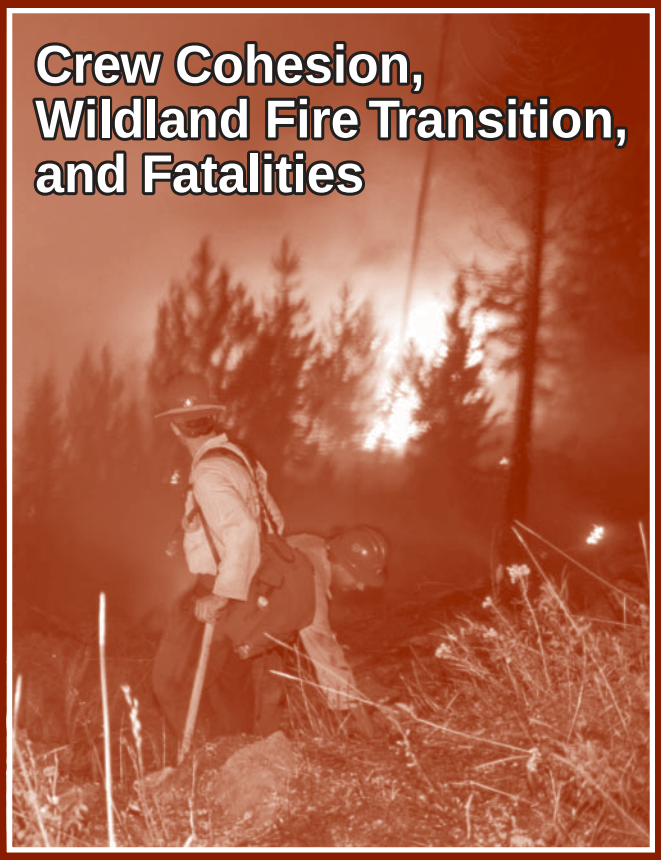
Crew Cohesion, Wildland Fire Transition, and Fatalities



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Acknowledgments

I called on Chuck Whitlock to help me write this paper. I bounced many of my ideas off him because of his valuable knowledge of the firefighting community. A colleague, Raymond Gold, reviewed drafts of the paper and made suggestions that were to the point about sharing rules and game playing. I also used data from fire investigation reports, social science publications, popular books, fire handbooks, my own reports on Forest Service work crews, and my observations while on the investigation team at the Thirtymile Fire. Several insights in the paper arose from my ongoing involvement in a project at the Missoula Technology and Development Center, *Avoiding Entrapment in Wildfire*.

From our publications shop in the center, two additional people deserve special thanks. Bert Lindler patiently worked with me carefully critiquing and editing multiple drafts of the paper. Sara Lustgraaf rallied to meet the short deadline for the paper. She did a wonderful job with the typing and layout.

Introduction

Like wildfire, my research into the topic of cohesion in fire crews sought its own direction. The topic took me into considerations of the safety of firefighters and eventually into the connection between crew cohesion and fire fatalities. I relied on numerous sources, which I have acknowledged, to help develop this paper.

The concept of cohesion, or how fire crews are or are not bonded, is woven through all four parts of this paper. In part I, I look at the role of crew cohesion in three tragic fires. In part II, I examine how the concept of group cohesion became central in sociological studies of human groups. I also discuss my studies of cohesion and safety in Forest Service field crews. The third part of the paper discusses crew cohesion during different stages of firefighting. I draw special attention to the role crew cohesion plays during the dangerous fire transition period. In the final part, I discuss some implications the paper has for future studies and for wildland firefighter training, concluding with a brief summary.

Part I—Crew Cohesion at the Mann Gulch, South Canyon, and Thirtymile Fires

Cohesion and Fire Crews—A Long-Standing Concern

Experts who have studied why people died fighting wildfires have long noted a connection between fire crew cohesion and fatalities. Let's look at this connection in the context of three firefighting tragedies.

Intracrew and Intercrew Cohesion Problems in Three Firefighting Tragedies

Intracrew cohesion is the cohesion within a single crew fighting a fire. Intercrew cohesion refers to cohesion between different crews fighting the same fire as well as their cohesion with fire managers.

In this paper I will focus on intracrew and intercrew cohesion of the ground crews. Cohesion with fire managers is critical during fire transition, but it will not be considered here. I will use the Mann Gulch, South Canyon, and Thirtymile Fires to illustrate the dangers when intracrew and intercrew cohesion are not established before crews chase fires that blow up. Until recently, few of my studies have focused on wildland firefighting crews. I will blend my ideas on cohesion with some brilliant insights provided by Karl Weick, who wrote about the collapse of sensemaking in firefighting crews (Weick 1993, 1995).

The Mann Gulch Fire—Failure in Intracrew Cohesion

In *South Canyon Revisited* (1995), Weick compared the Mann Gulch and South Canyon Fire disasters. He points to the lack of crew cohesion in both fires. The Mann Gulch crew collapse is a clear example of the consequences of a lack of ***intracrew*** cohesion. Weick wrote:

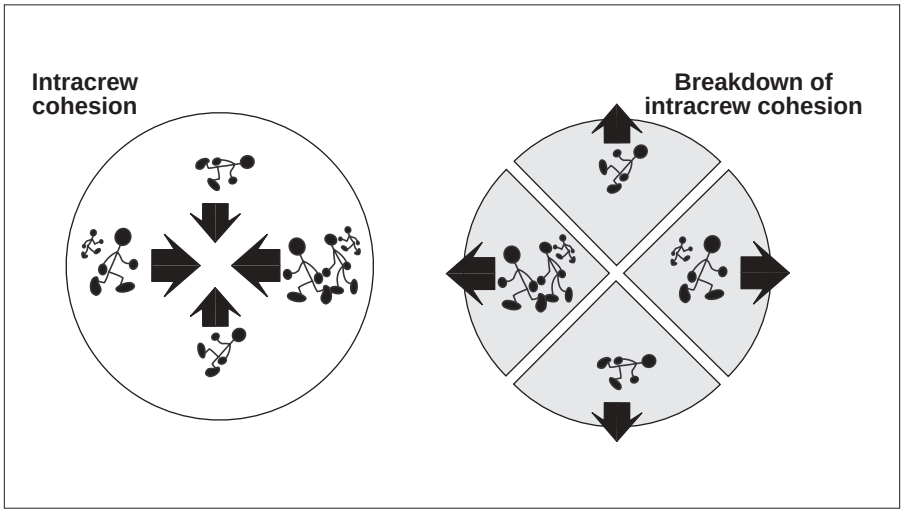
> *Since the crew did not know each other well, since Dodge knew only three of them, since several were on their first jump, and since Dodge himself was rusty on leading a crew, it was imperative to build some common understandings and common action into this assortment of strangers. That didn't happen.*

Weick, quoting from Norman Maclean's book, *Young Men and Fire* (1992), points out that the smokejumpers at Mann Gulch were probably not a crew at all. They were merely "loosely coupled" firefighters without any intracrew cohesion. Weick wrote:

> *As the entity of a crew dissolved, it is not surprising that the final command from the "crew" leader to jump into an escape fire was heard not as a legitimate order but as the ravings of someone who had "gone nuts."*

The South Canyon Fire—Failure in Intercrew Cohesion

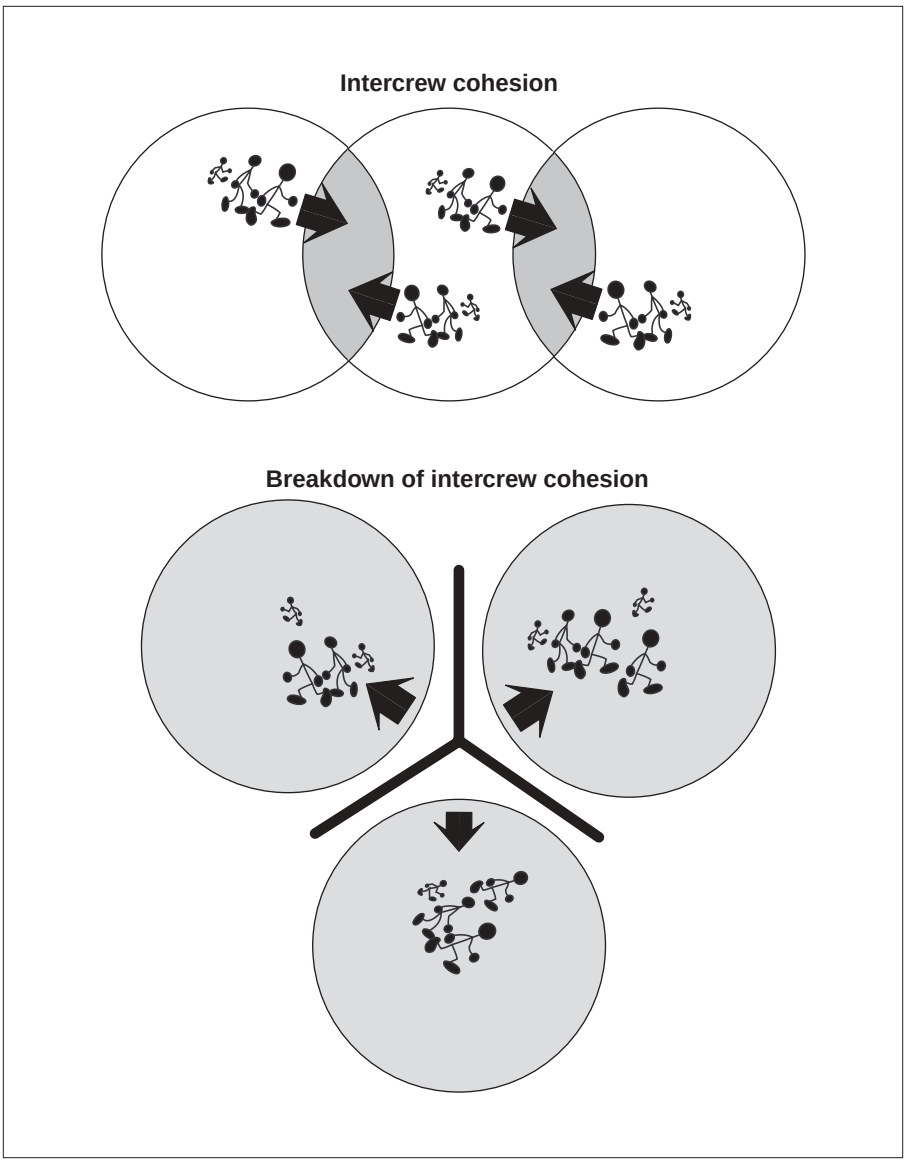
The South Canyon fire illustrates the absence of ***intercrew*** cohesion. It would be hard to argue that the Prineville Hotshots lacked intracrew cohesion. Smokejumpers and helitack crews at the South Canyon fire also probably had cohesion within their own ranks. Strong intercrew cohesion did not exist among the three crews fighting the fire. Quoting from the report of the incident investigation team (USDA Forest Service 1995):



As is typical in extended attack situations, firefighting groups arrived on the fire at intervals from dispersed locations and blended into the existing organization.

Weick focused on the word "blended," when he wrote:

The key word there is "blended." Blending sounds like something that occurs automatically, not something that people work at. Many would say it is hard to blend into an "existing organization" if that organization itself is invisible, as was the case for some people at South Canyon. Some people trying to blend did not know who the Incident Commander was, or which radio traffic had the force of authority, or what the suppression strategy was, since it seemed counterintuitive.



The Thirtymile Fire—Failure of Intracrew and Intercrew Cohesion

As one of the investigators of the Thirtymile Fire, I was able to make firsthand observations of crew cohesion. I found problems with both intracrew and intercrew cohesion. The Northwest Regulars No. 6, the type II crew that was entrapped, was made up of a mixture of two crews from two different districts. When these crews were configured into a single type II crew, they lacked intracrew cohesion.

The two crews had not trained or worked together. For the most part, they were two crews of strangers caught up fighting a fire that suddenly escaped. The type II crew boss/incident commander was unfamiliar to the Naches crew. Home crew cohesion was apparent when I found that firefighters from each of the two districts drew close to each other while they were in the "safety zone" waiting for the fire to pass.

For the most part, the crew from the Lake/Leavenworth Ranger District gathered on the road. The Naches crew, except for one person, gathered together on the rocks above the road. As the fire approached, people sought security; they wanted to be close to their trusted crew leaders and fellow crewmembers. These were the people with whom they shared intracrew cohesion. This clustering into cohesive crews explains why the four people who died on the rocks belonged to the Naches crew. The crewmembers from the Lake/Leavenworth Ranger District were on the road with their familiar crew leader.

In this tragic incident, intracrew cohesion probably saved the lives of the Lake/Leavenworth crew. They "hung together" and deployed their shelters on the road. However, the same intracrew cohesion spelled doom for the Naches crew.

Come Down Out of the Rocks—That's Not the Place to Be

Let me try to explain why I feel the squad boss from the Naches crew did not comply with "orders" from the crew boss who reportedly told him three times: "Come down out of rocks. That's not the place to be." As the type II crew waited in the safety zone, they had collective uncertainty about what whether to deploy on the road or on the rocks. Social psychologist, Karl Weick (1993), refers to such periods of extreme uncertainty as "cosmology episodes…when people suddenly, and deeply feel that the universe is no longer a rational, orderly system. What makes such an episode so shattering is that both the sense of what is occurring and the means to rebuild that sense collapse."

Weick noted that when groups are confronted by anomie (a collapse of social stability) during "cosmological episodes" they will always seek to restore a sense of control and order by falling back into their intracohesive groups and taking direction from their home crew leaders. Weick wrote about it this way:

> *"Collegial authority patterns overlay bureaucratic ones as the tempo of operations increase. Formal rank and status decline as a reason for obedience."*

The Lake/Leavenworth crew boss, in addition to being the incident commander, was also the overall crew boss formally in charge of both crews making up the type II crew. While waiting for the fire to pass, the Lake/Leavenworth crew stayed cohesive and remained near their crew boss on the road. However, in this situation, the crew boss' formal authority over the Naches crew did not carry much weight. The members of the Naches crew waited together on the rocks above the road and died with their natural intracrew leader. The collegial authority of the Naches crew leader had more legitimacy for the Naches crew than the formally assigned power of the overall type II crew boss. The Naches crew members and their leader followed the basic social rule that governs people during anomic moments (when rules governing sense-making and action collapse). During such times, people naturally seek to be in their intracohesive groups with their trusted leaders.

More Intercrew Cohesion Problems at the Thirtymile Fire

Engine Crew No. 704 and the Entiat interagency hotshot crew were also fighting the fire. There can be little doubt the engine and hotshot crews had high levels of intracrew cohesion. However, the investigation report shows all sorts of confusion regarding failures to blend their efforts into a single intercohesive firefighting unit with the type II crew.

Part II—The Discovery of Cohesion and the Welfare of People

Cohesion—A Definition

When the word cohesion is used in relation to groups, people are describing how closely tied together they are as a group. But the meaning of cohesion extends far beyond this. People in cohesive groups speak openly of themselves as "a little family." They often talk about their cohesion in spiritual and reverential ways. Members of military, sports, and work teams may use the word "cohesion" to describe a kind of intensified spiritual state of interpersonal connectedness or a special group "chemistry." When people experience cohesion in the groups they belong to, they speak as if they have been blessed with a special kind of strength that enables them to overcome great obstacles. The special strength provided by cohesion has not gone unnoticed by sociologists.

Sociologists have long used the idea of cohesion in studies of a variety of small groups. These studies have focused on cohesion in families, military units, sports teams, neighborhoods, church congregations, labor unions, street gangs, and especially small work groups. In this paper, I want to connect the idea of cohesion to wildland firefighting crews. Before I do so, it is important to discuss how cohesion became such a central concept in sociological studies.

Suicide—The Problem of Cohesion in Modern Human Groups

At the turn of the 20th century, French sociologist Emile Durkheim conducted a study of suicide (Durkheim 1897). He concluded that suicide rates vary inversely with the degree of social integration (cohesion) of people's groups. In other words, people belonging to groups with low cohesion had higher suicide rates than those who belonged to highly cohesive groups. He used the word "anomic," meaning "without rules" to describe groups with weak cohesion. His landmark study laid the groundwork for future sociological studies of cohesion in different kinds of groups.

Accidents and Cohesion in Forest Service Crews

In my studies of Forest Service field crews (Driessen 1986, 1996), I discovered that a modified version of Durkheim's proposition applied to accident rates. Accidents in field crews were inversely correlated with the cohesion in the crews. In other words, the greater the crew cohesion, the fewer the accidents. People working in cohesive field crews were fully aware that their cohesion helped protect them from dangers inherent in the work. I listened to workers and their supervisors describe work practices that fostered their cohesion. Generally they talked about the importance of staying focused on good production and how this focus depended on physical fitness, work skills, safety awareness, interpersonal harmony, and good supervision.

Perhaps the most important discovery I made in these studies is this:

> *Crew cohesion is "made" by individual workers themselves when they establish agreements about the rules that govern a host of their day-to-day work practices.*

I found that members of cohesive crews talk frankly with one another about their ongoing expectations. These expectations govern such things as work pace, rest periods, decisionmaking, humor, warnings of danger, requests for help, assistance for fellow crewmembers, complaints, sharing food, and other practical matters that bear directly on maintaining their cohesion. Cohesion, and the protection it affords individual workers, comes about only after crews have tested and negotiated acceptable norms governing their work practices. It takes time for this cohesion to develop. In my studies, I found it takes from 6 to 8 weeks for individual seasonal workers to "click" into crews. When this happened, individual workers bonded into intracohesive crews. They were filled with pride about their production and trusted one another like a "little family" (Driessen 1986, 1996).

Part III—Firefighter Fatalities and Transition Fires

Based on my recent work on fire-related projects, I have some impressions about the levels of cohesion in different types of fire crews. My impressions are in appendix A. These impressions can be used as hypotheses to guide future studies of cohesion in the different kinds of fire crews. For now, I want to focus on the importance of fire crew cohesion at the stage in firefighting when most fatalities happen. To do this, I need to briefly discuss different types of fires and different stages in fighting fires.

Types of Wildland Fires

According to the *Fireline Handbook* (National Wildfire Coordinating Group 1998), "typing fires provides managers with additional information in selecting the best resource for the task." Wildfire typing provides managers a context for determining the types of crews to assign to fires. Fires are identified as type I, II, III, IV, and V. The lower the number, the larger and more complex the fire. In other words, type I and II fires are large and complex. Type IV and V fires are smaller and less complex.

Stages in Wildland Firefighting

Each fire is also identified based on the stage of attack. The stages are identified as initial attack, extended attack, and transition.

Initial Attack Stage

The *Fireline Handbook* describes initial attack as the action taken by resources (people and equipment) that are the first to arrive at the incident. All wildfires that are controlled by suppression forces undergo initial attack. The number and type of resources responding to the initial attack varies depending on the fire danger, fuel type, values at risk, and other factors.

During initial attack, the fires are relatively small, probably type IV or V. District crews will probably be assigned to suppress a small fire. It is not unusual for the initial attack fire crew to have the support of a single resource such as a dozer, engine crew, or some sort of aircraft, (such as a helicopter with a water bucket). Smokejumpers are usually assigned to carry out initial attack on small fires in remote locations. As fires grow in complexity and size, type I crews, type II crews, contract crews, and single resources can be assigned (see appendix A for a description of the types of crews).

Extended Attack Stage

If type IV or V fires are not contained within a 24-hour work shift, or if the fire grows rapidly, the suppression moves from "initial attack" to "extended attack." The *Fireline Handbook* describes extended attack as:

> *…a wildfire that has not been contained/controlled by the initial attack forces and additional fire-fighting resources are arriving, enroute, or being ordered by the initial attack commander. An extended attack fits into the Type III incident as regards complexity.*

At this critical transition period when the fire may be expanding, often rapidly, type I crews and single resources can be requested to fight the fire. More type II crews can also be ordered.

The Ambiguous and Dangerous Transition Stage—Fire and People

The "transition stage" is confusing because the fire community uses the word "transition" in two senses. **First**, transition refers to a time when a fire is changing from a small, type IV or V fire to a much larger type III fire. In ordinary language, this means the fire has grown big. Some fires grow big suddenly. Firefighters use different words to describe this moment: blowing up, taking off, losing control, or making a run. During transition, the fire has quickly expanded beyond the capacity of the resources that were initially assigned to control it.

The *Fireline Handbook* describes a fire transition stage this way:

> *Transition from an Initial Attack Incident to an Extended Attack Incident. Early recognition by the Initial Attack IC (Incident Commander) that the initial attack forces will not control a fire is important. As soon as the Initial Attack IC recognizes that additional resources are needed or knows additional forces are enroute, the IC may need to withdraw from direct fireline suppression and must prepare for the transition to the Extended Attack.*

The **second** meaning of transition is a transfer of the command established during initial attack. As new crews and resources are assigned for extended attack, new crew bosses and a new incident commander are placed in control. They establish new strategy and tactics. The *Fireline Handbook* warns that at this transition stage, "fire crews may need to disengage from fighting the fire." During initial attack, crews are relatively organized. When the fire makes a sudden transition, or blows up, there is an urgent need for organizational controls to make a transition. Two recent studies have found that when both the fire and the firefighting organization are in transition, fire crews are at maximum risk.

Transition and Fatalities—The Munson and Mangan Studies

During the fire transition stage, the fire has grown or is growing rapidly. However, the resources, tactics, strategies, and organizational structures are not yet in place to engage the fire in an extended attack. Perhaps most importantly, inter-crew cohesion is not in place either. How dangerous is this period? A recent study, *Wildland Firefighter Entrapments* (Munson 2000), found that 43 percent of the firefighting fatalities occurred during type IV or V fires. Twenty-nine percent of the fatalities occurred during type III fires. These three types of fires accounted for 72 percent of all wildland fire fatalities from 1976 to 1999. Many of these deaths occurred when fires were rapidly transitioning or had transitioned into type III fires.

Another recent study, *Wildand Fire Fatalities in the United States* (Mangan 1999), also pointed to the danger of the transition stage. Mangan wrote:

> *The other dangerous phase of a wildfire is the "transition phase," when the fire has escaped initial attack efforts and higher level incident management teams are being brought in. During this phase some confusion may exist over areas of responsibility; locations of different resources such as crews, engines, or line overhead; or appropriate radio frequencies for tactical operations. This is often the time the fire is exceeding the capability of the initial attack.*

Mangan points to other reasons why transition stages are so dangerous:

> *Most of the burnover events occurred during the initial attack or extended initial-attack phase. This is when the firefighters are often involved in independent action, either as members of a small crew, an engine, or even as individuals. The higher levels of incident management teams are not on the scene, communication may be confused, fire weather and behavior conditions may not be widely known or recognized, and the chain of command may not be well established.*

My own observations as well as the observations from other recent studies all focus attention on the likelihood of crew cohesion problems during the transition stage in wildfires and in prescribed burns that have gotten out of control.

Part IV—Future Implications

Focus on the Money—Fires in Transition

When Jesse James was asked why he robbed banks, he supposedly replied: "That's where the money is!" If up to 72 percent of all fire fatalities occur during fires in transition, we should focus future studies and training there.

Previous recommendations to pay more attention to problems in fire crew cohesion have been very general (Putnam 1995; Tri-Data 1998; USDA Forest Service 2001). See appendix B for a more detailed discussion of these recommendations. Future work should concentrate on ways to rapidly establish crew cohesion within the contexts of different types of fire transitions.

Creating Context—Developing a Classification of Transition Fires

Initially, studies need to focus on creating a more precise language for fire crews, crew bosses, and fire managers. This language is needed by crew bosses to quickly establish intercrew cohesion before starting an extended attack. The first step in creating this language is to develop a precise classification system of the types of transition fires.

As the word is now used in firefighting, *transition* refers to very complex changing fire events as well as to changing command structures. The first task is to describe the properties of different types of transition fires. From these descriptions, a classification scheme can be constructed to provide crew bosses with a shared language. This shared language will permit them to distinguish between different types of transitions that are now lumped into one word. With new classifications of transition fires, crew bosses will be able to talk precisely. Using a common language will give crew bosses a common understanding of how to act and react together, depending on the type of transition fire they identify.

Because the present terminology used for fire transitions is not precise, individuals are free to come up with their own interpretation of the fire situation. These different interpretations make it extremely difficult for different crews and their leaders to know how to act and react collectively (with intercrew cohesion) before starting an extended attack. Studies can construct a specific typology of transition stages in wildland fires. Once this typology is complete, it needs to be taught to all firefighters, especially crew leaders and fire managers. A shared language for the different types of fire transitions will allow firefighters to place their collective actions in a common context.

Writing a Common Playbook—Connecting Context and Action

An analogy to baseball may help. All baseball players share a complex typology of baseball situations—full count, bases loaded with two outs, and so forth. These types of baseball scenarios are like types of fire transition situations. Not only do the players recognize the different situations, they also have a shared "playbook" that calls for specific strategy and tactics depending on the different types of situations. The playbook dictates when to walk a player, when to steal, or where to throw the ball. A common playbook for different types of transition fires would specify what actions to take depending on the type of fire situation. When there is a shared typology and a common playbook, even strangers can quickly play a game together.

Finding the Unwritten Typology and Unwritten Playbook

My previous studies of field crews and their supervisors demonstrate that it is reasonable to assume that the fire community already has an unwritten classification of the types of transition fires as well as an unwritten playbook. Good crew bosses use these unwritten typologies of fire transitions and the unwritten playbook to guide their actions as they establish and maintain crew cohesion when fires are in transition. Every year there are thousands of different types of transition wildfires. The vast majority of these situations are recognized and the potential crew cohesion problems associated with them are successfully managed. The successes come about because crews and their leaders are using this unwritten typology to recognize fire transitions and the unwritten playbook to select strategies and tactics.

In the physical sciences, classification schemes or typologies have to be constructed using the technical language of scientists. Birds, rocks, and trees don't have their own language. However, in cultural sciences, we can construct typologies of fire transition based on the language actually used by experienced wildland fire crews and their leaders. For this project, we can record the natural language typology actually used by crews and their leaders during different types of fire transitions (Schutz 1962). This typology can then be taught to all wildland firefighters. The playbook can be developed by recording the actions (strategy and tactics) used by good leaders during different types of fire transitions (Garfinkel 1967; Gumperz and Hymes 1972; Rose 1992; and Driessen 1997).

Simulation Training

Simulation training for wildland firefighters can be based on recognizing types of fire transitions and using strategy and tactics identified in the playbook. This training can also be designed to test future wildland fire crew bosses and managers. During training, it will be possible to determine who does or does not have the ability to identify types of transition fires and to practice using the playbook to establish intracrew and intercrew cohesion before starting extended attack (Klein 2001).

Serendipitous Outcomes

Studies of the sort described in this paper almost always produce unexpected discoveries. These discoveries will lead to exciting new solutions to current problems (Reichenbach 1953; Glaser and Strauss 1967). As studies proceed, it will be important to take advantage of these discoveries. I would expect a variety of new study proposals and policy recommendations to emerge during the course of the work. Many of the proposals will focus on ways to accelerate intracrew cohesion in the different types of fire crews discussed in appendix A.

Summary

Poor intercrew and intracrew cohesion during the fire transition stage is a major factor in wildland fire fatalities. Cohesion problems that were quite different existed in crews on the Mann Gulch, South Canyon, and Thirtymile Fires. Because of the rapid growth of such fires and the associated transition of command, it is difficult for crew bosses to create the minimally required intercrew cohesion before starting extended attack.

Sociologists know from their studies that cohesive groups are safer than groups with little or no cohesion. My studies of field crews show that during the transition stage in fires, it is unrealistic to expect different fire crews and fire managers to blend together into a single intercohesive unit. The time it takes to create this cohesion could be greatly reduced by focusing on the kinds of studies and training I have suggested in this paper.

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Appendix A—Some Impressions of Different Wildland Fire Crews and Their Cohesion

I will focus on type I and type II crews, engine crews, smokejumpers, contract crews, and single resources, as described in the *Fireline Handbook* (National Wildfire Coordinating Group 1998).

Type I Crews (Hotshots)—The *National Interagency Mobilization Guide* (National Interagency Fire Center 1999) describes type I crews as the primary firefighting force. Each crew must meet the minimum standards specified in the *Interagency Hotshot Crew Operations Guide* (Anon. 2001) These standards specify working and training requirements, experience levels, and the assignment of permanent supervisors. Because of these requirements, crewmembers are able to establish deep understandings of each other as people, work out their own internal division of labor, and learn how to fight fire together as a tightly knit crew. In most instances, one would expect high cohesion in hotshot crews.

Type II Crews—The guide describes type II crews as "any crew, which does not meet experience, financing, training, and travel requirements of a type I (IHC) crew." Type II crews are the same size as type I crews, usually 18 to 20 firefighters. A temporarily assigned crew boss often leads them. Smaller field crews from different districts are combined to make up an 18 to 20 person type II crew. These types of crews are assembled on an ad hoc basis. The smaller crews brought together to form the type II crew often have not trained or worked together on previous fires or projects. When they are assembled, many of the members may not know one another. Based on this social arrangement, one would not expect strong intracrew cohesion, including bonds to the assigned crew boss. There may be strong intracrew cohesion within the separate district crews. However, until the different crews have worked together for a while as a type II crew, their overall intracrew cohesion is probably low. Further study is needed to determine what it takes for type II crews formed from different crews to develop intracrew cohesion.

Smokejumpers—In the *National Interagency Mobilization Guide*, smokejumpers are described as a national resource. Their primary mission is initial attack. Everyone I've talked to said it would be wrong to think that smokejumpers work in cohesive crews. Different jumpers are assigned for each initial attack. Because they work together in this fashion, smokejumpers don't have continuous and stable working relationships from one fire to the next, as do hotshots. Smokejumpers feel they belong to an elite firefighting unit with a unique work culture, complete with the symbolic trappings of uniform, rituals, and lore. Membership in this community creates special bonds. However, these bonds are not to a single crew. Further study would be needed to answer the question: What are the communication problems that smokejumpers face, and how do they manage these problems when they are required to quickly create intracrew cohesion when starting initial attacks?

Engine Crews—The appendix in the *Fireline Handbook* (National Wildfire Coordinating Group 1998) describes the makeup of engine crews. The number of people in an engine crew varies according to the size of the fire engine pump and tank capacity. Most Forest Service engine crews have about three members, with one person assigned as the captain, or engine boss. These small crews that work together throughout a fire season may have the potential to reach the intracrew cohesion levels found in hotshots. However, cohesion among engine crewmembers also needs to be studied.

Single Resources—Another category of people available to assist in fire suppression is identified as single resources. Some examples of single resources are dozer operators, aircraft pilots, and engine crews. Future studies of these different types of single resources should focus on successful work practices used when these resources attempt to blend in to the intercohesive firefighting crews, especially during wildfire transitions.

Contract Crews—The use of contract firefighting crews is relatively new in the wildland firefighting community. I have not talked to anyone about the social organization or cohesion levels in these kinds of crews. Contract crew cohesion and how these crews integrate with other types of firefighting crews remains to be studied.

Appendix B—Fire Crew Cohesion: Previous Recommendations

Recommendations From the Human Factors Workshop—A 5-day human factors workshop was held in Missoula, MT, during June 1995. Experts in psychology, sociology, formal organizations, fire safety, and wildland firefighting were brought together. On the last day of the workshop, 21 recommendations were formulated. Two recommendations focused on improving cohesion in fire crews:

- Develop methods to speed up crew cohesion and work practices before fireline assignments.
- Organize more national, regional, and local rendezvous where there is more mixing of type I, type II, engine, and helitack crews, fire management officers, incident management teams, and dispatchers so they can share knowledge and discuss problems.

Recommendations From the TriData Study—In 1998 the TriData Corp. completed a major study on the fire safety culture. A report from the study, *Phase III—Implementing Cultural Changes for Safety*, made two specific recommendations about improving fire crew cohesion:

- Unit cohesion should be fostered and attention given to developing good crew dynamics.
- Foster better crew cohesion, especially among type II crews.

Management Evaluation Report of the Thirtymile Fire—The incident review board wrote about the problem of people who were unfamiliar with each other working together:

- There were a number of issues that limited the development of crew cohesion for the Northwest Regular No. 6 crew. These included: collateral duties of command, fatigue, incident complexity, lack of opportunity to work together, and management effectiveness.

These reports from workshops, studies, and fire fatality investigations all recommended working to increase the cohesion of wildland fire crews.

Library Card

Driessen, Jon. 2002. Crew cohesion, wildland fire transition, and fatalities. Tech. Rep. 0251-2809-MTDC. Missoula, MT: U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center. 16 electronic p.

Describes the role played by crew cohesion in the deaths of firefighters in three firefighting tragedies: the Mann Gulch Fire, the South Canyon Fire, and the Thirtymile Fire. Two types of cohesion are involved, the cohesion within a crew (intracrew cohesion) and the cohesion among crews (intercrew cohesion). Cohesion is a way of describing how closely people feel they are tied to a group. Studies of field crews in the Forest Service have shown that the less cohesion crews had, the more likely they were to be involved in accidents. Meanwhile, studies of wildland firefighter fatalities during the 1990s have shown that nearly three-fourths of the fatalities occurred when fires were making the transition from relatively small to relatively large fires, or shortly after they had become relatively large fires. The transition is often sudden, when it is described as a "blow up." Driessen recommends studies that would allow the different types of transition fires to be classified. This classification system would allow crew leaders and fire managers to communicate clearly when fires are making the transition from relatively small fires to relatively large fires. The studies would also identify tactics that successful crew leaders use to build the essential level of crew cohesion when fires are in transition.

Keywords: firefighters, fire fighters, firefighting, fire fighting, group interaction, groups, safety at work, social behavior, sociology, sociology of work

About the Author

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