



*Knowledge management is getting the right information to the right people at the right time.*

### In This Issue

Page 1  
**Southern California 2003**  
 Strategy and Tactics  
 Lessons Learned

Page 4  
**Crew Bosses**  
 Lessons Learned

**Lesson Learned** – An innovative approach or work practice that is captured and shared to promote repeat application. A lesson learned may also be an adverse work practice or experience that is captured or shared to avoid recurrence.

**Best Practice** – A process, technique, or innovative use of resources, technology, or equipment that has a proven record of success in providing significant improvement to an organization.

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## Southern California 2003



### Strategy and Tactics Lessons Learned

*This edition continues with excerpts from the Lessons Learned Information Collection Team report from the Southern California Wildfires. To view the full report go to: <http://www.wildfirelessons.net/ICTs.htm>*

### Strategy and Tactics

This section identifies some of the lessons learned regarding strategy and tactics as described by the interviewees.

#### Adapting Strategic Thinking

Almost all respondents reported that adapting their thinking presented their biggest challenge. The situation required people to quickly grasp the enormity of events, improvise solutions, and adapt tried-and-true tactics or standard operating procedures for a new and evolving situation.

Most leaders stated they did not think far enough ahead at the start, and they felt as if they were “behind the power curve.” The situation was so dire that respondents at all levels reported feeling “provoked”

into wanting to take immediate action without keeping the big picture in mind. Several senior leaders reported that under these circumstances, they were prone to *tunnel vision* and consequently did not think about contingencies and alternatives. Many senior leaders stated that going out of their way to seek the ideas of peers and subordinates helped maintain discipline and keep the focus on the big picture.

Respondents said that the most significant lesson was that, whether you are a single resource or an Incident Management Team (IMT), one must have a well thought out plan before engaging in the interface. Ingress, egress, trigger points, and contingencies are critical factors to both survival and success.

#### Summary of Lessons Learned — Adapting Strategic Thinking

- Leaders at all levels said that collaborating with and seeking input from others to maintain a focus on the big picture helped combat tunnel vision and the tendency to narrow focus in high-stress situations.



- Remaining emotionally detached and trusting doctrine, training, and experience to guide decisions was a key theme leaders related. Conducting proper size-up and planning were even more important during the chaotic and extreme circumstances before engaging.
- Leaders said it helped their focus to think about the opportunities the situation presented, and to impact what they could with what resources were available.



### Structure Triage

When the fires surged through the Wildland Urban Interface (WUI), well into the urban environment, firefighters said they had to shift their thinking from triaging individual houses to evaluating entire city blocks.

Firefighters created anchor points by taking advantage of neighborhoods with relatively few exposed structures. Municipal and county firefighters said that pre-incident planning provided valuable information that enabled them to make quick decisions about which structures or neighborhoods were defensible and where they might make safe, effective stands in their local areas.

### Summary of Lessons Learned — Structure Triage

During these fires, thinking on structure triage shifted from individual structures to entire neighborhoods and communities. Pre-incident planning saved time in determining defensibility and viable locations to establish anchor points.

- In general, 10 to 20 percent involvement was the trigger point for firefighters to abandon an individual structure and concentrate on protecting neighboring structures.
- Firefighters had to concentrate efforts on areas where defensible space had been created; little effort was justified in areas without these preparations.

### Structure Protection Branches and Groups

Respondents reported effective results from organizing into structure protection groups and branches rather than divisions in WUI areas.

On several incidents, leaders established a structure branch contingency plan that they were ready to implement when the fire reached certain trigger points. They reported that having this contingency plan, with resources pre-assigned, saved valuable time when fire conditions demanded a shift in strategy or tactics.

### Summary of Lessons Learned — Structure Protection Branches and Groups

- Structure protection resources in the WUI were more effective when organized into functional groups committed to a zone defense, and were delegated the responsibility to act within these areas.
- Contingency plans for establishing structure protection groups and branches were most effective when made early. Most trigger points to initiate implementation did not allow enough time from recognition to when the group needed to be functioning.

### Strike Team Organization

Five-engine strike teams were very effective when making a stand or holding the fire at the perimeter of a neighborhood. However, respondents indicated that, inside urban areas, two-engine teams were more effective.

Strike Team Leaders found that single engines with three person crews were stretched thin when the flame front moved into urban areas and engine crews had to deal with several homes at once, and that safety margins and crew effectiveness were reduced. In some cases, agencies had people available but lacked engines, so they supplemented engine crews, staffing engines with up to eight people. Respondents reported excellent results using this technique. It allowed teams to effectively run four hose lines and use a master stream device without compromising Lookouts, Communications, Escape Routes, and Safety Zones (LCES).

Some firefighters reported that using a task force of four engines paired with a dozer and a water tender worked better for structure and community protection than four engines alone or a dozer alone. Firefighters also reported that, at times, Type 1 engines were assigned to strike teams operating in WUI areas with small narrow roads and minimal turnarounds. They felt this was not effective, and that Type 1 engines were better suited for assignments in urban areas where firefighters could take advantage of their ability to deliver water from hydrants at high volume.

### Summary of Lessons Learned — Strike Team Organization

- The standard strike team configuration was effective in wildland areas — when holding line or making a stand. In urban areas, two-engine teams worked well. Augmenting engines with off-duty structural firefighters increased the effectiveness of engine crews. Type 1 Engines were less effective in WUI areas with narrow access and turnarounds.
- Strike teams ran into span of control problems when the captain tried to function as part of an engine crew and the Strike Team Leader (STEN). If a STEN is not available to lead and supervise an engine strike team, the strike team should be disbanded and the engines re-assigned as single resources.

## Bump and Run versus Anchor and Hold

Most respondents indicated they initially defaulted to their preferred tactics: structural firefighters headed for the fire's origin, while wildland firefighters tried to find an anchor and start perimeter control.

When fires entered urban neighborhoods, many firefighters said the bump and run tactic proved ineffective. In more densely populated urban neighborhoods, firefighters reported that intense radiant heat emanating from involved structures was more of a threat to surrounding structures than flame impingement or ember attack.

Some municipal and county departments reported that they adapted by implementing a tactic they called *anchor and hold* or *temporary anchoring*. These firefighters switched to using hydrants and 2 ½ inch hose and lower flow nozzles in order to pump enough water to cool involved structures in enough time to stop radiant heating or flame impingement on neighboring houses.

To avoid over-commitment to any single area, mitigate this risk, they made additional effort to maintain LCES and they remained highly mobile by laying out minimal hose and abandoning it or dragging it from location to location. This effort enabled firefighters to remain mobile enough to react to new spot fires. Respondents who used this tactic said it was extremely effective, and they felt it combined the best of wildland doctrine with the additional capabilities of structural engines. They cautioned that a reliable water supply and pressure is required to make the mobile anchoring tactic effective.

### Summary of Lessons Learned —



## Bump and Run versus Anchor and Hold

- Bump and run worked well in the WUI but became ineffective in the urban neighborhoods where multiple structural spot fires and intense radiant heat was more of a threat than flame impingement or ember attack.
- Traditional hydrant use was ineffective because crews tended to get over-commit to one area for too long. A mobile

system of temporary anchoring was more effective in dense, urban areas.

- Temporary anchoring required increased attention to LCES. The potential for over-commitment was mitigated by limiting the amount of hose used based on available crewmembers.
- To be an effective tactic, temporary anchoring requires a reliable water source and adequate water pressure.
- Explore the idea of encouraging homeowners to purchase and store barrier products on their property for fire department use.

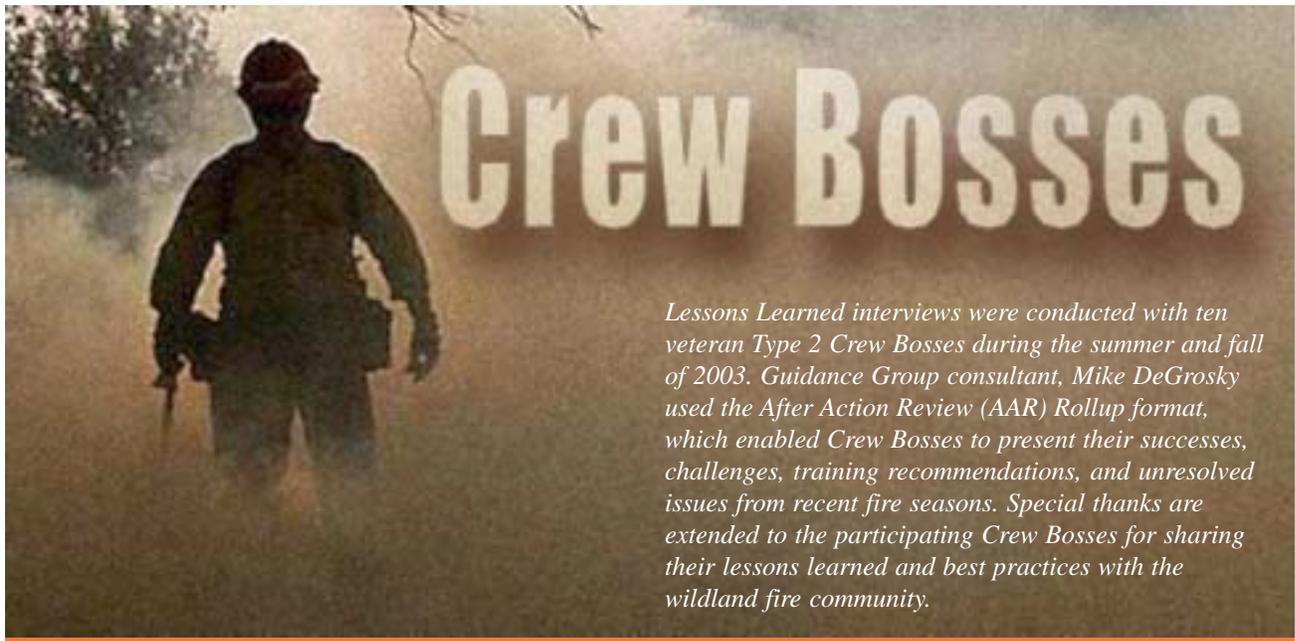


## Residual Fire

Firefighters reported that after the flaming front passed, some units were ordered to *bump and run*, reposition, or fall back to attack again further downstream. Houses were watered and foamed per standard operating procedure, but several later burned. Respondents indicated that the losses would have been reduced or prevented if they had been able to leave some units behind to patrol. Firefighter effectiveness was increased when a small task force of engines and crews focused on residual fire and command vehicles or observers patrolled and identified potential problem areas.

### Summary of Lessons Learned — Residual Fire

- Many structures were lost when resources were not assigned to patrol for residual fires while using bump and run tactics in the WUI. Assigning field observers to patrol and report problems, using a smaller task force to deal with residual fires was effective.
- Leader set trigger points for patrolling resources to rejoin the main effort after an appropriate amount of time. ★



*Lessons Learned interviews were conducted with ten veteran Type 2 Crew Bosses during the summer and fall of 2003. Guidance Group consultant, Mike DeGrosky used the After Action Review (AAR) Rollup format, which enabled Crew Bosses to present their successes, challenges, training recommendations, and unresolved issues from recent fire seasons. Special thanks are extended to the participating Crew Bosses for sharing their lessons learned and best practices with the wildland fire community.*

## Lessons Learned – Achieved Successes

### A Well-Prepared Crew

One Crew Boss felt that their most notable successes stem from the ability to take crewmembers very new to fire and train them to perform as part of a cohesive crew. This meant taking new firefighters from the Lake States region, often on their first fire assignment, and properly preparing them to fight fire in unfamiliar environments of the Western United States.

The **lessons learned** included:

- Generate enthusiasm among the crew. People learn, retain lessons, and are positively influenced in the long term when their trainer is enthusiastic.
- Use mentors on the crew. Have experienced crewmembers train the less experienced ones.
- Allow crewmembers to make mistakes from which they can learn. Never compromise safety, for training. However, when appropriate, allow crewmembers room to figure out situations on their own, providing guidance as necessary.
- When you identify rookie crewmembers and those with previous fire assignment experience doing a task incorrectly, exercise patience and open-mindedness. When correcting their performance, keep in mind that even a more experienced firefighter may have been taught an improper method to complete a task.



- Many firefighters lack a “big picture” understanding of the Incident Command System (ICS) because they have only been exposed to the introductory ICS modules. While on an assignment, take the time necessary to explain how your crew integrates into the overall ICS structure.

### A “People” Job

A Crew Boss with 11 years experience observed the evolution of Type 2 crews from Forest Service regulars with abundant experience to “pick-up” crews that might include a mix of multi-agency personnel and casuals. This Crew Boss believes he has avoided the issue of underperforming crews and major injuries via their ability to bring a crew together, get them focused on safety, doing a good job, and the importance of obtaining a respectable crew rating.

The interviewed Crew Boss emphasized the importance of approaching the Crew Boss position as a people job, a common theme among the Crew Bosses interviewed.

In the course of performing this people job, this Crew Boss learned **several lessons** about being a superior Crew Boss:

- Assess your crew at the start of the assignment and optimize use of your resources. Know who has experience and whom you can look to for assistance. Delegate tasks to those who are capable of performing them.

- Select Squad Bosses who can lead by example, and as the Crew Boss, you must also lead by example.
- To succeed as a Crew Boss, a person has to enjoy working with people and seeing a team come together. Critical tasks include helping people to develop, and creating an environment that allows the formation of a cohesive team that can continually learn. An effective Crew Boss must recognize and accept that they typically work with a diverse group of people with different talents, skills, personalities, and backgrounds.
- In summary, they said the key ingredients to a positive Crew Boss assignment are: (1) a good attitude, (2) selecting a core of experienced Squad Bosses and crewmembers whose skills and knowledge you can rely on to help guide the less experienced crewmembers, (3) having as part of your own resume a variety of Crew Boss assignments and experiences to draw upon, (4) maintaining a positive crew atmosphere, and (5) handling attitude and discipline problems immediately and firmly.



### Taking Initiative and Providing Leadership in a Deteriorating Situation

A Crew Boss with 15 seasons of experience noted that a defining personal success and lesson learned occurred during a 1995 wildfire in Alaska when, during an extended attack, resources were scattered and the radio communications network became overloaded. This Crew Boss noted the confusion present and took the initiative to help sort out the situation. This was accomplished by directing personnel to various alternative and available communication frequencies, which lessened the then existing state of confusion.

As a result of this experience, they identified the following **lessons that they continue to share** with others in leadership positions:

- Line firefighters must understand more than just the operations function of the Incident Command System (ICS.) They need to understand the basics of logistics, dispatching and other ICS support functions so they can avoid or resolve problems while contributing effectively in a dynamic situation.
- Crew Bosses need to constantly view the big picture to “make life easier” for everybody, not just the operations personnel.

- If direction is lacking, take initiative and help sort things out if the situation warrants. Remember, mass confusion compromises safety. Someone must be immediately viewed as in charge, whether it is given or assumed authority.
- Control objectives are not necessarily achieved by throwing everything at a fire (assigning all available resources). Assign only those resources that can be supervised within the effective span-of-control of safe operations. Unlimited, but uncoordinated use of operational resources does not generally serve to achieve the control objectives and may ultimately hinder operations and safety.
- Do not make the mistake of requiring all personnel to remain on the command net with the idea that the Fire Management Officer can hear what is happening. This action usually complicates command because the communication channel becomes jammed. To help alleviate overuse of the command channel, this Crew Boss noted the importance of managers trusting their operations personnel and appropriately delegating responsibilities as is delineated under the ICS organization.
- Lastly, remember that Bendix King radios are blocked from being programmed for “Victor” (air to air) frequencies. Therefore air units should prearrange and coordinate an overlapping radio guard frequency with other fire resources on which they can communicate.

### Turning a Crew Around

One Crew Boss has always worked with “pick-up” crews on fire assignments. Not unlike other Crew Bosses interviewed, they said their greatest satisfaction comes when they take a group of diverse people and incorporate them into a cohesive unit by the end of the assignment.

This Crew Boss recalled an assignment where they were assigned as a single resource to a California On-Call (OC) crew, composed of members of seven Native American tribes. Most of these crewmembers came from at-risk communities or tough neighborhoods. Among the crewmembers were individuals with criminal records, or who had negative histories with each other. This Crew Boss said they quickly identified three unproductive members who were “sandbagging” and creating additional problems within the crew. The Crew Boss promptly removed these three from the crew and then gave abundant support and reinforcement to the remaining crewmembers, including putting an extensive effort into resolving internal conflicts. The Crew Boss indicated that “once these things were in place, the work part was easy” and the crew became an extremely productive unit.

Some of the **key lessons** the Crew Boss learned from their supervision of pick-up crews included:

- Work with your Squad Bosses to ensure they are doing their job correctly.
- Squad Bosses are key to a Crew Boss’s success at maintaining an effective span of control.
- Take the necessary time and effort required to resolve

conflicts with the crew. If ignored, these conflicts will only worsen.

- Know when to be strict and take action including discipline, but also recognize when the crew is working hard and encourage them by showing your support.
- Reinforce positive crew performance after they have put forth a strong effort by complimenting their effort to the Division Supervisor in front of the crew.
- Finally, stay focused, remembering you are there to perform a job and get that job done.



## Lessons Learned – Overcoming a Challenge

### Creating a Cohesive Team

One Crew Boss observed that the greatest challenges they faced resulted not from the nature of the fire assignment work, but from the challenge of dealing with the variety of personalities on a 20-person crew. Here again, this Crew Boss spoke of the time-consuming task of bringing those personalities together into a cohesive team.

This Crew Boss believed they were able to **overcome these challenges** by:

- Focusing on bonding and relationship building as part of crew development
- Maintaining personal space while still providing personal attention and a personal touch with the crew, thereby treating crewmembers as both individuals and part of a team.
- Recognizing the need for personal attention and addressing personal problems while maintaining privacy. Providing opportunities for crewmembers to discuss personal issues by making the crew aware of the Crew Boss' own personal schedule and routine. For example, after the daily After Action Review (AAR) may be a good time for a crewmember to talk with the Crew Boss.
- Maintaining overall situational awareness by

stepping back to look at the “big picture”. The Crew Boss must emphasize to the crew why they cannot be a worker and still maintain situational awareness for the entire crew.

- Using the diversity within the crew to learn, such as picking up foreign language skills or technical knowledge from those on the crew who possess a skill you lack.
- Understanding that long-term crew development takes time. Never be in a hurry, because this is a process that can take years, and involves a degree of natural evolution.
- Developing leaders by constantly encouraging them to move up the ranks, starting at the apprenticeship level. Promote an atmosphere of confidence and build the desire for crewmembers to advance onwards.

### Maintaining Control

On a 2001 Washington wildfire, a crew was backfiring in grass and scattered conifer forest to protect structures. The fire unexpectedly began advancing rapidly on the structures, pushed by 20+ mph winds. The well-briefed crew had previously identified their escape routes and safety zones. However, the fire jumped the line, cutting off a squad of 10 firefighters from their escape route, including this Crew Boss who was a squad boss on this assignment. While the major threats facing the 10 firefighters were heat, smoke, and the ember shower, the firefighters had enough time to burnout and enlarge a safety zone, incorporating a large piece of equipment. These actions allowed the firefighters to avoid the need to deploy their fire shelters. There were several first

time firefighters in the squad. Several squad members became frightened and some wanted to run for it. The Squad Boss was able to keep the entire squad safe by keeping the group together and calming them down by explaining what to expect, and thereby preventing rash decisions.

The Squad Boss feels their lessons learned from this event are particularly important today. He outlines these **lessons learned** for others to use:

- In entrapment situations, *maintaining control* is paramount. The entrapped Squad Boss continually talked to the squad members and kept them informed of what was happening. They also encouraged constant communication to whatever degree was possible during the incident. Constant communication and keeping people informed they felt was essential to maintaining control. In addition, constant communication via radio with overhead can also be helpful in keeping people calm because they know that others are aware of the situation.



- In an entrapment, as the leader, you must *remain calm* yourself at all times. You will be most effective when you talk and act calmly since the crew is watching your behavior for cues.

- Recall how it was to be a new firefighter lacking experience on fires as well as lacking understanding of fire behavior and fire potential. Keep crewmembers informed and address their fears to help calm them.

- A Critical Incident Stress Debriefing (CISD) for entrapped personnel is very important. In this entrapment, none was offered and little attention was given to the event or the involved personnel. The Crew Boss and Squad Bosses took it upon themselves to involve the crew in a substantial debriefing in the absence of a formal CISD.

## Crew Safety and Welfare

Another Crew Boss indicated that the greatest challenges lie in ensuring the safety and welfare of the crew. Like many other experienced Crew Bosses, this individual agrees that it is important to approach the Crew Boss position as a “people skill” position.

According to this Crew Boss, **to meet crew safety and welfare** a Crew Boss must:

- Continuously monitor the crew circumstances and maintain overall situational awareness.

- Constantly review and ensure adherence to tactical safety doctrine such as the 10 Standard Firefighting Orders, 18 Watch Out Situations, Lookouts/Communications/Escape Routes/Safety Zones (LCES) and downhill line construction guidelines. An excellent source to keep with you at all times is the January 2004 edition of the Incident Response Pocket Guide (IRPG) – [http://www.nwccg.gov/pms/pubs/IRPG\\_Jan2004.pdf](http://www.nwccg.gov/pms/pubs/IRPG_Jan2004.pdf).

The IRPG is PMS #461, NFES #1077, January 2004.

- Make sure the Squad Bosses are accounting for their people at all times.
- Stay focused on bringing everyone back from every assignment safely. This principle should drive all decisions that affect the crew.
- On a fire assignment, draw on day-to-day supervisory experience and skills from your regular duties back home and put them to use.

## Developing Crew Cohesion

Another Crew Boss stated that their biggest challenge was to figure out how to develop crew cohesion quickly in the short-term environment that two-week fire assignments offer. They have seen failures in this area that they believe is an inherent high risk in a system that often puts crews together “on the fly.”

Their experiences have taught them to **reduce this risk and enhance crew cohesion** by:

- Immediately assembling the crew to “meet and greet” when the crew first gathers at the mobilization center and before getting on the plane or bus. They also

use this time period to assess individual crewmembers experience level.

- Establishing a crew structure and stick with it throughout the assignment. The Crew Boss must not just be another one of the crewmembers. It is not the Crew Boss’ job to fit in with “the guys.” The crew needs to know that the Crew Boss is in charge, and has the final word from the beginning of the assignment.

- Recognizing that cohesion builds after people get to know each other, and that this in turn builds relationships. The process of building cohesion usually takes several days of working together. Seek ways to build relationships early and quickly. One technique that works is to have crewmembers pair with an unfamiliar crewmember during transportation to the incident. Let them know that they will be responsible for introducing their partner to the crew,



and ask them to learn several things about each other during the ride. Assemble the crew after arriving and have each crewmember introduce their partner, relating to the rest of the crew what they learned about that crewmember.

## An Important Developmental Position

After completing the Position Task Book and trainee assignments, some Crew Bosses do not acquire much actual Crew Boss experience before becoming a Strike Team Leader Crew (STCR). The same is sometimes true when people progress from STCR to Division or Group Supervisor. Consequently, there are individuals in these overhead positions who do not fully understand and appreciate the challenges of getting 20 people onto the line every day. This often makes for unrealistic expectations.

The **lessons** this experienced Crew Boss has learned include:

- A Crew Boss needs to communicate, work and negotiate with the Strike Team Leaders and Division Supervisors. Help the operations overhead to understand the crew’s capabilities. Therefore, the Crew Boss has to be honest and up front in their conversations with the overhead about his crew’s abilities or shortcomings.

- Interagency Type 2 crews are much more complex and difficult to supervise than single agency crews. Challenges include variable levels of training, differing expectations, conflicting approaches to conduct and ethics,

standards that differ, and the multiple agency paperwork compliance requirements that can tax the Crew Boss' ability to supervise.

Make use of the resources that the Incident Management Team and the home unit provide to help resolve personnel issues. Know whom to seek help from at the incident and use them when needed. The Crew Boss, when properly supported, does not need to try to resolve more complex personnel issues on their own.

A mix of agency personnel and Administratively Determined (AD) hires can work, but the Crew Boss must really make it work. The Crew Boss does this by setting a tone that encourages crew cohesion.

## Training Curriculum Recommendations

### Qualification and Certification

Several experienced Crew Bosses noted a negative impact since Crew Boss and other Single Resource Boss qualifications have been separated in the NWCG Wildland Fire and Prescribed Fire Qualification Guide (310-1).

They have observed that this change enables personnel to cross relatively easily between aviation, engine, handcrew, and dozer functions at the Single Resource Boss level. They have also found this to have generally weakened the training, experience and quality of Single Resource Bosses (i.e. dozer boss, engine boss, felling boss.)

These veterans maintain that Crew Boss represents a crucial developmental position and that performing as a Crew Boss represents a critical skill building experience. It was stated that personnel are advancing into overhead positions with little or no crew experience. They believe to correct this, all Single Resource Bosses should be required to first serve and to build multiple dispatch experience, as a fully qualified Crew Boss. Consequently, they expressed concern over what they see as a possible flaw in the NWCG 310-1 and recommend the qualification standard be re-examined.

These experienced Crew Bosses cited a pattern of units mistakenly determining that their personnel are fully ready to move to the next level of training and operations before receiving adequate experience in the Crew Boss position. Some Crew Bosses related the situation to a developing trend in which both individuals and agencies are treating the Crew Boss position as just a qualifications system step and not the critically important

supervisory position and developmental opportunity it actually is. According to many of the Crew Bosses interviewed, there exists a need to establish accountability across all NWCG associated agencies to ensure honest and consistent completion of training and task books before red card endorsements are issued. Finally, these Crew Bosses felt that the key to Crew Boss success lays in the availability of high caliber Squad Bosses. Therefore, it was their opinion, that it is incumbent on NWCG agencies to put considerably more effort into Squad Boss training and development.

## Unresolved Issues and Recommendations

### Training and Certifying Contract Crews

Several Crew Bosses raised the issue of working with contract resources, a topic they regard as a major safety concern. These Crew Bosses recognized that contractors are part of the reality of modern wildland firefighting and acknowledged that they have had the opportunity to work with some good contract crews. However, they generally regard the training, experience, and qualifications of contract resources as a significant safety issue that the agencies are not adequately addressing in a proactive manner.

They report encountering contract engine and crew resources carrying red cards listing appropriate qualifications, which are actually under trained and too inexperienced to hold these qualification endorsements. Consequently, these veteran firefighters report that agency personnel are working side-by-side with contract personnel who do not understand fire behavior and operate with a sense of fear. These inexperienced resources, justifiably afraid due to a lack of experience, behave indecisively on the fireline. This compromises everyone's safety.

Some Crew Bosses believe that the growth of contract resources requires an increasing need for quality overhead and crew performance monitoring. They have also noted a trend where contract resources are willing to do what is needed, but initially do not know what to do, and wait for direction before taking action. The Crew Bosses who raised this issue recommend that the agencies require contract resources to meet the same standards as agency resources, require more training (and accountability for that training) and demand accountability for experience requirements. ★

*Editor's note: Under the current NWCG 310-1 standards, contract resources are required to meet the same standards as agency crews.*

