



Case Study: HRO Implementation on the Shoshone National Forest

Background

Personnel on the Shoshone National Forest mark 2006 as a bad year, but one that also demonstrated the Forest's commitment to resilience. On April 10th of that year, the Homestead Park II prescribed burn escaped control under adverse weather conditions, spreading onto private property and burning four cabins. On July 18, the Little Venus Fire blew up, entrapping personnel assigned to the fire as part of a fire use module as they hiked into a fire camp, forcing ten firefighters to deploy their fire shelters. As one might imagine, a considerable amount of review, investigation, and soul searching consumed the time and attention of Shoshone personnel afterward.

Understandably, following the Homestead Park II escape and the little Venus entrapment, the Forest's fire and aviation program struggled, seeking solutions that would enable them to build the organization back up from a loss of confidence. Forest personnel took pride in a respected, high performance fire and aviation program before these events. Concerned that the Forest could easily slip into organizational dysfunction following these events, the Shoshone mapped-out an action plan to return to its customary high performance. Key Forest personnel had been exposed to the concepts of High Reliability Organizing (HRO) and included HRO training as a key element of the Shoshone's recovery action plan.

The Forest conducted formal HRO training during its 2006 fall fire meeting, at which, the participants conducted HRO audits as described by Weick and Sutcliffe in their book *Managing the Unexpected*. The Forest intended to use the examples provided by both the Homestead II escape and the little Venus Fire entrapment as motivation for incorporating HRO principles into their operations beginning in the spring of 2007.

Fast forward to 2008, the Shoshone National Forest experienced the 67,000 acre Gun Barrel Fire. The fire started about 40 miles west of Cody, Wyoming and burned for more than one month in heavy dead, and downed timber on extreme terrain. Burning near the North Fork Highway leading to the East Entrance of Yellowstone National Park, the fire presented an immediate threat to numerous private properties, including several historic lodges, necessitating a point protection strategy. The fire's duration required multiple incident management team transitions and, at one point, a major shift in strategy. Given this very complex situation, the Gun Barrel Fire could have further challenged



the Forest's capabilities and confidence. Instead, the Shoshone provided an example of a unit clicking along as it should be, confidently managing an exceptionally challenging incident. The 2008 Gun Barrel Fire demonstrates that the Shoshone National Forest's fire and aviation program had bounced back from the Little Venus and Homestead Park II setbacks, not only to regain their former level of performance, but to become, in some ways, a stronger organization than they were before.

Forest personnel also saw evidence of their resilience and return to full functioning during 2007. It was a transition year during which they also confronted challenging events and one could argue that the Shoshone's Fire and Aviation program never really let down, but demonstrated their resilience from the start. The Forest maintains a positive safety record given the amount of exposure to risk its personnel face. In response to the Little Venus entrapment, crews put more thought into walk-ins on tricky fires, reflecting a preoccupation with failure. Forest personnel have improved their prescribed fire contingency planning and holding plans, demonstrating a reluctance to simplify. The Gun Barrel Fire demonstrated the Forest's capacity to formally think through how to manage fires and turn that into guidance to incident management teams, emblematic of the HRO principle sensitivity to operations. No one suggests that knowing about HRO completely explains the Forest's resilience. However, several people familiar with the situation acknowledge the contribution that both their native inclination toward HRO principles and the Forest's formal efforts have made, and the Shoshone is contemplating its next steps.

High Reliability Organizing

Fire management represents a complex and inherently risky undertaking, in the course of which fire management personnel may confront many unexpected events, conditions and circumstances with the potential to escalate beyond their control. However, both research and experience have shown that certain organizations simultaneously operate in high-risk and high tempo environments, achieve their operational objectives, and yet realize more acceptable levels of human error and accidents. Experts have called these "high reliability organizations" (HRO).

HROs are organizations that create a mindful infrastructure that manages activities according to five organizing principles:

1. *Preoccupation with Failure.* A wary and persistent attention to detecting and quickly responding to all errors and failures. Treating all errors and failures as weak signals of possible larger failures, and a signal of possible weakness in other parts of the operation or organization. Focusing on early problem identification that enables action before problems become substantial.
2. *Reluctance to Simplify.* Resisting the common tendency to oversimplify explanations of events and to steer away from evidence that disconfirms management direction or suggests the presence of unexpected problems.
3. *Sensitivity to Operations.* Maintaining situational awareness and the big picture of current operations. Integrating information about operations and performance into a single picture of the overall situation and operational performance. Sensitivity to operations permits early problem identification, permitting action before problems become too substantial.
4. *Commitment to Resilience.* Recognizing, understanding and accepting that human error and unexpected events are both persistent and omnipresent. Assuming the organization will eventually be surprised; and developing the capacity to respond to, contain, cope with, and bounce back from undesirable change swiftly and effectively.

5. *Deference to Expertise.* The loosening of hierarchical restraints and enabling the organization to empower expert people closest to a problem, often lower-level personnel, when operational decisions must be made quickly and accurately. Shifting leadership to people who currently have the answer to the problem at hand.

These principles represent a blend of organizational alertness, flexibility, and adaptability. They also represent a combination of anticipation and containment. A well functioning HRO also engages in continuous learning, and the five principles outlined above serve as conditions for that learning. In this way, HROs update their system, improve their knowledge, and see learning as an inseparable part of their everyday work.

While “HRO” can signify a type of organization, the Wildland Fire Lessons Learned Center more commonly uses the acronym to signify “high reliability organizing,” an operating philosophy in which the five principles, when taken together, produce organizational mindfulness. Seen this way, the principles described above are five hallmarks of the operating practices found in organizations that operate in risky environments yet persistently have fewer accidents than one might expect. These organizations mobilize their resources and execute their work dynamically, implementing the five principles of mindfulness continuously. Perhaps most importantly, they anticipate unexpected events and human error and act quickly to contain both. The case study that follows provides one installment in a series intended as a resource for organizations wishing to embark on the path of high reliability, and chronicles the initial efforts of one National Forest to implement HRO principles in the workplace.

Notable Successes That Others May Learn From

Lesson Learned: Examples of High Reliability Behaviors Abound in Everyday Operational Activities

Operational personnel may struggle to relate the principles of HRO to their work, and this simple fact can, and does, present a significant barrier to consciously incorporating HRO principles into work routines in operational units. However, in reality, wildland fire management personnel do things in the course of their work that they later recognize as HRO, once exposed to the principles in a practical way. With minimal effort, those interested in HRO can use real, operational examples to provide positive and practical examples.

For example, a near-miss with a positive outcome on the 2008 Gun Barrel Fire offers an effective example of at least three of the five HRO principles in action. An engine crewmember, assigned as a lookout, questioned instructions to leave his position and join resources that were pulling back to safety as fire behavior increased in the Moss Creek drainage in which they were working. The lookout believed that he had received instructions that would put him in danger from the approaching fire front. Confusion about the lookout’s location and the purpose of a subsequent request for aviation resources developed.

However, the organization contained and recovered from what had developed into a confused and



dangerous situation by taking reliable action. According to Safety Officers reviewing the incident, “The IHC Superintendent, commendably, reassured the confused lookout eventually obtaining a visual on the lookout. Calmly and in an assured manner, the IHC Superintendent continued to direct the lookout down the ridge informing the lookout to go a little faster and if need be to remove pack, keep a canteen of water and to put fire shelter in the shirt.” According to the Safety Officers’ write-up, “The IHC superintendent continued to direct the lookout until being observed by the Zone FMO nearby on the highway. The Zone FMO on the highway then took the lead and had the lookout continue south to the highway rather than turning into Moss Creek.”

This incident offers numerous practical and operational examples of HRO principles at work. For example, someone noticed increasing fire behavior that suggested a need to pull firefighters from the line. An IHC superintendent assigned to the Division overheard radio traffic that indicated that a lookout’s escape route might be compromised. These were weak signals of impending problems. Detecting weak signals and making strong response to them represents a hallmark of the HRO principle known as Preoccupation with Failure.

Upon request, a supervisor reluctantly assigned a firefighter from their engine as a lookout, though they had not been assigned the area the previous day and they were unfamiliar with it. The engine later departed the Moss Creek drainage to assess and protect structures in other drainages, leaving their crewmember behind. Other personnel assigned to the Division did not know the lookout’s exact position, and the lookout, misunderstanding his own proximity to the fire, felt threatened by it. On the other hand, Division personnel knew the lookout’s general location, maintained communications with the lookout, and advised the lookout of the decision to retreat from the line. The IHC Superintendent, Division Supervisor, and the Forest’s Zone Fire Management Officer worked together to resolve the lookout’s dilemma. All provide effective examples, both positive and negative, of the HRO principle called Sensitivity to Operations. The IHC superintendent having the lead role in resolving the incident demonstrates Deference to Expertise on the part of the DIVS, and FMO.

While the immediate response in the field averted potentially serious consequences, people’s reactions to the incident afterward provide effective, operational examples of reliable performance as well. According to Forest personnel, some of those reactions represent positive change from the past. Involved personnel discussed the incident in an after action review (AAR), the lookout’s supervisor debriefed with the unit’s engine supervisor, who returned with both the involved personnel as well as other unit personnel to conduct a field review of the incident. Safety Officers, investigating the episode, prepared a useful report documenting lessons learned from the incident.

The events in Moss Creek that day demonstrate that wildland fire management personnel routinely do things in the course of their work that they may later recognize as HRO, once exposed to the principles in a practical way. With minimal effort, those people advocating HRO can use real, operational examples to provide positive and practical examples.

While organizations might struggle to see how they are succeeding with HRO on a daily basis, or even long-term, the key is to operate successfully on purpose, not by accident, and to watch for indicators of success.



Lesson Learned: All HRO Implementation Efforts Start Somewhere - Pick an Emphasis

Few organizations seem well prepared to adopt HRO principles and behaviors systematically and comprehensively. Consequently, organizations interested in consciously incorporating HRO principles into their people's work routines find success by choosing an area of emphasis, such as a certain process, behavior, or HRO principle as an effective means of initially focusing their organization on HRO. On the Shoshone National Forest, the concept of communicating upward in the organization, or "upward voice," seems to serve that role. The Forest has placed considerable emphasis on encouraging a free flow of communication up and down the organization's chain of command. Opinions vary on the Forest about the degree to which people previously engaged in upward reporting and how well they could speak-up when they had concerns. However, Forest personnel universally report that they've made progress encouraging people to report errors upward and voice their concerns to superiors. This represents a significant change in a broader fire management culture. Historically, fire people and the organizations they serve valued workers who put their head down and quietly and energetically did as they were told. In addition, wildland fire organizations tend to review errors and incidents afterward rather than averting them by communication.

Upward reporting of human error requires a climate in which people hold themselves accountable, but do not fear reprisal for reporting. Management must communicate to employees that upward reporting is their job, that keeping problems to themselves is inappropriate, that they have not only a right, but a responsibility to speak up when they have concerns. "If you see something, tell me because I can't see everything".

This change requires a considerable measure of confidence by supervisors. Organizations must prepare their supervisors if they seriously intend to encourage an organization with a reporting culture and free-flowing communication. From an HRO standpoint, to encourage upward reporting and open communication, supervisors must communicate with the personnel closest to the operation, loosen hierarchical restraints, empower expert people closest to a problem, and even shift leadership to people who currently have the answer to the problem at hand. Most importantly, a commitment to upward voice must prove genuine. If a supervisor says "Bring your concern to me" but ignores the concern, discounts the concern, or punishes self-reported errors, they risk a serious, and possibly irreparable, loss of credibility. People, particularly those lower in the organization who take the risk to communicate upward, look for demonstrated credibility. If a person says they are listening, they better be listening and prove willing to show that people's input may actually change their decisions.

Similarly, if an organization seriously intends to foster a reporting culture and free-flowing communication, they must prepare lower-level personnel who are not used to having these opportunities provided to them and these expectations placed on them. If the organization expects upward reporting of error and a free flow of communication up the chain of command, but no one speaks-up because they are afraid or uncomfortable or because they simply don't understand their right and obligation, the initiative fails.

When people treat all errors as weak signals of possible larger failures, or weakness in other parts of the operation or organization, and quickly report those signals, they engage the HRO principle known as *Preoccupation with Failure*.

When supervisors, managers and leaders accept input from a wide variety of sources, including people at the lowest level of their organizations, they engage the HRO principle known as *Reluctance to Simplify*. This is particularly effective when they resist the common tendency to avoid evidence that disconfirms management direction or suggests the presence of unexpected problems.

When upward communication contributes to situational awareness and improved understanding of the big picture of current operations, people engage the HRO principle of *Sensitivity to Operations*.

When an organization's people can communicate freely up and down the chain of command, they improve the organization's capacity to respond to, contain, cope with, and bounce back from undesirable change swiftly and effectively, engaging the HRO principle of *Commitment to Resilience*.

Finally, organizations engage the HRO principle known as *Deference to Expertise* when they loosen hierarchical constraints and empower people closest to a problem when operational decisions must be made. Deference to expertise often empowers lower-level personnel to communicate their ideas and concerns; and even shifts leadership to those lower-level people when they have the answer to the problem at hand.

Lesson Learned: Start with Behavior - People Must See HRO as Practical and Relevant to Adopt the Principles

Experience shows that few fire personnel readily relate to, understand, or adopt HRO concepts and terminology that, at first, can seem unfamiliar, abstract, and somewhat academic. Any organization intending to implement HRO must search for ways to make HRO principles practical, make them resonate with their personnel, and show people that they can apply HRO principles to gain insight into their own behavior and the behavior of their organization. Based on their experience, personnel on the Shoshone National Forest have concluded that they must first focus on identifying desirable behaviors and then map those behaviors to HRO principles later on. According to personnel on the Forest, that requires using familiar terms to explain HRO principles and relating HRO practice to recognizable field routines and procedures whenever possible.

It also requires that management make clear that HRO adoption does not constitute "going to a system," taking on more work, or interfering with target accomplishment. Instead, HRO adoption involves identifying desirable behaviors, many of which occur to varying degrees in the organization now. Manage and lead in ways that encourage the organization's personnel to maximize those behaviors. Encourage personnel to develop habits that foster high reliability. Some people find HRO principles less than intuitive, so when an organization can link HRO principles to behaviors people engage in all the time, people see those principles in ways that are practical and relevant to them and their jobs.

This requires asking about and talking about behavior without getting hung up on terminology, at least not initially. Some Shoshone personnel feel confident that they apply the principles of HRO to their work, but are quick to point out that they could not map their daily work routines to HRO principles. They also contend that, while they feel their crews implement the principles on the ground, they do not use formal HRO terminology.

After initially struggling with whether there exists a framework for relating HRO principles to the work of wildland firefighters, HRO advocates on the Shoshone concluded that two practices, briefings and AARs, represent two operational practices that can anchor HRO efforts on the Forest and provide the bookends of improved performance. Fire personnel on the Shoshone see an increasingly interactive briefing and a solid AAR as key practices. Conducted by well-trained personnel, they present effective growth opportunities and can prove essential to success.

The ongoing challenge will be to affect other behaviors between the briefing and the AAR. On the Shoshone, Forest personnel identified three desires.

1. Preparing people to remain preoccupied with failure, proactively seeking out weak signals of possible problems and gaming out possible scenarios, and preparing supervisors to foster an environment conducive to this principle. Like other fire organizations, Shoshone fire personnel feel that some key leaders are instinctively preoccupied with failure and model the principle. The challenge remains to recognize and acknowledge that fact as an organization, and take steps to institutionalize the principle.
2. Building on the organization's native commitment to resilience, focusing on how Forest personnel and the Forest's fire organization successfully contained and bounced back from the Little Venus and Homestead experiences.
3. Encouraging the Forest's supervisors, managers and leaders to defer to the expertise that exists at all levels of the fire management organization.

Lesson Learned: For most organizations, movement toward HRO principles constitutes significant organizational and cultural change, subject to all the enablers and constraints of organizational and cultural change.

Like it would in most organizations, HRO implementation on the Shoshone National Forest represents a significant organizational and cultural change. Consequently, HRO implementation also remains subject to factors that either enable or constrain all organizational and cultural change. Those factors are known to organizational change experts. Organizations change successfully when the people within those organizations take up and support the idea behind the change and spread it by advocating during their interaction with others. In this way, ideas and innovations can become contagious, reaching a critical mass or "tipping point" and become sustainable. Consequently, for a given organizational change to move to its potential tipping point, organizations must encourage people to shift from apathy about the change to advocacy for it. For that shift to occur, the right conditions must exist for people to become committed to organizational change and for them to willingly spread their sense of commitment to others. Most notably, organizational change requires both support and sustained commitment to succeed.

In the aftermath of the entrapment incident on the Little Venus Fire, key Forest personnel initiated an effort to foster the principles of high reliability organizing on the Forest, primarily via the fire and aviation management program. This was part of a broader action plan intended to avert organizational dysfunction and return to the Forest's customary high performance.

Unfortunately, several aspects of the Forest's culture worked against the effort. First, coming on the heels of the Little Venus entrapment and the Homestead II escape, the HRO initiative felt imposed and punitive to some key personnel on the Forest; some who one might assume would be vital to the success of the initiative. Second, the Forest was advocating unfamiliar principles and a theoretical model in an agency that has seen its fair share of change initiatives come and go. People value practicality and many believed that their workplace had already become too complex. Some felt that they had seen more than enough new "flavor of the month" programs. Third, initial training created, for some, an impression that the Shoshone's fire and aviation personnel were "already HRO" or "already doing this" and some Forest personnel were quick to seize on what they saw as a stamp of approval, requiring no further action.

In addition, Forest personnel, some quite influential among the workforce, want to believe that others have taken time to understand their organization, operations, and local culture before being told how they might improve. Finally, the Shoshone is the nation's first national Forest, and enjoys a strong culture that one might describe as "old school Forest Service." Forest personnel tend to stay put on this forest, more so than the broader Forest Service organization, known for its highly mobile workforce. While these attributes produce a strong culture, strong organizational cultures can prove particularly resistant to change.

With strong organizational cultures common in the wildland fire service, like the Shoshone, many fire organizations pursuing the path of high reliability will face similar barriers to change. Without recognizing HRO implementation as the organizational and cultural change that it is, HRO initiatives will go the way of most change efforts, the overwhelming majority of which fail.

Recognizing adoption of HRO principles as the organizational and cultural change that it is, one can take away a number of lessons from the Shoshone experience, including:

- Formally or systematically adopting HRO principles in the workplace cannot avoid being messy. Human beings are involved. Their relationships to one another are inherently untidy. Human beings often resist change, regardless of how beneficial or positive that change may ultimately prove. An HRO effort may become even more challenging when, as is the case on the Shoshone National Forest, people are recovering from traumatic events. Their already complicated relationships are further strained, and people may perceive that HRO advocates are pushing a "silver bullet" solution. However, HRO advocates should not allow these challenges to dissuade them. It is said that the greater the struggle, the greater the learning.
- People will show intense interest in knowing how they *implement* HRO principles in "real life." Most fire people will not be all that interested in the theory; they want to know how the concept works, how it relates to what they do, and how it can benefit them. Firefighters relate to motivations such as becoming more proficient at doing their job and doing it safely, becoming a more capable and safe organization with fewer accidents and near misses, and improving communications. All can serve as a framework or rationale for systematically adopting HRO.
- Anticipate skepticism. Some wildland fire personnel intuitively recognize that much of their training and experience incorporates HRO principles, and that they engage in many of the processes and behaviors that the experts ascribe to high reliability organizations. Consequently, some wildland fire personnel will react with frustration characterized as "we're already doing this!" In fact, Weick and Sutcliffe reinforce that very point in *Managing the Unexpected*. This skepticism may actually prove strongest in the highest performing groups. However, highly experienced fire personnel, who also have come to know the HRO concept well, suggest a response such as the following,

Yes, we do a lot of this. We *are* good, but we haven't thought about *why* we're good and how we can be as good as we can be. We want to systematically adopt HRO because we know this is a risky business, because we have weak areas and are vulnerable to error; because we want to avert avoidable failure, and because we want to be as good as we can be."

Ultimately, one would anticipate that fire personnel would appreciate the fact that formally adopting HRO principles represents a change, but not an extreme change, for their organization; and that the fire culture proves compatible with many aspects of HRO.

Ironically, while some firefighters perceive that they are "already doing this," others immediately disregard the concept as yet another impractical management idea that won't work in their world. However, experience shows that fire personnel embrace HRO once they can relate it to their work. Fire management people do things in the course of their work that they can later recognize as HRO, once someone exposes them to HRO principles in a practical way. Experienced fire personnel find that when people consciously incorporate HRO principles into their work routines and use HRO principles as a tool to reflect upon their work and think their way through situations, skeptics become advocates. Those advocates become positive and practical examples.

On the other hand, HRO advocates must accept that, in the wildland fire community, they will confront experienced and highly capable personnel who intuitively engage in the processes and behaviors that experts ascribe to high reliability organizations, but who outwardly resist formal adoption of the HRO concept. Similarly, wildland fire personnel tend to lead by quiet example, and some will adopt HRO principles in subtle ways, simply incorporating them into their own behaviors and how they relate to other firefighters.

- Those advocating HRO to others must start by understanding the programs and people they hope to influence. The HRO advocate should collaboratively assess operational strengths and weaknesses, and then focus on practical HRO applications to reinforce operational strengths and mitigate known operational weaknesses. HRO advocates must be prepared to accept that a local unit may only adopt certain HRO components that motivate them and that they deem applicable to their organization. They may grab hold of those and, perhaps, go no further. In addition, personnel who have experienced HRO implementation in their workplace recommend simply, honestly acknowledging resistance to change in the organization's initial training.
- The messenger makes a difference, and the style of a trainer or advocate must seem appropriate for the target audience. The trainer must understand, and seem relevant to, the local culture. Right or wrong, people accept or reject new ideas based on their perception of the credibility of the advocate or trainer. An HRO advocate or trainer, who has done their homework, can anticipate the spectrum of acceptance because they know their audience and can anticipate their reaction. Similarly, HRO advocates must understand that, if they are to advocate HRO, they must model the behavior that they desire and that they encourage from others. In short, HRO advocates must "walk the talk."
- In an organization with a mobile workforce like the U.S. Forest Service, key players leave, holes open in leadership capacity, and the organization experiences a nearly continual influx of new people. That organizational reality allows the possibility that the organization will lose people who have the habits desired and replace them with people who lack the behaviors the organization wants. While this can, and does, cause the death of change efforts, it also illustrates, that to truly implement HRO in the workplace, the organization cannot depend too heavily on a person or a few people, but pursue a cultural and organization-wide change that transcends personalities.

- Organizations improve the flow of people moving from skepticism, apathy and resistance toward advocacy when managers facilitate opportunities for advocates of a given organizational change and personnel who are more apathetic about it to communicate directly with each other. On the Shoshone, HRO advocates arranged outside training, distributed a book by noted experts, and pronounced intent to implement the principles advanced by the book and training. However, there needs to be more opportunity for ongoing two-way communication from which the less enthusiastic could gain from the experience and expertise of the advocates or from which advocates and others could learn from one another. However, distances on this forest make it tough to get people together face-to-face, and that can present a challenge to effective two-way communication between field units and between field units and the Supervisor's Office. In today's operating environment, many fire organizations will face this challenge. However, the fact remains, organizations must provide for, enable, and support opportunities for advocates and others to communicate directly. To accomplish this, the organization will require local unit champions who are well supported.
 - An organization intending to formally adopt HRO principles would treat its training efforts as opportunities to first initiate, and then compound, behavior over time. This is done with the intent of moving the organization toward a tipping point that would then trigger the exponential growth of desired HRO behaviors. At the bottom line, organizational change can spread exponentially after reaching a tipping point. Reaching that tipping point requires that HRO advocates view each participant in an HRO training session as a important emissary who will spread their enthusiasm to at least one other person.
 - An HRO adoption effort requires clearly crafted strategic goals, the existence of which would enable the organization to observe behavioral changes as they oscillated around a goal or goals.
 - The organization must provide infrastructure to support the change. This infrastructure includes management actions that management can carry out such as providing job-specific training, tools to capture and disseminate lessons learned, a well-defined roll out plan, or tools and processes that are specific to measuring process on the change itself.
 - Several personnel on the Shoshone National Forest suggest that adopting HRO "hook, line and sinker" can prove a strategy with a low probability for success. They would recommend building the idea through a gradual process, implementing in stages and somewhat casually. Such a process might include explicitly providing practical examples that make sense for people, slowly increasing people's capabilities and capacities, and sustaining the process in a way that recognizes that organizational change requires long-term commitment. HRO advocates may need to get people thinking differently before bringing out the book and introducing a lot of unfamiliar terminology. To succeed requires local unit champions, and the organization would be wise to assure that they gain the support of field unit fire management officers, assistant fire management officers, and other key players before proceeding to influence the broader organization.
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Lesson Learned: At a Programmatic Level, the HRO Principle Sensitivity to Operations Requires Engaged Line and Staff Officers

Sensitivity to Operations involves maintaining situational awareness and the big picture of current operations, so that one might integrate information about operations and performance into a single picture of the overall situation and operational performance. Sensitivity to operations permits early problem identification, permitting action before problems become too substantial to correct. At the programmatic

level, sensitivity to operations requires engaged line and staff officers, who are in-touch with, and involved in daily operations. Of course, such an engaged line officer will occasionally get in the way of District Fire Management Officers, but most fire professionals agree that the benefits of engagement outweighs the occasional duplication of effort.

Line and staff officer engagement requires physical presence and plenty of opportunities to interact. Like the Shoshone National Forest, large units with personnel separated by big distances will find this a challenge, but the fact remains; line and staff officers advocating change in their organizations must visibly engage in the change effort and create plenty of opportunities for change advocates and others to communicate directly. This kind of engagement seems consistent with the Shoshone's emphasis on encouraging bottom-up communications and upward voice. Fire organizations seeking those same values, must understand that "upward voice" requires an open and collegial management style on the part of supervisors and managers. However, an open style can also allow for conflict to arise. Consequently, organizations serious about this value find their supervisors and managers managing periodic conflict. However, experienced leaders understand that little positive organizational change, innovation, or creativity exists without conflict.

Lesson Learned: Without Sustained Effort, HRO Implementation Efforts Plateau and Then Decline

As indicated elsewhere in this report, for most fire organizations, movement toward HRO principles constitutes significant organizational and cultural change. Significant change requires continual, sustained effort. Organizations intending to formally adopt HRO principles will find that management's good intentions must translate into uninterrupted, focused attention. Management must sustain their effort with consistent, meaningful support to the people expected to carry through with the desired change. A consistent, sustained effort would include:

- Repeated training for key supervisors and leaders that helps them to understand HRO principles in understandable, practical ways that relate the HRO concept to their work and focuses on application.
 - Sustained, continuous focus and attention, including regular training and reinforcement activities, that dispels the notion that another "flavor of the month" has come along.
 - Demonstrated management commitment, including committed resources, reinforced by genuine and consistent modeling of the desired change by those advocating the change and committed resources.
 - A focus on action, systematically preparing people for application and incorporation into daily work behaviors.
 - Support for practitioners including mentoring.
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Lesson Learned: Effective Briefings and After Action Reviews (AAR) - A Great Place to Start Building High Reliability

Managers in the Shoshone's Fire and Aviation Management program concluded that they can build HRO implementation on a foundation of organizational learning and continual improvement, centering their efforts on effective briefings and the After Action Review (AAR) process. Fire personnel understand briefings, the conduct of which represents one of the primary ways in which fire personnel direct and communicate with one another in the incident environment. Conventional wisdom holds that leader's

intent lies at the heart of every briefing. The AAR provides a method of learning from people's collective experience, and uses a collaborative appraisal of experience to improve performance both by preventing recurrent errors and reproducing success. Shoshone Forest personnel are already familiar with both the briefing and AAR tools; and Shoshone fire and aviation management personnel believe that both briefings and the AAR process can present them with an effective means of focusing their organization on the HRO principle of preoccupation with failure, as well as others.

However, many fire personnel perpetuate misconceptions about the value, purpose and conduct of AARs. In addition, fire professionals realize that some briefings are highly effective while others are not. Consequently, when an organization's efforts are heavily reliant on briefings and AARs, fire management personnel learn that they must systematically train people both to participate in and to effectively facilitate them. Shoshone personnel believe that training related to both briefings and AARs should go beyond mechanics and technique. Briefing and AAR training should introduce both as key organizational learning tools and include information on the intent of conducting them, and provide guidelines for doing them effectively, so that they bookend efforts to achieve reliable performance.



Lesson Learned: HRO Efforts Take Hold in Organizations Where a Just Culture Exists

Like fire organizations elsewhere, the Shoshone's experience suggests an organization intending to formally adopt HRO principles will succeed best when they first establish a climate and culture in which their efforts can prosper. Some personnel on the Shoshone National Forest have observed that such a climate and culture requires a "just culture" (as part of a healthy safety culture).

A Just Culture

Punishment, both actual and threatened, can prove counterproductive both to organizational learning and to the safety of fire management personnel. Individual blame too often obscures both the larger organization's role in accidents and the organization's learning from the accident. This proves particularly true when organizations punish what may be unavoidable human error. Managerial inaction can prove similarly counterproductive. Consequently, the Shoshone fire organization strives for an atmosphere of trust in which the organization's personnel are encouraged to report, feel they are listened to and heard, and in which they see change take place as a result of their efforts.

In a just culture, there is no stigma attached to speaking up about errors or defects in the system. In fact, people are rewarded and praised for doing so. In such a culture, the organization must focus on what, not who, and on learning rather than blame.

The Most Difficult Challenges Faced and How They May be Overcome

Lesson Learned: Without Sustained Effort, HRO Implementation Efforts Stagnate and Decline

As indicated elsewhere in this report, for many fire organizations, moving toward HRO principles represents a big organizational change and maybe even a cultural shift. Significant change like that requires continual, sustained effort. Organizations intending to purposefully adopt HRO principles will find that management's plans must translate into uninterrupted effort as well as sustained support to the people who management expects to carry through with the desired change.

Lesson Learned: People Must See HRO as Practical and Relevant to Adopt the Principles

Personnel involved in the Shoshone effort found that not all their fire management personnel would readily relate to or adopt unfamiliar HRO concepts. They recommend that any organization intending to implement HRO find ways to make HRO principles practical, make them resonate with the target audience, and show people that they can use HRO principles to improve their organization's performance. Use familiar terms to explain HRO principles and relate HRO practice to recognizable field routines and procedures whenever possible.

Lesson Learned: People and Organizations Resist Change

HRO advocates should prepare for a wide range of receptions. HRO implementation represents a significant change, and people, as well as organizations, resist change more often than not. Consequently, HRO advocates must treat any implementation effort as subject to all the factors that either enable or constrain all organizational and cultural change and plan accordingly.

Lesson Learned: High Performance and High Reliability Are Not Bankable

People and organizations frequently, and mistakenly, believe that their objective is to "become an HRO," as if it were a certification. However, in reality, organizations cannot bank high performance or high reliability. Organizations achieving high reliability become learning organizations committed to continuously learning and improving performance. When HRO trainers introduce HRO to wildland firefighters by declaring "You already do this" that approach may backfire, encouraging participants to accept that stamp of approval and see no need to move further with the concept. A better way to approach the matter might be to say "You do a lot of this. "You *are* good, but let's think and talk about *why* you're good and how you can be continually improving. You want to systematically adopt HRO because we know this is an inherently risky business. All organizations, no matter how good, are

vulnerable to failure, because none of us are immune to human error or unexpected events. You want to avert avoidable failure and you want to be as good as you can be.”

Recommended Training Changes

The Shoshone National Forest engaged its HRO efforts as part of a broader action plan to assure continued high performance and employed ad-hoc resources involving an informal network of HRO advocates and experts. Based on that experience, Shoshone National Forest personnel recommend training related measures that would support a broader, more far-reaching effort.

Recommendation: Get buy-in from the organization’s leadership. Leadership buy-in helps the effort go a long way quickly. Have some HRO training tools targeted specifically to organizational leadership.

Recommendation: When planning an HRO training effort, plan to employ a full spectrum of training tools, utilizing a variety of examples.

Recommendation: Use only well organized materials and presentations when introducing the HRO concept and assure that individual trainers only employ materials they are familiar with.

Recommendation: To maximize their utility, customize and contextualize the [HRO audit instruments](#) included in Weick and Sutcliffe’s book *Managing the Unexpected* before employing them as an introductory training tool. Shoshone personnel made the following observations about their use of the audits in training:

- They completed audits as part of their training, but, as conducted, the audits did not ultimately have a significant impact on their HRO implementation attempts.
 - A diverse group complicates the HRO audit process, because people struggle to identify what constitutes “the unit.” Because people lacked a common basis for assumptions, the resulting data was not highly correlated. The Shoshone experience suggests that, when doing audits, the organization needs to explore and agree on the unit of analysis before diving-in.
 - There also exists a need to customize the audit forms to fit the local context before using them.
 - A skilled coach or facilitator, familiar with the audit instruments is essential to success when employing them as a training tool.
 - One person was able to complete coarse analysis of the audit data in an evening.
 - Shoshone personnel would like to see the Wildland Fire Lessons Learned Center expand its existing resources related to using HRO audit results to provide practitioners with advice on how to use HRO audit results at the resource level, at the unit level, at the forest level, and at the agency level.
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Recommendation: Develop a better presentation on application of the HRO principles, including practical examples of desired behaviors.

Recommendation: Illustrate the principle of commitment to resilience by pointing out resilience of real

people and real organizations. Positively reinforce the resilience of real people by pointing out things that have gone well when undesirable events occur.

Recommendation: Use accident investigation reports as vehicles to illustrate the concept of detecting and responding to weak signals. Also use these reports to demonstrate the concept of transitioning toward more interactive briefings in which supervisors do a better job of gathering information from them working for them and listening to dissenting opinions. This training approach can effectively lead to discussions that illustrate the HRO principles of preoccupation with failure, sensitivity to operations, and deference to expertise.

Recommendation: Include up to two hours of HRO related content into the introductory leadership and safety components of introductory fire training (S-110/130/190), providing effective examples of desired behavior or behavior patterns. The fire community needs to introduce HRO concepts on everyone's first day as a firefighter.

Recommendation: Use the existing AAR DVD, "Conducting Effective AAR's," as standard practice, to train people to participate in and facilitate effective AARs.

Recommendation: Develop a training video/DVD similar to the "Conducting Effective AARs" training package to train people to conduct effective briefings, at all levels of the organization, emphasizing how to get productive interaction during the briefing.

Recommendation: Develop a national staff ride of the Little Venus Fire entrapment, highlighting HRO principles.

Recommendation: Develop a comprehensive HRO training curriculum beginning with new employee orientation, including the red-carded "militia" (perhaps via the annual safety refresher course) and the seasonal workforce.

Recommendation: Conduct HRO related training according to the following principles:

- Simplify HRO concepts from *Managing the Unexpected* (Weick and Sutcliffe).
- Emphasize that adopting HRO principles does not require more work, but is more about how one works, and should not interfere with demonstrating results to line officers. In fact, HRO principles should reduce organizational effort and improve performance as errors waste time. While this concept may prove hard to convey, people must see application and practicality if they are to adopt HRO principles.
- Cover HRO principles in sufficient depth. Otherwise people have just enough information to confuse them and become frustrated when they find they do not know how to implement the concept.
- Focus on helping people translate the HRO principles to action. Let them know what a very successful HRO would look like on the ground.
- Face to face workshops are most effective. Reading the book should be considered a supporting activity.

- Do not get too hung up on terminology. Not all fire personnel readily relate to, understand, or adopt unfamiliar, and somewhat academic, HRO terminology. Any organization intending to implement HRO should use familiar terms to explain HRO principles and relate HRO practice to recognizable field routines and procedures whenever possible.
 - Use real life examples from beyond the fire environment, including the aircraft carrier example.
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Issues Meriting Further Review and Development

Organizational Climate and Culture: It has become increasingly clear that successful HRO efforts in the wildland fire community stem from an ability to establish an effective climate, culture and tone; all of which prove essential to success. Experience indicates that an organization intending to implement HRO principles will succeed best when the organization first establishes a climate and culture in which their efforts can flourish. Organizations should focus on fostering an organizational culture that facilitates desirable behaviors, starting with basic training of new employees. Organizations can also foster an effective climate by conducting routine AARs on their projects, involving people in them, as well as encouraging and allowing people to speak up in them.

HRO Outside of Fire and Aviation: Some people believe that natural resource agencies need to get HRO “out of the fire bubble” and allow the principles to migrate to the wider organization. Others question whether fire and aviation programs represent the best, most logical vector from which HRO should enter agencies. Fire enjoys a very strong culture and implementing HRO requires changing that strong culture.

Some have suggested that HRO belongs in the agency safety portfolio, and that safety provides the bridge between programs. Therefore, safety represents a logical place for HRO initiatives. While others warn that safety can represent an immediate turn off, some people suggest that, perhaps HRO advocates could best influence entire agencies via safety programs, by using fire and aviation management as an example. For instance, in the U.S. Forest Service, a safety-centered HRO approach could simultaneously provide HRO with a high profile and influence the entire agency, all while making the Forest Service’s safety program more meaningful.

If HRO became an integral part of an agency’s safety culture, it could become an organizational constant (like the uniform, badge, the color of their trucks, and the organization’s emblem), a part of how the agency routinely does business, and common across work units. To accomplish that, HRO could not appear to be a “flavor of the month” (including an agency Chiefs’ initiative), but should provide the foundation of agency culture. People will resist if they regard HRO as just “another initiative” rather than foundational principles that will last. Using this approach, the agency would commit to logical HRO principles that do not change and those would become the way the agency does business.

As a next step, the Shoshone National Forest intends to experiment with a safety oriented HRO initiative, patterned on efforts pioneered at Sequoia and King’s Canyon National Parks (SEKI). SEKI took a collaborative approach to implementing HRO by establishing a Fire and Aviation Safety Committee at the heart of their effort. Besides improving firefighter safety, this approach to implementing HRO principles created a healthy, collaborative organizational climate that, in turn, improved job satisfaction and employee retention. [SEKI HRO Case Study](#)



Conclusion

Fire management represents a complex and inherently risky undertaking. In the course of discharging their duties, fire management personnel may confront many unexpected events, conditions and circumstances with the potential to escalate beyond their control. However, both experience and research show that select organizations simultaneously operate in high-risk and high tempo environments, achieve their operational objectives, and realize acceptable levels of human error and accidents. Experts have called these “high reliability organizations” (HRO) and their practices “high reliability organizing.”

Following a series of unexpected and unwanted events, the Shoshone National Forest mapped-out an action plan to return to its customary high performance. Key Forest personnel had been exposed to the concepts of High Reliability Organizing (HRO) and included HRO training as a foundational element of the Shoshone’s recovery action plan.

In 2008, during the Gun Barrel Fire the Shoshone’s fire and aviation management program provided an example of a unit clicking along as it should be, confidently managing an exceptionally challenging incident. They demonstrated that the Forest’s program had bounced back from its setbacks, not only to regain their former level of performance, but to become, in some ways, a stronger organization than they were before. No one suggests that knowing about HRO completely explains the Forest’s resilience. However, several persons familiar with the situation acknowledge the contribution that both their native inclination toward HRO principles and the Forest’s formal HRO implementation efforts have made. Now the Shoshone is contemplating its next steps.

Their experience provides several notable lessons that others might learn from. This case study provides one installment in a series intended as a resource for organizations wishing to embark on the path of high reliability, and chronicles one organization’s efforts to implement HRO principles in the workplace.

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Weick, K., & Sutcliffe, K. (2007). *Managing the unexpected: Resilient performance in an age of uncertainty* (2nd ed.). San Francisco: Jossey-Bass.

Resources at the Wildland Fire Lessons Learned Center

Organizational Learning, <http://www.wildfirelessons.net/OrgLearning.aspx>
High Reliability Organizing, <http://www.wildfirelessons.net/HRO.aspx>
After Action Reviews, <http://www.wildfirelessons.net/AAR.aspx>

* The complete *Conducting Effective After Action Reviews* and the *HRO Teaching Tips* training packages each cost approximately \$12.95, which includes the cost of shipping, and can be obtained by ordering directly from the following source: **Custom Recording and Sound** Phone: (208) 344-3535, FAX: (208) 323-0373, Email: customorders@cableone.net

The HRO Case Studies Series

This report is the third in a series of HRO Case Studies created as a product of a Wildland Fire Lessons Learned Center (LLC) information collection team effort. Team members on this assignment included:

David A. Christenson, Team Lead, LLC Assistant Manager

Michael T. DeGrosky, CEO of the Guidance Group, Eatonville, WA

Questions about this report should be directed to:

Paula Nasiatka, LLC Center Manager –or–
David A. Christenson, LLC Assistant Manager
National Advanced Fire & Resources Institute
3265 E. Universal Way
Tucson, Arizona 85756
(520) 799-8760 and 61
(520) 799-8785 FAX
pnasiatka@fs.fed.us
dchristenson@fs.fed.us

Photos from this report are from the Gun Barrel Fire of 2008 and were provided by the Shoshone National Forest