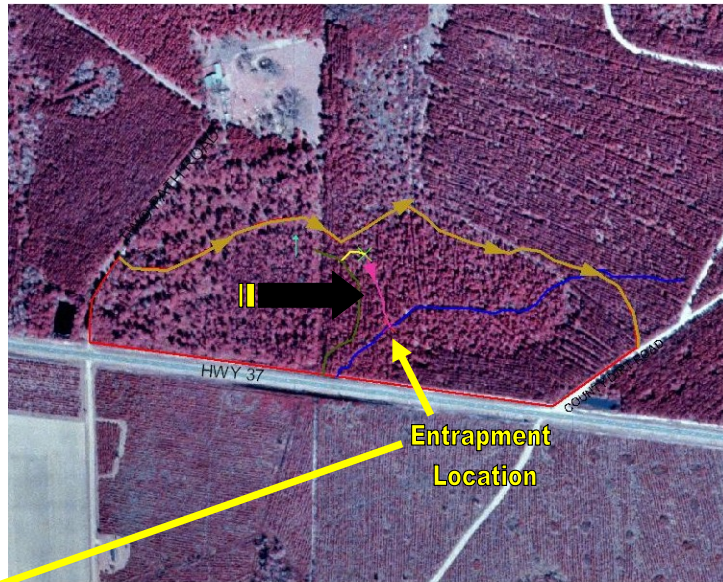
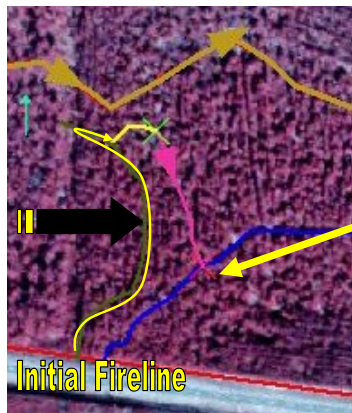


Chisholm Fire

Entrapment Investigation Report

Chisholm Fire Map
Clinch County, Georgia
February 18, 2006



- Head fire
- Flanking fire.shp
- Final cut off break - 2527 ft
- Otis 1st break - 604 ft
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- wedged tractor / burn over
- Canal - 1560 ft
- perimeter - 26.65 ac/5129 ft

0 500 Feet



**This report is compiled in response to a wildfire entrapment of a
Tractor Plow Operator
With fire shelter deployment, on the
Chisholm Fire, February 18, 2006**

Submitted by Chisholm Fire Entrapment Investigation Team:

Harvey Taylor; Ranger 1 Investigator Ben Hill / Irwin County Forestry Unit
Jeff Stone; Chief Ranger Liberty-Long County Forestry Unit
Vernon Owens; District Ranger Statesboro District Office
Monroe Gaines; Safety & Training Manager GFC Macon, Georgia

April 11, 2006



Georgia Forestry Commission

P. O. Box 819 • Macon, Georgia 31202-0819
(478) 751-3500 • FAX (478) 751-3465

Sonny Perdue
Governor

Kenneth C. Stewart, Jr.
Director

April 14, 2006

MEMO TO: Buck Wynn; District Forester, Waycross District
Alan Dozier, Chief of Forest Protection
Robert Farris, Chief of Field Operations
Ken Stewart, Director

FROM: Chisholm Fire Entrapment Investigation Team

SUBJECT: Entrapment Investigation Report

The investigation team responded to the challenging assignment of examining this incident to help reduce and/or mitigate the circumstances which could lead any of us into repeating the event. We have a strong responsibility to wildland firefighters everywhere to be as factual and objective as possible. Firefighters and fire supervisors are engaged in a complex business that has inherent risk under stressful conditions and circumstances.

This incident was a result of a series of judgments, decisions, events and actions which occur many times during execution of our duty. The attached report provides the summary of findings on this incident and recommendations of the investigation team.

Our report is submitted to you as agency administrators for review of the team's findings and analysis of causal factors. We also ask you to resolve to provide the leadership needed to give an extra margin of safety in all that we do. Certainly no one wants to experience what those on the "front lines" of this case went through.

Sincere appreciation is extended to everyone who participated and contributed to the investigation. We felt that all involved were forthright and conscientious in the search for preventative solutions.

Respectfully submitted by:

Monroe Gaines, Chisholm Fire Investigation Team Leader

Jim L. Gillis, Jr., Chairman
Soperton

H. G. Thomas New
Louisville

Wesley Langdale
Valdosta

H. G. Yeomans
Swainsboro

Victor Beadles
Moultrie

Fred Warnell, Jr.
Richmond Hill

Robert Pollard
Appling

Executive Summary

On February 18, 2006 (Saturday) at approximately 3:35 p.m., a Georgia Forestry Commission ranger operating a tractor-plow fire suppression dozer became entrapped while on initial attack of a wildfire in Clinch County Georgia. The ranger had to deploy his fire shelter inside the tractor and suffered 2nd-3rd degree burns to the arms and face.

An off duty Chief Ranger (supervisor) discovered the fire approximately 35 minutes earlier and initiated dispatch of a volunteer fire department brush truck and the tractor-plow unit. The fire was burning in 20+ year old pine plantation with a heavy under story of predominant gallberry and pine needle litter.

Upon arrival of the tractor-plow unit, the chief ranger briefed the operator on a strategy to attempt initial attack of the fire at an unimproved woods road in front of the fire, anchoring the fireline adjacent to State highway 37.

The operator began attack on the fire as directed, completed one short fireline across the head of the fire to the left flank, accomplished a u-turn and considered installing a secondary line.

At this juncture, the operator stated (in later interview) that the fire intensity had “blown up” and he decided to disengage and attempt to escape back to the highway. This was a distance of approximately 300 – 400 feet, back across the head of the fire. At approximately 75 feet from the highway, the operator encountered a shallow drainage ditch with the tractor. He felt this encounter blocked further attempt at escape.

The fuel density, fire behavior and proximity of the head fire to his location, led to the operators decision to deploy his fire shelter immediately. Due to not plowing a firebreak out during the escape, he realized his only option was to deploy inside the tractor cab and attempt to ride the fire out, which he did. There was no bare mineral soil and fuel was very heavy.

Within 2-3 minutes, the fire head had passed. The operator emerged from the shelter and called the chief ranger on the tractor radio to report the situation, and that he felt “burned and blistered”. The supervisor called a local ambulance, went to the aid of the operator and escorted him back to the highway. He was able to walk out on his own.

An ambulance arrived on scene within 5 minutes, completed triage and transported the operator to a regional medical center. He was subsequently treated by a burn center and underwent skin graft procedures to arms and face and is still recovering.

The State Safety Officer initiated an Entrapment Investigation Team (EIT) who reported to the location the next morning (Sunday February 19, 2006). Ensuing investigations by the EIT have developed the following “causal factors”, findings and recommendations.

Bold-face statements are Contributing Factors

- *Italics statements are recommendations of the EIT*
- *(10 Standard Fire Order or 18-Watchout overlooked)*

1-Fuel was very heavy in this area, which in return contributed to the entrapment.

- *Tactics: make less aggressive attack in heavy fuels and boggy conditions*
- *(Identify escape routes and make them known)*
- *(Terrain and fuels make escape to safety zones difficult)*

2-Weather was a contributing factor. The fire danger rating for that area was predicted to be a class five day.

- *Operational Period: Manning all offices on class 5 days should be SOP. Be sure ANY "On-Call" off duty personnel are aware of weather even if not at office.*
- *Class 5 Day SOP should require at least 2 suppression tractors responding*
- *(Keep informed on fire weather conditions and forecasts)*
- *(Base all actions on current and expected fire behavior)*

3-Topography was a deciding factor in the entrapment. If the drainage ditch had not been present, most likely the tractor would have reached the road ahead of the fire.

- *Tactics: make less aggressive attack in heavy fuels and boggy conditions*
- *Tactics: always allow adequate room for contingency when tactics are not working, or when in adverse topography*
- *(Identify escape routes and make them known)*
- *(Terrain and fuels make escape to safety zones difficult)*

4-Observe and Predict (Situational Awareness). The fire was burning very erratic due to the drafting effect caused by State Hwy. 37. The fire had developed crowning and spotting before the initial attack occurred, and at the time of initial attack.

- *Ongoing evaluations: Train that it is alright to re-evaluate and change plans even if directions are given by supervisor*
- *Situation Awareness: Be aware of changing conditions that compromise earlier perceptions. Base all actions on current and expected fire behavior.*
- *Safety Briefing: take more time to discuss issues that might arise. Operator needs to know it is okay to ask about safety concerns or discuss alternative strategies/tactics.*
- *(Base all actions on current and expected fire behavior)*
- *(Give clear instructions and insure they are understood)*

5-Visibility= The heavy fuel was a contributing factor in the judgment call to deploy the fire shelter inside the tractor. He was unable to see the drainage ditch because of the heavy under story.

- *Tactics: make less aggressive attack in heavy fuels and boggy conditions*
- *(Fuels and/or terrain make escape to safety zones difficult)*
- *Always consider the safest option for escape route and safety zone*

5-Strategy= There are many factors that played into the strategies engaged. The operator as well as the Chief Ranger were responding from “Off-Duty” status and had not seen a weather forecast for that day. The intensity of the fire was not adequately considered when making the initial attack. This was evident because of the direct attack used. The positioning of the suppression unit was an indicator that the fire was not properly sized up.

- *Operational Period: Manning all offices on class 5 days should be SOP. Be sure ANY “On-Call” off duty personnel are aware of weather even if not at office.*
- *Tactics: make less aggressive attack in heavy fuels and boggy conditions*
- *Leadership: leadership does not always see what operator sees. Operator needs to know that it is okay to ask questions or discuss alternative strategies/tactics if they perceive safety concerns.*
- *Safety Briefing: take more time to discuss issues that might arise. Operator needs to know it is okay to ask about safety concerns.*
- *Size-Up: Must be on-going and*
- *(Base all actions on current and expected fire behavior)*
- *(Fight fire aggressively, having provided for safety first)*
- *(Attempting frontal assault on the fire)*
- *(Terrain and fuels make escape to safety zones difficult)*

6-Tactics= The decision to use a direct attack instead of an indirect attack was a significant factor in this incident. The fire behavior before, and at the time of initial attack, was indicating that the fire was burning in an erratic manner.

- *Strategy: Need to always see the big picture. Need more practical training on looking ahead, practicing and testing Situation Awareness*
- *Ongoing evaluations: Train that it is alright to re-evaluate and discuss the need to change plans even if directions are given by supervisor.*
- *(Base all actions on current and expected fire behavior)*
- *(Fight fire aggressively, having provided for safety first)*
- *(Attempting frontal assault on the fire)*
- *(Terrain and fuels make escape to safety zones difficult)*

7-Safety Briefing= The initial attack briefing was very limited – “unload here, attack fire here, etc.”

- *Safety Briefing: take more time to discuss issues that might arise. Operator needs to know it is okay to ask about safety concerns.*
- *(Instructions and assignments not clear)*
- *(Identify escape routes and make them known)*

8- Communications= The “off-duty” status of the responding units and consequential limitations the Chief Ranger had (PPE, communications) by being in his POV contributed to the overall situation.

- *Operational Period: Manning all offices on class 5 days should be SOP. Be sure ANY “On-Call” off duty personnel are aware of weather even if not at office.*
- *(Base all actions on current and expected fire behavior)*

9-Ongoing evaluations= Due the fact the Chief Ranger had to move the suppression unit truck and lowboy to a more secure place, the Chief Ranger was out of the process for few minutes. The Chief Ranger made good decisions under the situation.

- *Communication: Need to have constant communication. Need portable radios for tractor-plow operators and supervisors.*

10- Leadership= The Chief Ranger did a conventional job in the directing of the fire control operation at the scene. Could things been done differently? Yes, decisions are based on the current demands, situations, individual decisions, experience levels, etc.

- *Leadership: leadership does not always see what operator sees. Operator needs to know that it is okay to make own decisions or question strategy/tactics when personal safety is at risk.*
- *Strategy: Need to always see the big picture. Need more training on looking ahead.*
- *More often than not the culture of “fight fires aggressively” overrides “while providing for safety first”.*

Synopsis

This situation was a result of several linked contributing factors. Most significant were:

- *Aggressive initial attack by a single tractor-plow suppression unit during high fire danger weather, in heavy fuels, boggy terrain, with erratic fire behavior.*
- *Supervisor failed to adjust initial attack strategy. It was too late for such direct action by time the suppression tractor arrived. Instructions given obviously influenced the operator’s initial action.*
- *The operator’s escape route choice as back in front of the advancing fire was a critical decision. He was actually in a safer location on the left flank.*

Principal Recommendations

- Implement agency-wide SOP to ensure adequate On-Duty staffing during periods of high fire danger. Initial response with more resources and supervision will enhance capability and readiness.
- Firefighter refresher training on principles of: Size-Up; Direct/Indirect strategies, L.C.E.S. and Situational Awareness.
- All-encompassing expectation for “Safety First on All Fires – All the Time”.
- Implement routine practice of “AAR” (After Action Review) on fires at the unit level. Supervision and management should measure success of this practice, and provide a process for distribution of “lessons learned” throughout the agency.

Management – Line Supervisors – Firefighters

Implement corrective measures at your level of authority ASAP
to address gaps in firefighter safety identified in this report

Firefighter refresher and training suggestions based on the Chisholm Fire incident

There were several recommendations for “refresher training” by the Entrapment Investigation Team in the Chisholm Fire investigation report. Some of the most significant areas discussed were:

Fire supervisors, firefighters and management personnel either do not have “faith” in GFC fire weather forecasts, Manning and Action Guide recommendations, or do not universally use these components, experience and previous training to “connect the dots” in adequate and effective decision making.

Variation in the way county units, districts, etc. staff offices and respond to fires indicates the emphasis on “fire readiness” may have slipped. This seems to be a result of “mission creep”, scheduling conflicts, staffing shortages, etc.

The 10 Standard Fire Orders and 18 Watch Out Situations are not “institutionalized” among GFC fire supervisors and firefighters. How to effectively use and apply these basic principles in decision making and execution of day-to-day firefighting situations seems perplexing, and not standard practice.

Preliminary Recommendation

Organize a facilitated review session using the Chisholm Fire entrapment report and accompanying PowerPoint presentation. Thoughtful consideration and open discussion of this case is a good starting point. Note: The facilitator must be thoroughly familiar with the supplement on T.A.P.S. tactics and competent in leading discussion in this subject matter.

This session should be focused on fire supervisors (chief ranger, district ranger, ranger 2) to begin with. The objective should be to discuss and identify how the contributing factors relating to this type of incident can be effectively mitigated in district/county unit operations. Identify a few specific areas to focus on initial improvement.

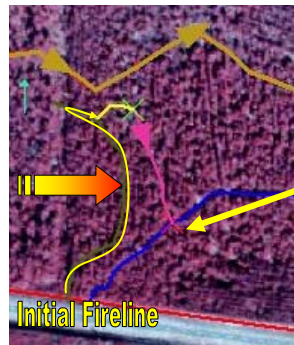
Focus on improving GFC operations, decision making capacity, “back to basics” applications, consistency, and “connect the dots” practices which result in an emphasis on safety and efficiency. Key on management and supervisor roles in decision making and situational awareness (refer back to L-180 and L-280 principles and also reference from the Incident Response Pocket Guide and GFC Manning and Action Guidelines)

Once specific action items are clearly identified and agreed upon by the fire management staff, conduct a review for all firefighters and communicate mitigation plans, procedures enhancements, etc.

Additional presentations and information included on the Chisholm Fire CD can be “localized” or used as support or stand-alone refresher training programs.

An on-going effort to further enhance our focus on safe, efficient and effective firefighting practices. Be sure to share ideas on improvement with line supervisors and top management.

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0 500 Feet



Sequence of Events

- Anchor Point and Initial Attack began at 2-Path Rd. Near Hwy
- Head Fire Had Just Crossed 2-Path
- Initial Strategy Was to Try and Stop The Head Fire at This Location



Sequence of Events

- Initial Line Ended at Left-Flank
- Made a U-Turn With Intent To Put In a Secondary Line
- Disengaged Within A Short Distance on Return Line Due to Boggy Conditions



Sequence of Events

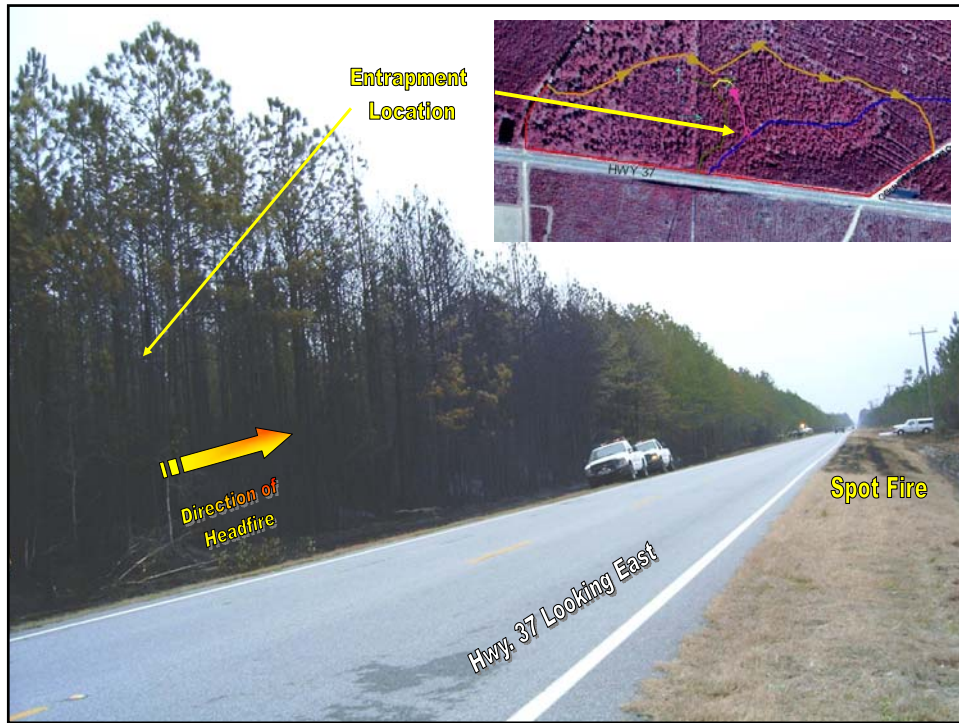
- Picked Up Plow at This Point
- Attempted To Escape Back Towards The Hwy.
- Fire Intensity Had Increased significantly

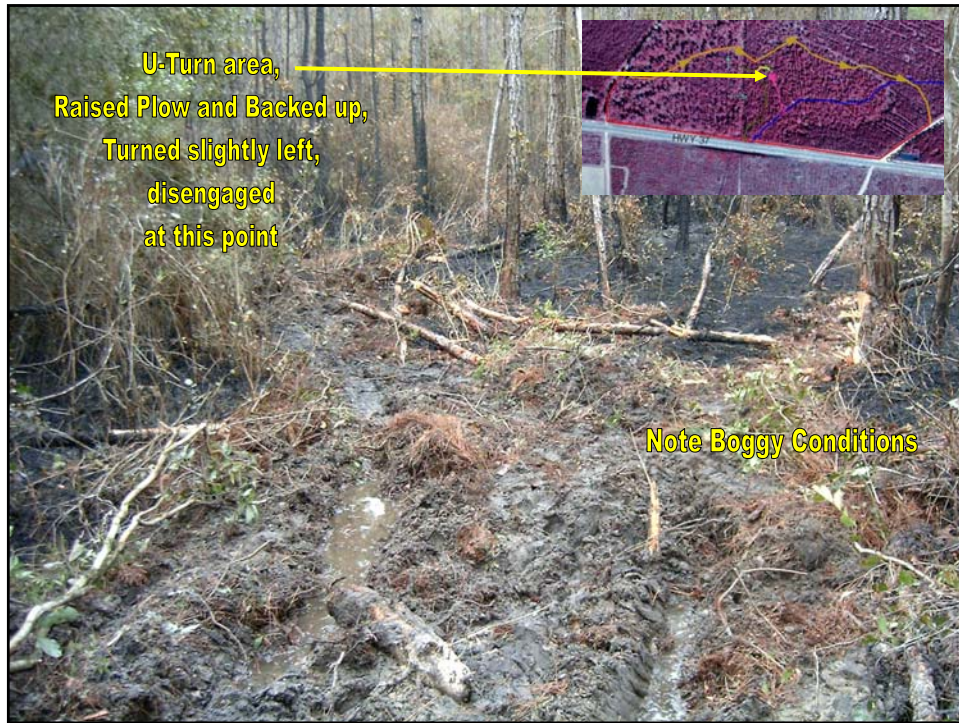


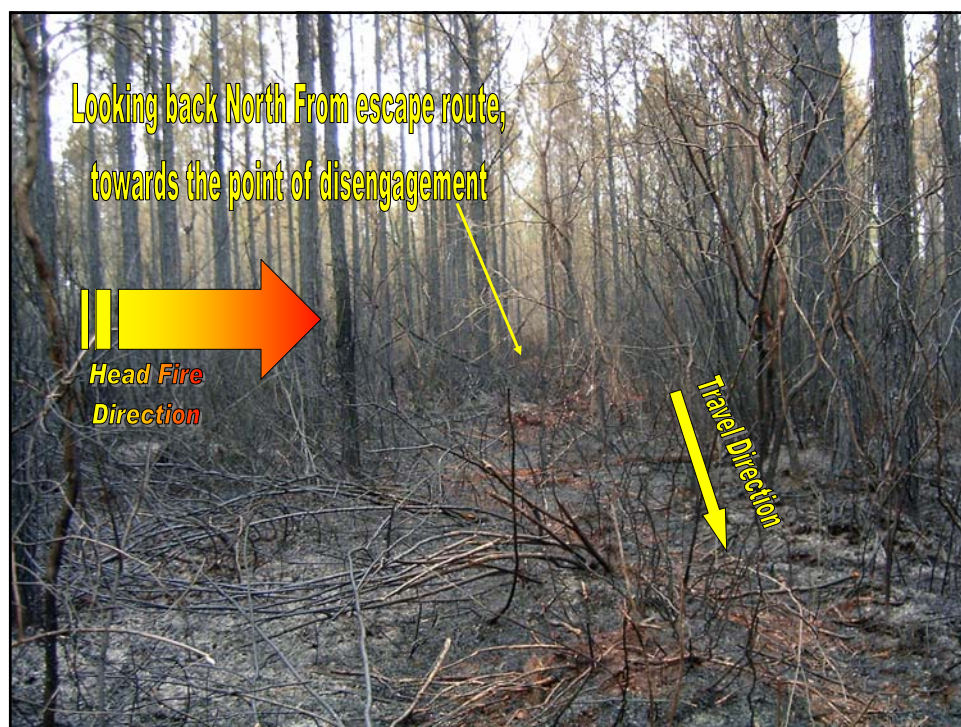
Sequence of Events

- Traveled Approximately 332 ft. Towards Hwy.
- Attempted to Cross Drainage Ditch, V-Blade Lodged Between Two Pine Trees
- Deployed Shelter Inside Tractor Cab









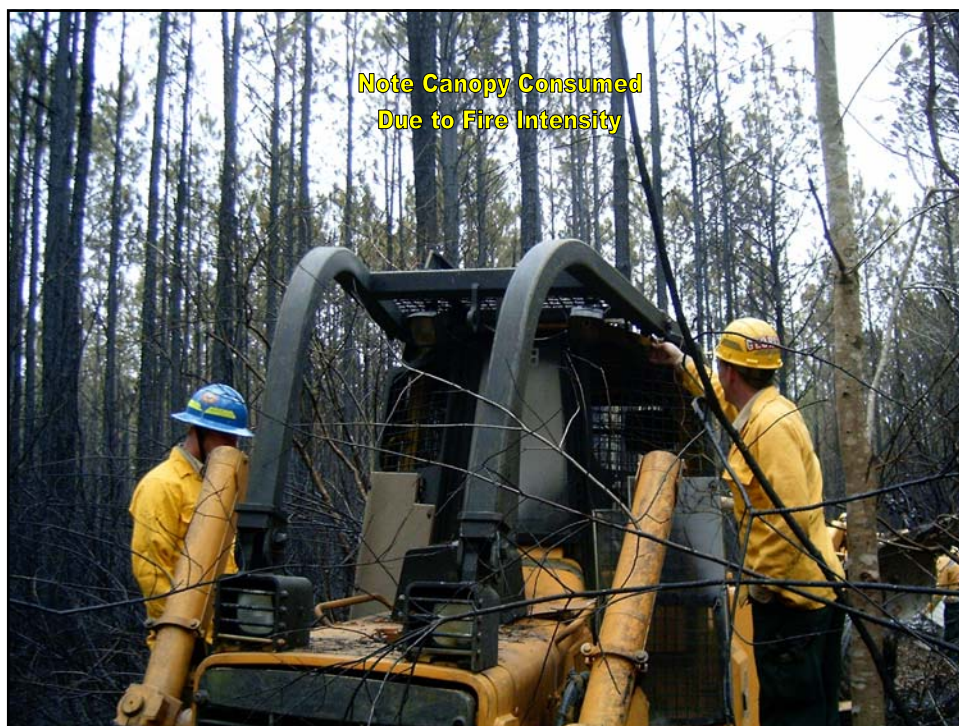




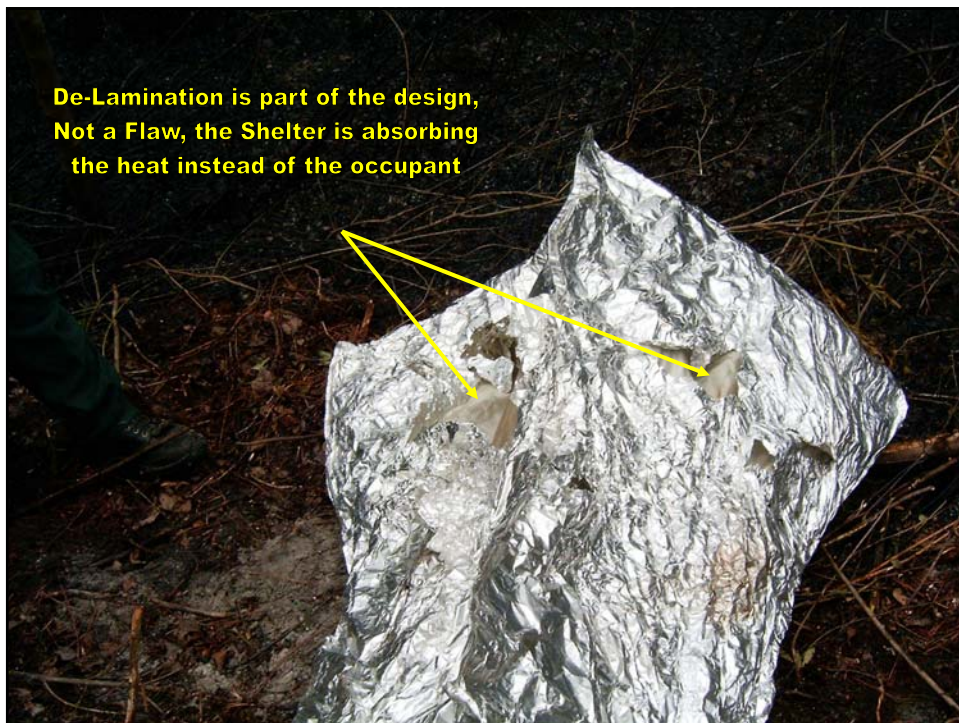
















Evidence of Intense Heat
on Tractor Components



Evidence of Intense Heat
on Tractor Components



The purpose of this "Refresher" version of TAPS is to reinforce practices for experienced wildfire suppression personnel and supervisors in the **safe** operation of a tractor plow unit in **flat** terrain.

This selection from the TAPS course deals with Tractor plow firefighting strategy and tactics under adverse fire danger conditions.

The purpose was to develop a training package specifically focused on strategy and tactics which can be employed to mitigate the situations found in the Chisholm Fire Entrapment.

Therefore the course does not include discussion of overall fire safety.

While less experienced operators might benefit from this review it is recommended they complete the entire TAPS course under experienced instructors.

REFERENCE MATERIAL:

- Incident Response Pocket Guide
- Fireline Handbook
- GFC Manning and Action Guide