

# Night Shift

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For most of the general population, their concept of wildland fire suppression is fashioned by the sights they see on their nightly news broadcasts, or by the photos on the front page of their daily papers: air tanker and heavy helicopters, dropping retardant, foam or water on an actively burning fire, with flame lengths exceeding 20 feet, and dark gray smoke clouds billowing in the background. Occasionally ground pounders are seen, but are often either mopping up, or watching air operations from afar.

Although its not generally publicized in the popular media, most experienced fire fighters know that the best time to make significant gains against a wildfire is when the temperatures cool down and the humidity rises: after the sun goes down, on the Night Shift.

More correctly called the Night Operational Period under the Incident Command System (ICS), night shift has long been recognized for the tactical advantages it offers firefighters, but also for the increased risks to their safety, nearly all related to the greatly reduced visibility. During the 1990's, vast areas of American forests that had extensive stands of timber that were suffering the effects of major forest health problems, from both insects and diseases. The resulting dead trees and snags became a serious hazard, often falling silently with little or no warning for the firefighters working below them. As a result of these risky conditions, night operations on many large wildfires were either eliminated, or staffing was significantly reduced from those on the fireline during the day operational period. These decisions were criticized by some in the private timber companies and some state forestry personnel, but were widely practiced by most incident management teams throughout the 90's. The last few fire seasons have seen an increased use of the Night Shift, and so it seems like a

good time to take a look at the benefits, risks, and consider some recommendations to increase safety when folks are on the line at night.

## **Why Work Nights??**

As mentioned earlier, there are some definite benefits to fighting fires at night under most situations: the temperatures are lower, the relative humidity rises, the fire behavior is less active, and there are better opportunities to "go direct" against the fire's edge than usually occur during the peak of the burning period. Being on the line at night also allows us to pick up the spot fires and slopovers that might go unnoticed and cause problems the next day. Mop up is made easier too, since open flame and the glow of burning embers are more easily spotted in the dark. And if burnout operations are in your plan of action, nighttime is frequently the best, and safest, time to pull it off.

All in all, a lot of benefits to being out at night.

But, for all the benefits of fighting fire at night, there are few references in any of the widely used fire publications that address the unique conditions that firefighters will face. The Fireline Handbook (PMS 410-1) has one brief paragraph in the "Safety" section that talks about night operational periods. The "Watch Out Situations" have several items that both directly and indirectly reference night operations: "in country not seen in daylight" (#2); "safety zones and escape routes not identified" (#3); and "taking a nap near fireline (#18). The Incident Response Pocket Guide (PMS 461) is silent on night operations.

## **Risks at Night**

So, if working the night shift has all these benefits, why was its use seriously curtailed in the 1990's? It seems like its far more desirable than sweating your butt off in the heat of the day, only to see the fire take off running across your control lines under conditions of high temps and low RH's.

Unfortunately, there are a number of "downsides" to extensive night operations, nearly all relating to issues of firefighter safety.

First, there are the unseen dangers mentioned in the opening: falling snags, widow-makers, and rolling rocks are always a risk, and can cause serious injury or death to a firefighter. While these dangers are present during daylight hours too, there is at least some possibility that folks on the line can spot them and respond in enough time to prevent injury.

Darkness also prevents us from seeing the clouds and the smoke column, both critically important in judging changes in the fire weather and fire behavior. Besides not seeing the clouds and smoke, the darkness also makes it more difficult to accurately assess the fire's location on the landscape, especially in such critical areas as drainage bottoms. And don't always count on the fire laying down at night, either: "thermal belts" burn actively in many mountainous areas, spreading rapidly, spotting and torching under some circumstances.

Air operations, an important part of our fire suppression workforce, are totally out of the picture during the hours of darkness on the night shift. Helibuckets, air tankers, lead plans and Air Attack are unable to help out, both with their fire suppression missions, but equally critical by serving as our "eyes in the sky" to spot hazardous conditions that are not visible from the ground.

Posting lookouts is also much less effective, since distances and locations are much more difficult to judge in the dark. In addition, crews working under a timber canopy may not be visible to a lookout, even if headlamps are being used. And while lookouts are having a hard time spotting firefighters, those folks on the ground may have a difficult time keeping track of their escape routes and safety zone location under nighttime conditions.

Equipment operations on the night shift, by their very nature, are more limited and more dangerous: falling trees at night is eliminated, and limbing and bucking operations become riskier because of the limited light provided by headlamps. Dozer operations, especially in broken terrain or around crews, must proceed at a much slower pace. The lighting kits available for dozers allow good visibility to the front, but extreme care is needed when backing up or pushing over trees and brush. The Dozer Boss is especially

vulnerable to accidents, and extreme care must be taken to insure visibility with the dozer operator at all times.

Movement of engines, crew carriers and overhead vehicles takes on an increased risk in darkness, especially when combined with narrow, smoky, dusty and winding roads. Our record of vehicle accidents over the past 10-15 years is filled with close calls, injuries and fatalities that have occurred under just such conditions. The July 2002 accident on the Stanza fire in Northern California that killed three U.S. Forest Service engine crewmembers was a recent example of how risky night driving on fires can be. The 72-hour Expanded briefing on the accident referenced a narrow road, smoke and dust, and reduced visibility in the early morning darkness (2:00 AM).

Another serious safety hazard of the night shift is receiving more attention in recent months: Fatigue. Perhaps one of the more insidious hazards of working the Night Shift, fatigue has the potential to affect safe operations in a number of subtle, yet potentially deadly ways. Human beings, by our very nature, have evolved in to creatures that are best suited to functioning best in conditions of full daylight. When we take folks who have been working in that environment for extended periods, and then assign them to strenuous and demanding work activities on the Night Shift, there is a risk that they'll not adapt and function at their full capacity. This is especially critical in a wildland fire setting, where the ability to recognize and respond to a variety of ever-changing conditions can be the difference between success and failure, safety or accidents.

The impacts of fatigue are compounded by the "normal" way of doing business on wildfires: individuals or crews are called to the fire late in the workday or in the evening hours; travel to the fire area often occurs in hours of darkness, and then assignments are made to the Night Shift. This necessitates the dreaded "day sleeping". Since most incident base camps and spike camps don't offer motels or other indoor sleeping facilities, the individuals assigned to the Night Shift must use their individual tents, or under group sleeping tarps; both are usually set up in areas of full sunlight, and too often in areas impacted by the ongoing daytime activities of a fire camp. Quality and quantity of sleep are both less than desirable.

The July 2001 "Thirtymile" fire fatality investigation report referenced a 1998 study that looked at the loss of a single night's sleep. It reported that

"...25.1 hours of wakefulness impairs decision-making and vigilance to levels comparable to a blood alcohol content of .10, suggesting that moderate levels of sustained wakefulness produce performance (impairment) equivalent to or greater than those observed at levels of alcohol intoxication deemed unacceptable when driving, working, or operating dangerous equipment." More simply put, when you're sleep deprived, your performance degenerates to a level that would get you arrested for Driving While Intoxicated (DWI) in many States. Long night shifts, with reduced hours of quality sleep, can cause serious safety concerns after only a few operational periods.

The last safety concern about night shift operations comes into play in the event that someone is, in fact, injured on the fire and requires medical evacuation: the same darkness that limits our use of tactical aircraft for fire suppression becomes even more critical in that we are unable to count on helicopters to evacuate the injured to a full-treatment medical facility in a timely manner. Extracting an injured firefighter from the fireline in an area of steep slopes and narrow trails is difficult at best, but the difficulty is compounded by darkness. If the Night Shift is planned, the Medivac Plan must consider the limitations of helicopters in addressing emergency evacuation.

## **Working Safe on the Night Shift**

We've looked at the pro's and con's of the night shift, and the potential safety concerns that arise whenever folks are fighting wildland fire in the dark. Do we charge ahead with business as usual? Or, do we pull back into the relative safety of the incident base camps, and give up as much as 50% of the time available to us for suppression actions? Like most of the problems we address in wildland fire management, the answers are not simple, and very seldom lend themselves to a black or white solution: the practical solution most likely lies in some varying shades of gray, depending upon the site specific conditions of the fire.

I do believe that the Night Shift is a viable and valuable tool for our suppression efforts, but needs some special considerations to be safely implemented:

1. A good "risk vs. benefit analysis" must be completed that verifies the need for a Night Shift;
2. Night Shift personnel must receive a good daylight orientation to the area that they will be working. This may require adjusting start times to allow for more daylight hours at the start of the shift;
3. Shorten the span of control, so that all personnel are well supervised. Consider adding an extra Strike Team Leader, Task Force Leader and line Safety Officer if needed;
4. Lower the production expectations to a reasonable level, so that compensations can be made for the greatly reduced visibility in darkness;
5. Limit "road patrols" and other unnecessary driving in darkness by engines, crews and overhead;
6. Consider options to get drivers rested when they must drive off the fireline and back into the Incident Base camp after an all-night shift;
7. Limit equipment use such as chain saws and dozers when ever feasible;
8. Set up quiet, dark "daytime sleeping areas" for Night shift personnel. This may require using a local high school gym, or renting motel rooms;
9. Use "Chem-lites" to make Escape Routes and Safety Zones visible in the dark. Be sure all personnel are briefed on the color schemes.
10. Rotate Night Shift personnel after 3-4 nights, insuring that they are well rested before transitioning to the Day Shift;
11. Increase the number and skill levels of emergency medical personnel on the line. Consider staging ambulances and Paramedics ion the field as needed.
12. Explore and evaluate the use of night helicopter operations with local "Life Flight" air ambulances, as well as the National Guard, Air Force Reserve and Coast Guard units in the local area. If feasible, pre-identify suitable night helispots, locate with GPS, and order helispot lighting kits for each location.

## **Take Back the Night**

Even in the middle of the summer when the days are incredibly long, we cannot afford to uniformly ignore the nighttime hours in our fire suppression efforts. There are excellent opportunities to safely and efficiently fight fire at night. Our safety concerns about fighting fire at night can be

addressed, and firefighters will have the chance to be highly productive while enjoying some of those classic moments on fires that are remembered long after the fire is out and the ground is covered by snow.