By A.J. Heightman, MPA, EMT-P

Rehab & High Reliability Organizations

Daved Van Stralen, MD, a former Los Angeles paramedic, now assistant professor of pediatrics at Loma Linda University and EMS medical director for the San Bernardino, Calif., division of AMR and San Bernardino County (Calif.) Fire Department, has hooked me on studying high reliability organizations (HROs) and the impact these organizations, and—more specifically—their staff, can make on safety, efficiency and the reduction of errors.

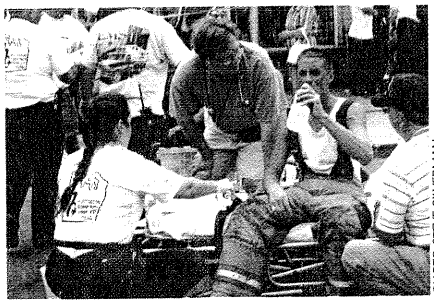
Karl Weick, PhD, professor of organizational behavior and psychology at the University of Michigan, and fellow researcher, Kathleen Sutcliffe, PhD, are heralded for helping develop the concept of high reliability organizations along with Karlene Roberts, PhD, professor of organizational behavior at the Haas School of Business, University of California, Berkeley, who codified the characteristics of HROs from her work on naval aviation and aircraft carriers. It's a concept that emergency service managers have been aware of for years, but never pinned a name on.

In 2001, Weick and Sutcliffe co-authored *Managing the Unexpected—Assuring High Performance in an Age of Complexity.* In the book, they examine organizations that must manage unexpected threats and, therefore, can't afford to make mistakes. These include the airline industry (e.g., maintenance and air traffic control staff), the military (e.g., aircraft carrier flight-deck crews), personnel at chemical and nuclear plants, NASA, and emergency personnel.

The *Harvard Business Review* reported that Weick's 1969 book *The Social Psychology of Organizing* "turned organizational psychology on its head by praising the advantages of chaos, demonstrating the pitfalls of planning and celebrating the rewards of "sense-making."

So what exactly is an HRO and what do they do? An HRO finds areas that *could* become problems and addresses them before they have a chance to occur. They innovate. They allow bottom-to-top staff input into safety, and they allow open discussion about errors or fallacies in their planning processes.

More specifically, HROs make their personnel aware that plans are libraries of information that can't replace quick, reasonable decisions that make sense in the heat of a battle. For example, on the flight deck of an aircraft carrier, one person is in charge of alerting an approaching pilot to abort their landing if a safety issue surfaces. You can call that person the *top decision-maker, incident commander* or any other term that means *top dog.* But at least four other people *(little dogs)* are scanning the deck and reviewing instrumentation that can detect problems and suggest that the pilot not land. The top decision-maker won't question the rationale for a suggestion that the landing be aborted; they'll immediately order the pilot to abort the landing and circle until the real or perceived problem is investigated and resolved.



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Rehab is a critical function that must be established at all "working" incidents.

In analyzing the actions (or inactions) of NASA engineers at the time of the Space Shuttle Challenger accident, Diane Vaughan of Columbia University noted that shuttle managers didn't embrace safety-conscious attitudes. Instead, their attitudes were shaped and reinforced by NASA's inability to step back and gauge its biases. When a lower-level Morton Thiokol engineer expressed concerns about the ability of the booster rocket seal to hold up under the freezing pad conditions the night before the launch, bureaucracy and processes triumphed, and the warning wasn't heeded by top management. The results were disastrous, resulting in seven deaths, millions of taxpayer dollars lost and years of mission delays.

Roberts and Carolyn Libuser, PhD, found that HROs conduct relatively error-free operations over a long period of time. They consistently make good decisions that result in high quality and reliable operations. HROs all have five common characteristics:

1. **Process auditing:** They put into place ongoing checks for expected and unexpected problems. They routinely test key equipment and staff readiness through drills. And they follow up on changes shown to be necessary by prior audits.
2. **Reward system:** HROs recognize and acknowledge individuals who behave in a compliant or non-compliant manner. This has a powerful influence on the behavior of others in the organization.
3. **Quality degradation:** HROs work diligently to avoid the degradation of quality or the development of inferior service (e.g., lengthy response times or extrications, poor patient care, poor maintenance). They view quality as a process, not an achievement. *Example:* When the Richmond Ambulance Authority, an HRO, detected through its Road Safety System vehicle performance

data that crews were responding more rapidly to calls for gunshot victims than for cardiac arrests in a particular area, they investigated and *encouraged* their crews to more evenly distribute their adrenaline.

4. **Perception of risk:** An HRO encourages its staff to report risks in the operation. Risks can include unpadded edges in a patient compartment, a missing helmet or safety vest, or an operational procedure that's putting staff at risk. An HRO acknowledges risks and mitigates them.
5. **Command and control:** In addition to ensuring solid command and control, the chain of command and passing command smoothly, HROs encourage redundancy, situational awareness, formal rules and procedures, authority migration and training to reinforce organizational goals. There's an appropriate shift from vertical hierarchy to horizontal hierarchy when low-tempo situations change to high-tempo situations.

In short, HROs are preoccupied with avoiding failure, reluctant to simplify or ignore suggestions or interpretations of hazards by anyone in the organization. They're sensitive to all operations, committed to resilience and not afraid to defer to expertise. This means that when a mutual aid company responds to their incident and brings up a safety issue, it's heard and addressed.

So what separates the innovators from the stagnant, the HROs from the non-HROs in emergency services? Years ago, some agencies realized it wasn't a good idea to have police tactical teams initiate high-risk missions without a paramedic along to immediately care for any life-threatening wounds incurred. These innovative agencies were HROs but didn't know it. They identified the high risk of police tactical operations and the probability of injury, and instituted tactical paramedic programs to address the issue.

Today, rehabilitation of emergency personnel is an area that identifies departments as HROs. Rehab shows that the departments are preoccupied with failure and the unnecessary taxing of limited resources, and fix things before somebody gets hurt or dies.

If, like Phoenix and Houston fire departments, you not only have a rehab policy, but also mandatory rehab training and specialized rehab resources that you send to all working incidents, you're probably an HRO.

If you allow firefighters, particularly those with known medical conditions, to wear turnout gear and continually work in a high heat and physical stress environment without being put through a rehab process, you fall into the non-HRO category.

What many organizations have done for years (and many continue to do) is wait until a firefighter collapses due to heat exhaustion or dehydration/hypovolemia and rush him to a hospital in the only ambulance on scene, leaving the scene without full EMS resources. However, the firefighter is restored to his original condition of health (the definition of rehab) in less than 15 minutes because the EMS crew removes his gear, cranks up the AC, cools him off, cleanses his lungs, helps relax him by administering some face mask O_2 and monitors his vital signs. By the time he reaches the ED, I bet he refuses stretcher transfer and walks in, becoming a worker's comp claim. In addition, the incident commander loses a now-rested and capable firefighter, and no ambulance is available if another firefighter is injured when a roof collapses. It doesn't make sense.

Rehab can be performed by a single ambulance or engine company crew and pay dividends by restoring personnel to battle-ready condition in less than 15 minutes, finding people exposed to carbon monoxide and other dangerous gases/substances, or detecting cardiac or respiratory abnormalities and addressing them on scene.

Rehab isn't rocket science. Its basic principals are:

- Give overworked and overheated (or cold) personnel a defined rest period;
- Do medical evals and treat injuries;
- Rehydrate personnel (because heat and energy cause fluid loss);
- Address any problems (or warning symptoms) found;
- Triage and transfer out to medical facilities, as necessary; and
- Reassign personnel.

In 1992, the U.S. Fire Administration (USFA) published a well-developed set of rehab guidelines, *Emergency Incident Rehabilitation* (FA-114/July 1992), that not only explains why rehab is necessary, but also provides a model program for rehab. It includes easy-to-use tables for heat index and wind chill factors, forms for tracking the rehab of personnel, and other practical, useful information.

If you don't already have one, put together a rehab plan. Make sure it includes these critical aspects:

1. Require your personnel to report to rehab after 45 minutes of strenuous work time or after going through two air bottles. The rest period should last at least 10 minutes and be extended as long as necessary to return vital signs to normal limits;
2. Encourage your personnel to advise an officer or report to rehab whenever they feel their level of fatigue or exposure to the elements is approaching a level that they feel is adversely affecting them or the operation they are involved in. (*Note:* This could be a warning of a serious medical problem in addition to dehydration);
3. During prolonged heat and physical stress situations, have your personnel consume at least *32 oz. of water each hour.* (Add this parameter to your rehab log sheet). If the incident is anticipated to last more than three hours, provide food on scene; and
4. Encourage your staff to be alert to, and report, any physical or environmental threats to the health and safety of others operating at the scene and any personnel they feel need to go to rehab.

Spend a few dollars on the development of mobile caches of BP cuffs, clipboards and log sheets, a timer, bags to hold ice, towels, cups, water, tympanic thermometers, spray misters, collapsible lawn chairs and shading tarps, and you can correct an obvious deficiency in your field operations. It will save you manpower, money and lost resources in the long run and put you on the road to being a high reliability organization. JEMS

The current USFA rehab guidelines, *Emergency Incident Rehabilitation* (FA-114/July 1992), can be ordered by calling USFA's 24-hour publications line at 301/447-1660, or the Publications Center at 301/447-1189 between 8:30 a.m. to 5 p.m. EST/EDT. To order it by mail, write to: Publications Center, United States Fire Administration, 16825 South Seton Ave., Emmitsburg, MD 21727.

To review the Phoenix Fire Department Rehab policy, go to http://phoenix.gov/FIRE/20208.html. For the Houston Fire Department's rehab guidelines, go to www.houstontx.gov/fire/firefighterinfo/ce/2001/April/April01CE.htm