also undesirable.

Scattering the slash was also undesirable. The result would have been slash spread out at of depth of 3-4 feet in landing areas.

Of course, the obvious answer would be to burn the piles in the winter time as a prescribed fire. However, this also presented a challenge because the area lacks any signed NEPA (National Environmental Policy Act) decisions to include such activities. Therefore, it was uncertain that this type of decision could be reached in a timely fashion.

This is what prompted the ordering and placement of two Air Curtain Burners (ACB) on Division Sierra as a trial to test the effectiveness and efficiency of slash disposal with this relatively new tool for repair work. (See Air Curtain Burner unit photo above.)



An Air Curtain Burner unit—a new tool that can be used for slash disposal by incident management teams.

Ordering

Two Air Curtain Burner units were ordered. The contractor charged a rate similar to other heavy equipment. Mobilization and demobilization fees were charged typical of transporting heavy equipment. For this incident, the contractor contacted a wrecker crane to load and unload the equipment per the contract. Subsequent movement of the equipment with the wrecker crane was an additional fee commensurate with wrecker crane charges.

- ❖ Ordering Air Curtain Burner units will require close coordination with the buying team.
- ❖ When ordering the unit, specify to mobilize with a truck/trailer capable of delivery on rough roads in the fire operation area and the ability to unload the unit on the ground at the work site. Be aware of the contract cost and what is included.
- ❖ The contractor delivered two Model S223 Air Curtain Burners (ACB) to Taos, New Mexico Armory staging. Overall size of the S223 unit is approximately 33 feet long by 8.5 feet wide by 8.5 feet high, with a fire box that is 23 feet long by 6 feet wide by 7 feet high. The unit's weight is 40,250 pounds. The owner's manual stated average burned material output to be 7-9 tons per hour.
- ❖ Be aware that based upon state DOT regulations, the contractor may need to obtain an overweight permit—causing delays in delivery.

Logistics

The IMT Operations members quickly learned that this was a complex operation with preplanning necessary to overcome various issues, including: selecting and leveling appropriate sites for ACB units; transporting the units to sites; heavy equipment needed to support the operation; and moving the units to the next work area.

- ❖ The first problem encountered was that the ACB contractor had shipped the units to the fire using tractor/trailer lowboys with low ground clearances that could not travel on the rough dirt roads. The ACB contractor hired a heavy lift tow/crane truck to transfer the units to a couple appropriate lowboy transports that another contractor had staged at the Armory. If the trucks had not been sitting at the Armory staging and the other equipment contractor was not willing to allow the use of his truck, the ACB project would have been delayed while another method of transportation was determined
- ❖ The two ACB units were successfully transported to the work site. The heavy lift tow/crane truck followed and unloaded the two units. The tow/crane truck was the perfect piece of equipment for the unloading project. The truck crane has a 41,000-pound lift capacity (just over the 40,000 pound weight of the ACB). The truck also came with a highly skilled operator and a large supply of specialized high-capacity chains, slings, and hooks.
- ❖ The use of a heavy lift crane with the appropriate rigging is the safest most efficient option for loading and unloading the ACB. A Foreman from an excavation company working on Division



The first problem the IMT encountered was that the ACB contractor shipped the two units using tractor/trailer lowboys that could not travel on the fire's rough dirt roads. They therefore had to be transferred by a heavy lift tow/crane truck to appropriate lowboys.

Sierra advised that his Type 1 Excavator might have been able to slide and ease the ACB from the trailer to the ground. He also stated that he did not believe his two Type 1 Excavators would be able to lift the ACB back onto a flatbed or lowboy trailer. When the Type 1 Excavator was dragging one of the ACB units, the Excavator struggled to lift one of its ends one foot above the ground.

Operations

- ❖ **Recommended personnel and equipment** for the ACB operation: TFLD and HEQB; Type 2 Excavator with a thumb (to load slash into the burn compartment); Type 2 Dozer (to level pad for ACB and move unit when needed); Type 3 or 4 Engine plus Water Tender (for protection in the event embers from ACB ignites surrounding fuels); and a Skid Steer Loader (to hook onto the scraper attachment used to clean ash out of burn compartment, every 1-2 days).



Igniting and feeding the Air Curtain Burner.

- ❖ The **ACB ignition process** is started by the Excavator loading the burn compartment to the top with small to medium diameter slash, then compacting down with bucket. The ACB operators then poured in 10 gallons of diesel fuel and ignited the slash through two small ports at the bottom of compartment with propane burners. The ACB operator had the blower engine idling but did not engage the fan until most of the slash had burned down (about 30 minutes), creating a good layer of hot coals. This is done so the blowing air curtain did not extinguish the flames. (This phase of the operation produced the most smoke and flames above the burn compartment.) When a good layer of hot coals is built up, the operator engages the blower and has the Excavator start loading the burn compartment—all diameters of material are loaded, including small logs and root wads.



- **The unit emits smoke while starting up and when material is dumped into it. Ensure contact is made with local cooperators and the public to inform them smoke will be visible.**

- ❖ **Feeding the Air Curtain Burner:**

- Care needs to be taken when the excavator is loading the burning compartment. Material stuck in the raker teeth may catch fire and accidentally be put back into the landing pile (igniting it).
- The excavator operator must be careful not to lower the bucket too close to burning material to prevent heat damage to the end of the boom (hydraulic hoses and seals). It was best to drop material from rakers above the top level of the burn compartment, especially when the unit reaches full heat. Also consider wrapping hydraulic hoses with heat resistant wrap.

- After 12 days of Air Curtain Burner operations, the resources on scene estimate that the consumption rate for two burners in good weather conditions is approximately 14 tons per full shift of use. It is important to note that for large scale operations the Air Curtain Burners are not a “quick,” efficient, or inexpensive tool to use for slash disposal. Burning machine piles by hand ignition in a prescribed burn is a much faster way of slash disposal, if possible.
- ❖ **Scene Safety:** After a couple hours of operation, the exterior of the ACB can reach a temperature of 500 degrees. The operators recommend all personnel and equipment stay at least 50 feet away.
- ❖ **Cool Down:** Once feeding slash into the burn compartment has stopped, it takes about 4-6 hours for the burn compartment to cool down. This needs to be taken into consideration for the TFLD to determine when to stop loading the burn chamber and allow the fire to cool down before personnel leave the site at end of shift.
- ❖ **Ash removal** from the burn compartment is necessary every 1-2 days to allow for most efficient burning/combustion. This is done with a 15-foot-long scraper attached to a Skid Steer Loader. (The IMT Team must supply the Skid Steer.) An excavator was considered to drag the ash out but the construction of the ACB made this difficult and a Skid Steer with the attachment was found to be most efficient. The hot ash was spread on cleared, bare soil in the area around the ACB with the Skid Steer. Engine modules need to be on scene to spray the area with water and cool off the debris.
- ❖ **Moving the ACB units** to different landing piles in the Division can be accomplished by towing the unit with a Type 2 Dozer (very slow operation — may damage roadbeds), or loading the units back on a transport/lowboy trailer and driving to the new work sites. Both options are slow and difficult. These ACBs are made to be skidded to new locations but this is best for short moves. Dragging the units long distances is undesirable due to weight and impact to the roads and the ACB. The best option is to reload with the crane and move to next location. Plan accordingly.
- ❖ Large capacity, six-wheel drive articulated dump trucks were used to move slash from nearby landing piles to the ACB burn location. This was a more efficient option due to difficulty moving the ACB unit. If landing piles are located too far away, moving the ACB units may be the best option. This means having two Excavators; one to load the ACB and one to load the dump trucks.

Lessons Learned

- ❖ Air Curtain Burners have a limited role in suppression repair when disposing of material.
- ❖ When considering the use of an Air Curtain Burner, make sure you consider the logistics needed to transport the equipment to the site, move it, feed it, and support it with fire suppression and ash clean out.
- ❖ Remember to contact cooperators and the public before ignitions — smoke will be visible, perhaps in an area that had previously not been smoky.
- ❖ Try new technologies and share what you learn. This equipment was ordered and operations began with one IMT who initiated an RLS. A subsequent IMT continued the operation and shared more lessons learned in this RLS.

**This RLS was submitted by:
Southwest Area Incident Management Teams 3 and 4
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