

## ***Toolbox Deployment Incident Overview***

***Toolbox Complex Fire near Picture Rock Pass, Fremont National Forest, Oregon  
July 24, 2002***

In this overview:

- A summary of the facts of the deployment incident
- An abridged timeline
- A summary of the conclusions of the Serious Accident Investigation Team (SAIT) report
- A summary of the highlights from the Lessons Learned report

### **Incident Summary**

On July 24, 2002, three crews -- one Hotshot crew, one Type 2 AD crew, and a third Type 2 Contract crew -- were assigned to Division T of the Toolbox Complex Fire. Around noon, a burn out was attempted, but multiple spot fires prevented the holding of the line. Ninety minutes after the burning operation started, all three crews disengaged and proceeded to the upper safety zone at Road 2901.

At 1400 hours, the Division Supervisor, Hotshot superintendent, and AD crew boss scouted another existing dozer line for additional firing operations. Per Division T supervisor instruction, all three crews moved to a lower safety zone (eventual deployment site) to prepare for this second burning operation. While all three crews were in the lower safety zone, the Hotshot superintendent radioed his assistant superintendent to send the Hotshot crew and the AD crew, but keep the Contract crew behind in the safety zone. At this point, the Contract crew boss had not received any briefing about the firing operation that was going on without his crew, but was told to remain in the safety zone, and shown the preferred escape routes.

By 1535 hours, the second firing operation had begun. After receiving a radio call from the Hotshot superintendent to "watch our backs," the Contract crew boss left his crew in the lower safety zone for several minutes while he walked out to assess the situation. During this time, fire and wind conditions continued to deteriorate, subjecting the crew to severe heat, smoke, and embers. When the Contract crew boss returned to the lower safety zone, the crewmembers were extremely nervous. To calm their fears and to provide protection from the heat and smoke, the Contract crew boss ordered the crew to deploy their shelters. The deployment lasted about 15 minutes. There were no fatalities. Eleven crewmembers were later treated and released: two individuals for minor burns and nine individuals for smoke inhalation.

[Read the complete SAIT report](#)

### **Incident Timeline (abridged)**

Sources:

*Toolbox Complex Fire Shelter Deployment Accident Investigation: Factual report and management evaluation report.* Serious Accident Investigation Team (SAIT), September 6, 2002.

*Toolbox Fire Shelter Deployment.* Preliminary report from the Occupational Safety & Health Administration (OSHA).

### *Abbreviations*

DIVS T -- Supervisor, Division T of the Toolbox Complex fire

SOFR -- Safety Officer

Crew 1 -- Gila Hotshots, a Type 1 crew

Crew 2 -- Chugach #1, a Type 2 AD crew

Crew 3 -- Ferguson #53, a Type 2 Contract crew

SZ – safety zone

0630	DIVS T gives a.m. briefing. Crew 3 boss is present.
0700-1015	DIVS T, SOFR, crew 1, and crew 2 dispatch to area of operations.
1130	Crew 3 arrives at assignment late due to required inspection, vehicle problems. DIVS T gives briefing and SOFR gives safety review (Thirty-Mile requirement). All three crews are present.
1200	DIVS T initiates first burnout operation.
1330	DIVS T gives order to disengage; the line is lost. Division T crews move to upper SZ for lunch.
1400	DIVS T, crew 1 superintendent, and crew 2 boss go to scout for second burning operation. Crew 3 is not represented in this scouting party.
1445-1530	Crew 1 superintendent orders all crews to move into a lower SZ to prepare for the second burning operation, per DIVS T instructions. All 3 crews move from upper SZ to lower SZ and wait there.
1535-1545	Crew 1 superintendent radios crew 1 assistant superintendent to send crew 1 and crew 2, but keep crew 3 behind in safety zone.  Crew 3 boss asks crew 2 boss if crew 3 will be going along. Crew 2 boss tells crew 3 boss to remain in the SZ. Crew 2 boss also indicates a preferred escape route from the lower SZ to the road.  DIVS T continues north on dozer line toward road. He is not informed that crew 3 will stay behind.
(same)	The crew 3 boss receives a radio call from the crew 1 superintendent to “watch our backs.” Crew 3 boss leaves his crew in the SZ and walks out “a couple hundred yards” to scout for crew 1 location, but doesn’t see them.
(same)	Crew 3 boss returns to the SZ and finds high winds, extreme heat and smoke from the main fire. Fire spots on south side of SZ, and one of the flagged escape route burns (impassable). Crew 3 boss does not know whether other escape route (line up to upper SZ) is holding. Crew 3 boss orders crew to north side of SZ. Crew 3 squad boss suggests leaving, but crew 3 boss declines to move. “He didn’t think the spot was that bad and that they were in a safety zone and that he had always thought escape routes led you to safety zones, not led you away from them.” Eventually he perceives that “they have no way out.”
(same)	Crew 3 boss radios crew 1 superintendent and tells him about spot fire at their SZ. Crew 1 superintendent acknowledges. DIVS T overhears and radios back to crew 3 boss asking whether the spot is inside the line or outside the line. Crew 3 boss responds that the spot is inside the line.  Crew 3 boss orders crew to move to west as fire moves east. When west side of SZ starts to heat up, crew 3 boss orders crew to crouch down. One crewmember yells in alarm (possibly hit by an ember). Crew 3 boss orders crew to pull shelters, move back to south side of SZ. All 20 crewmembers deploy shelters. Deployment goes smoothly, with a slight delay in only one case.
1545	Crew 3 boss radios crew 1 superintendent and tells them of the deployment, and that crew 1 will not be able to use the lower SZ or the escape route.
1550	DIVS T informs OPS section chief of the deployment.
1620	OPS section chief instructs Branch III director to begin pulling people off the line, radios for Safety officer, and notifies IC of deployment. Branch III and OPS section chief meet DIVS T, and

	establish radio contact with crew 3 until they can get them out.
1645	DIVS T waits for heat and smoke to dissipate, then walks into lower SZ to where crew 3 is located.
1700	Crew walks out to upper SZ and is evaluated by Safety and Ops personnel.

## Conclusions from the SAIT Report

Source:

*Toolbox Complex Fire Shelter Deployment Accident Investigation: Factual report and management evaluation report.* Serious Accident Investigation Team (SAIT), September 6, 2002.

The following items are summarized from the SAIT report Executive Summary, Management Evaluation Summary, and Appendices.

### Fire Behavior

- Extremely low relative humidity and instability made fuels more volatile and conditions more severe on July 24 than they had been on the previous 5 days. (p. 19)
- Winds switched several times during the afternoon, and wind plus terrain resulted in eddy rolls – a very common effect in saddles (where the lower safety zone was located). Eddy rolls combined with active spotting, torching, and crowning fire behavior influenced the deployment. (p. 20)

### Environmental Factors

- The combination of smoke, temperature, and embers influenced the decision to deploy. The Contract crew boss reported that he did not think they were in danger of serious injury or death, but that if they had not deployed there may be been more minor burns from embers and more lung problems from smoke inhalation, or that someone might have panicked and run. (p. 9)

### Incident Management

- The Hotshot superintendent decision to leave the least experienced Contract crew in the safety zone influenced the deployment in that the crew was cut off once their flagged escape route burned. The decision to leave the crew in the safety zone positively affected the outcome in that the crew was in a survivable location when the deployment occurred. (p. 9)

### Control Mechanisms

- **Communication:** Although not listed as an influence in the deployment, the report describes several communication issues.
  - Division communication with the contract crew boss was often indirect and relayed through the other crew bosses. (p. 9)
  - Neither the Division Supervisor nor the Contract crew boss followed up on indirect communications to make sure instructions were understood. (p. 14)
  - Radio communication was difficult, first because two different divisions (S and T) were using the same frequency leading to heavy radio traffic, and second due to the inability to establish a common frequency with the crew during and after deployment. (p. 5, 6, 15)

- **10 standard fire orders, 18 watch-out situations, and LCES:** The safety zone measured 195 by 210 feet, and was located on the east slope of the saddle approximately halfway up the slope from the bottom. The safety zone did not meet guidelines against locations in chimneys, saddles, or narrow canyons. The safety zone size was considered adequate to prevent any serious injury, but discomfort and minor burns may not have been prevented without the deployment of fire shelters. (p. 16)

### **Personnel Factors**

- **Attitudes:** The SAIT found that some of the Contract crewmembers' displays of anxiety significantly contributed to the crew boss's decision to deploy. (p. 10)
- **Leadership:** The Contract crew boss stated that he ordered the deployment in part to maintain control of his crew. The SAIT lists this as a significant contribution. (p. 10)
- **Experience levels:** Experience levels influenced the shelter deployment. The Hotshot superintendent staged the Contract crew in the safety zone during the second firing operation because he did not know the experience level of the crew. (p. 10)

### **Equipment**

Did not contribute to the deployment. Post-incident examination of the shelters and bags showed flaws and structural damage in several of the shelters, but no heat damage. Melted holes on the shelter bags had fused together, indicating that embers were still falling after deployment. The shirt worn by a firefighter who suffered a second-degree burn had a dye sublimation mark of 2 ½ by ½ inches, indicating a material temperature of 205 °C. (p. 27, 28)

## **Lessons Learned Summary**

Source:

*Toolbox Deployment Lessons Learned After incident Report (AIR), February 5, 2003.*

On December 13, 2002, several of the people involved in this incident met to examine the successes and issues surrounding the incident. The following are highlights from the comments made during that meeting.

### **Notable successes:**

- The Incident Management Team handled the "incident within the incident" effectively. Special mention was made of the Operations Section Chief's decision to transfer his duties to the Planning Operations Section Chief, so that he could focus on the investigation and firefighting could continue for the rest of the 80,000-acre active fire.
- Those on scene made timely, accurate calls during and after the deployment.
- The Thirty-Mile Abatement Plan was an active part of Incident Management Team operations.

### **Difficult challenges faced:**

- The amount of information required after the deployment was exorbitant.
- The language barrier between the investigators and the crew made it more difficult to identify what happened.
- The stigma associated with fire shelter deployment made it hard to overcome fear about the possible outcome of the investigations.

### **Training curriculum changes, additions, or deletions:**

- Redefine and educate about the roles of Division Supervisor and Hotshot Superintendent in dissemination of information, span of control, etc.
- Provide more training about investigation processes – SAIT versus OSHA, the SafeNet process, and the Lessons Learned process.
- The fire shelter pamphlet describes situations in which a shelter may be used in a precautionary deployment:

“While the fire shelter is considered a last resort, it can also protect you from embers or thick smoke. You should not hesitate to use your shelter to protect yourself. Do not worry about the cost of the fire shelter – your safety is always the highest priority.”

Evaluate the possibility of adding this precautionary deployment to the Proper Use of a Fire Shelter training.

**Unresolved issues:**

- Multiple investigations resulted in conflicting findings and interpretations, confusion of roles among both investigators and those involved in the incident.
- Contract crew administration and qualifications continue to be an issue.
- There is a need to review and define the appropriateness of deploying fire shelters under conditions other than “last resort,” and/or define levels of investigations.
- There is a need for mentoring and training about protocol for Incident Management Teams to re-engage or disengage after a serious accident.

[Read the complete Lessons Learned Report](#)