Mi-Wok Ranger District Prescribed Fire Burn Injury

Stanislaus National Forest

Pacific Southwest Region

Facilitated Learning Analysis

October 22, 2009

Summary

On October 22, 2009 a firefighter was assigned to lighting piles of activity slash with a drip torch in a five acre project area at the Bald Mountain Helibase located on the Mi Wok Ranger District of the Stanislaus National Forest. While lighting piles, at approximately 11:15 a.m., he stopped to carry two additional drip torches that were nearly empty back to the fueling area. While en route to the fueling area, the firefighter continued to light piles with a torch in one hand and the other two torches carried in the other hand. The two torches not being used for lighting at the time were carried by the handle, backwards with the spout down. The firefighter unknowingly dripped fuel from these two torches onto his pant leg. When the firefighter walked past a burning pile, his pant leg ignited. Two other firefighters working nearby assisted in extinguishing the fire and provided first aid.

The firefighter received 1st, 2nd, and 3rd degree burns to the right leg. The firefighter was transported to a local medical clinic for treatment, referred to UC Davis Burn Center, and was released. The following day, the firefighter received additional care from UC Davis Burn Center.

What was planned?

Burn piles of activity slash with drip torches within a five acre project area located at Bald Mountain Helibase on the Mi Wok District of the Stanislaus National Forest.

What actually happened?

On October 17, 2009 at approximately 9:30 a.m. pile burning was initiated at Bald Mountain Helibase located on the Mi Wok Ranger District of the Stanislaus National Forest. The total project area was 10 acres and burning continued for several days.

On the morning of October 22, an operational briefing was given by the Burn Boss to eight personnel to light piles with drip torches within the unit. The instructions did not include a safety briefing. However, all assigned personnel were given a Tailgate Safety and Health Session briefing on October 15, while assigned to the Stoddard Springs project area. Because of the low complexity of pile burning in the Bald Mountain Helibase unit, the Type 3 Burn Boss assumed the roles of Holding Boss and Firing Boss as described in the burn plan. The burn plan was valid with all appropriate signatures and was well within prescription.

A firefighter was assigned to lighting piles of activity slash with a drip torch in a five acre project area. While lighting piles, at approximately 11:15 a.m., he stopped to carry two additional drip torches that were nearly empty back to the fueling area. While en route to the fueling area, the firefighter continued to light piles with a torch in his left hand and the other two torches carried in the right hand. The two torches not being used for lighting at the time were carried by the handle, backwards with the spout pointed towards the ground. The firefighter unknowingly dripped fuel from these two torches onto his right pant leg. When the firefighter turned his back to the pile he was lighting, his fuel soaked pant leg brushed over some open flame causing it to catch fire.

He immediately dropped all three torches and tried to pat the fire out. When he realized he was not going to be able to put the fire out, the heat intensified and he screamed for help. He panicked and began to run. Two other firefighters working nearby ran to his aid. They yelled to him, “stop and drop.” The two firefighters caught up with the burning firefighter and assisted in extinguishing the fire. They provided first responder level care and first aid.

The first responders removed the firefighters burned pants and found significant burns to the lower right leg. They utilized their burn trauma kit and training to treat the patient with sterile burn sheets and applied ice packs in a zip lock bag.

The burned firefighter was transported to a local medical clinic where he was treated, referred to UC Davis Burn Center, and released. The following day the firefighter received additional care from the UC Davis Burn Center and was released. On October 25, the firefighter began to experience complications from the burn injury with infection and fever. He was admitted to the UC Davis Burn Center for overnight observation and treatment. The firefighter was released from the hospital on October 26.

Why did it happen?

The firefighter was focused on igniting piles. He did not realize the two drip torches in his right hand had discharged fuel onto his pant leg. The photos below demonstrate how the firefighter carried the two torches.

How was the burn being managed?

This was a low complexity type three pile burn located on an administrative site. The organization structure included a Type 3 Burn Boss and eight igniters and holders.

Why did the supervisor allow the firefighter to carry three drip torches?

The Burn Boss did not see the firefighter carrying three drip torches because he was not in the immediate area where the accident occurred.

What can I/we do differently next time? The following comments were given to the review team by the burned firefighter:

- Do not multi-task during firing operations. Do not perform other tasks while conducting firing operations with a firing device. Focus on one mission at a time.
- Carry drip torches by the handle, upright, with spout forward when not in use.
- When a drip torch is not in use and after the igniter (wick) has completely cooled, store the spout inside the drip torch container.

Recommendations:

- Keep the drip torch away from your body, clothing, and boots.
- Always carry the drip torch upright with spout forward until ready for use.
- Carry the drip torch by the handle only.
- Be careful where you spread fire with the torch.
- Extinguish the torch when not in use and secure the spout inside the tank after it has completely cooled, with seals closed.
- Wear gloves and keep sleeves rolled down. Always wear personal protective equipment.
- When fuel has contaminated clothing, leave the fire area and change into clean clothes.
- All employees have a responsibility to point out unsafe conditions and unsafe work practices.
- It is alright to carry more than one drip torch at a time as long as only one has the spout open. The other torches need to have the spouts secured inside the tank.
- Supervisors need to review the Job Hazard Analysis with all employees assigned prior to implementation for each project.
- Supervisors must conduct an operational safety briefing each day prior to firing operations with all assigned personnel.
- Maintain situational awareness during all firing projects no matter how simple or routine they might seem.
- Everyone assigned to a prescribed fire has the responsibility to identify safety issues and to voice concerns to make corrective actions when needed.

Discussion Points:

<u>Supervision (Burn Boss/Firing Boss)</u>

It is the responsibility of the Burn Boss and Firing Boss to provide all assigned personnel an operational safety briefing that include project objectives, ignition operations, and safety concerns no matter how simple or routine a burn might be. Ignition operations must be conducted in a safe manner according to the ignition plan.

Identify the experience level and qualifications of the ignition crew. The firing boss or burn boss (if a firing boss is not assigned) must be able to supervise the whole operation and provide feedback to Igniters at the project area. Good firefighters do not necessarily make good Igniters. It is up to the firing boss to provide leadership and feedback to the Igniters.

Burn Boss and Firing Boss Safety and Risk Management Considerations should include the following elements:

- Determine Hazards
- Identify Hazard Controls and Mitigations
- Evaluate Decisions
- Critique the Operation Constantly

Igniters

The use and operation of any firing device requires the operator to have the training and to wear all appropriate personal protective equipment. Proper procedures and protocol must be followed at all times to minimize risk and injury to operators, crewmembers, and adjacent personnel.

Job Hazard Analysis/Tailgate Safety and Health Session Briefings

Prior to prescribed fire implementation for each project area, a Job Hazard Analysis and Tailgate Safety Session should be completed and reviewed by all assigned personnel.

The Job Hazard Analysis shall identify all tasks and procedures associated with pile burning that have potential to cause injury or illness to personnel and damage to property or material. It should include emergency evacuation procedures. Discuss the project and activities with all participants. Supervisors need to observe the work area and activities associated with prescribed burning.

Identify appropriate actions to reduce or eliminate the hazard associated with pile burning. Mitigation measures for known hazards need to be in place prior to implementation of the project.

The Job Hazard Analysis must be reviewed and approved by the line officer.

Supervisors must conduct and document Tailgate Safety and Health Sessions to emphasize precautions identified in the Job Hazard Analysis. It is the responsibility of all employees to comply with the Job Hazard Analysis and the established safety and health procedures and practices.

Drip Torch Use (As described by the manufacture)

Independent use of firing equipment should be restricted to trained, experienced personnel, who will take precautions to avoid danger to themselves and others. Keep torch in good order, inspect periodically and replace worn or missing parts. Handle all petroleum products with the same precautions as when handling gasoline.

Fill the torch, leaving a two inch space at top, which allows for fuel expansion. Do not fill near open flame or other ignition sources. Wipe off outer surface of tank and handle. Remove discharge plug and insert in blind socket. Open breather valve two full turns. Tip torch forward, allowing fuel to wet the igniter. Light the igniter, drip torch is ready for use.

When a torch is not in use, extinguish igniter by allowing it to burn out. After igniter has cooled completely, remove lock-ring and reverse the spout inside the tank. Replace lock ring securely. Insert the sealing plug, from the blind threaded socket, into the spout opening. Close the breather valve.

Burn Injury Treatment

- Remove victim from heat source, extinguish fire.
- Examine airway for burns (singed facial hair, nasal hairs, soot burns around or in nose, mouth, or black sooty sputum).
- Examine for other injuries.
    - Provide basic first aid.
    - Maintain airway, breathing, circulation (ABC's).
    - Treat for shock by keeping person warm, feet elevated.
    - Provide oxygen, if available and trained to administer.
- Assess degree of burn and area affected.
    - **First Degree** – affected skin's outer layer. Redness, mild swelling, tenderness, and mild to moderate pain.
    - **Second Degree** – extends through entire outer layer and into the inner layer of skin. Blisters, swelling, weeping of fluids, and severe pain.
    - **Third Degree** – extends through all skin layers and into underlying fat, muscle, and bone. Discoloration (charred, white or cherry red), leathery, parchment-like, dry appearance. Pain is absent.
    - **Rule of Palms** – Patients palm = 1% of their body surface area. Estimate how many times the patients palm could be placed over the burned areas to estimate the percent of body that has been burned.
- Remove or cut away burned clothing. DO NOT cut away or remove clothing stuck to burnt skin.
- Apply cool, clear water over burned area. DO NOT soak a person or use cold water and ice packs. This encourages hypothermia.
- Cover burned area with a sterile dressing, moisten with saline solution, and apply dry dressing on top.
- For severe burns covering large areas of the body:
    - Wrap in clean, sterile sheet followed by plastic sheet.
    - Place inside sleeping bag or cover with insulated blanket.
- Monitor ABC's and keep burned areas moist.
- Avoid hypothermia and overheating.

Medical and Emergency Evacuation Plan

Supervisors and crewmembers are responsible for developing and discussing field emergency evacuation procedures and alternatives in the event a person becomes seriously injured or ill at the project area.

Be prepared to provide the following information in the event of an injury:

1. Nature of the accident or injury (avoid using victim's name).
2. Type of assistance needed, if any (ground, air, or water evacuation).
3. Location of accident or injury, best access route into the worksite (road name/number), identifiable ground/air landmarks.
4. Radio Frequencies.
5. Contact Person.
6. Local hazards to ground vehicles or aviation.
7. Weather conditions (wind speed and direction, visibility, and temperature).
8. Topography.
9. Number of individuals to be transported.
10. Estimated weight of the individuals for air/water evacuation.

The items listed above serve only as guidelines for the development of emergency evacuation procedures.

Review Team Participants:

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Team Member: Robert Laeng, Division Chief

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