

By THOMAS W. AURNHAMMER

Incident Safety In the Rural Environment

Part 1 – Fire Protection Challenges



While the basic concepts are the same, safety officers in the rural environment face much different challenges than their urban counterparts.

What is the “rural environment?” Many people have definitions for the term “rural,” but seldom are these rural definitions in agreement. For some inhabitants, rural can’t be defined, but they know it when they see it.

Seventy-five percent of the U.S. population lives in cities and suburbs, but cities occupy only 2% of the country. Rural areas occupy the remaining 98%. Fire protection in these areas is generally provided by volunteer or combination departments that face different challenges than their counterparts in larger and more developed communities.

One of the items that served as the impetus for this article was my move from a career municipal fire department to a combination rural fire district. Making the transition from protecting a population of 45,000 within a 30-square-mile area to a 325-square-mile district inhabited by 8,000 citizens was, to say the least, an eye opener.

Gone were the days of fire hydrants spaced every 500 feet and knowing that my on-duty staffing was sufficient to



Photos by Thomas W. Aurnhammer

Bridges in rural areas may not be designed to carry the weight of fire apparatus.

mount an interior fire attack. Welcome to the world of rural firefighting. I did realize, however, that the greatest common denominator in rural and more urbanized settings is the need to provide the safest working environment as possible while our members provide service to the community.

While I was doing research for this article, I read a news story that I found a little disturbing. It was about a double-fatality fire in a rural community. The story contained comments from the local

fire chief and included information that I would have expected to see. Limited resources, lack of a fixed water supply and the home’s location all contributed to the fire department’s challenges at this incident. The chief went on to speak of the risk from fire that is incurred in rural areas. To me, the story presented a realistic picture of rural fire protection in the United States.

Expectations Vs. Reality

What disturbed me greatly was the blog that followed the article on the newspaper’s website. Comments from the readers were what I would describe as “less than kind.” This led me to think about the rural community’s expectation of its fire department, and a notion came to mind. The attraction of country living has increased the number of folks relocating to rural America. Imagine moving from a city with an Insurance Services Office (ISO) Protection Class perhaps ranging from a 2 to a 4 and now living in a Class 10 area and expecting the same level of fire protection. Our attempts to balance the level of service our resources allow with fireground activities that make an effort to meet the wishes of our constituents, truly require the incident safety officer to maintain a high level of situational awareness relating to rural fire protection challenges and preventing firefighter injuries and deaths.

Whether working in a rural, suburban or urban area, all incident safety officers share common responsibilities. The most important function consists of monitoring the safety of responders. Incident safety of-

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ficers are members of the incident commander's command staff and have the authority to alter, suspend or terminate operations and may bypass the chain of command if the situation warrants it. They need to be clearly identified and monitor actions at the incident scene to ensure that members are operating within the risk-management plan. These individuals should also maintain personnel accountability, monitor radio traffic and provide situation reports to the incident commander. The person operating in this position should have knowledge of the Incident Action Plan and consider the establishment of safety or collapse zones if needed. The formation of rapid intervention teams and the monitoring of vehicle traffic when companies are operating in or near the roadway are also part of their responsibilities. Other duties may include rehab, infection control, tracking injured members and providing post-incident analysis assistance.

The incident safety officer is also responsible for the development of the "Safety Incident Action Plan." At smaller incidents, this is usually informal or oral and may just be as simple as providing some broad safety considerations. If assistant incident safety officers are utilized, the Safety Incident Action Plan

must be communicated to them. In large and/or long-duration operations, the plan should be written and document the safety aspects of the incident.

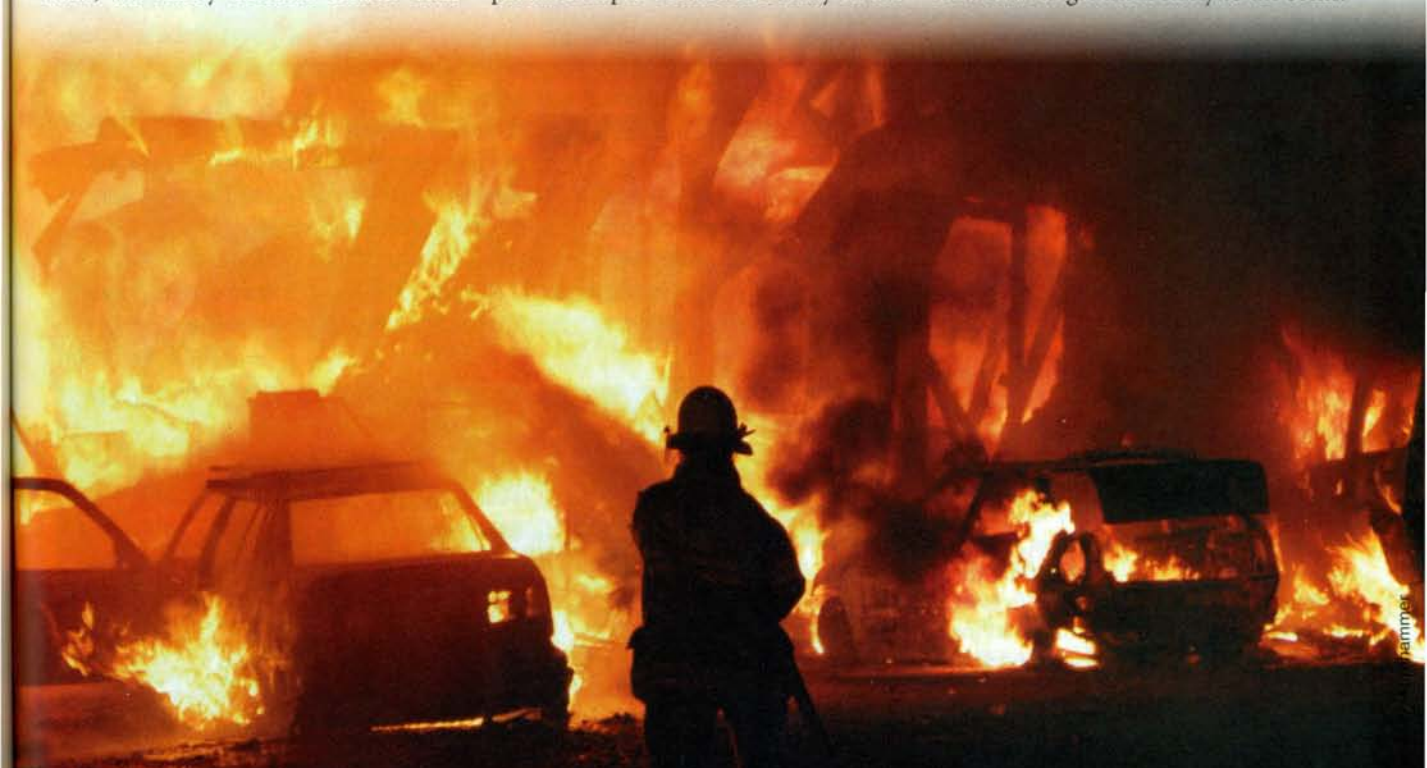
What are we up against when performing these duties in the rural environment? One need to look no further than the National Institute of Safety and Health (NIOSH) Fire Fighter Fatality Investigation and Prevention Program or the National Fire Fighter Near-Miss Reporting System to find rural fire incident specific case studies and information that are invaluable in heightening your awareness of problems encountered and lessons learned. This research, along with incident analysis from other sources such as the Firefighter Close Calls and Responder Safety websites, can easily be incorporated into training sessions to provide examples and real-life training on rural firefighter safety.

Let's look at some of these rural fire protection challenges as they relate to the incident safety officer's tasks. Delayed alarms are a fact of life in the rural environment. I recall an early-morning fire that occurred in a remotely located and unoccupied home. The fire was discovered only after it had vented the building and a partial collapse occurred. A delay in fire

discovery may also occur in agriculture and other farm outbuildings, depending on their proximity to an occupied structure in the area.

If a fire is discovered by a passing motorist, the availability of cellular telephone service may also have an impact. The reporting party may have to travel to an area that has cell service or find a neighbor's home to contact the emergency dispatch center. Another potential influence here is the dispatch services used to notify the local fire department. These can range from a state-of-the-art regional 911 communications center to having the fire telephone ring at the home of the local fire chief. The delay in discovery should be factored into the time portion of the "Value-Time-Size" risk assessment used in developing a Safety Incident Action Plan, as well as making offensive-versus-defensive fire-attack decisions.

Depending on the geographic size of a response area and the distribution of fire stations, extended fire department response times also present safety challenges. Does your department have a policy on responders using personal vehicles for emergency responses? After getting firefighters safely to the station, we now have to get them safely to the scene.



The delay in reporting this incident caused the fire to spread throughout the structure and to the exposed vehicles prior to the arrival of the fire department.

Rural America's fire apparatus range from high-end custom-built rigs to something fabricated out of an old pickup truck in a member's garage. Underpowered and overweight apparatus may also impact response time, and while safety should be a major consideration as to restricting the use of certain vehicles, some rural departments may not have the financial ability or community support to bring their current fleet up to standards.

While geographic location may create longer response times for fire and rescue personnel, a few other rural fire protection concerns also deserve mention. Roads and driveways that will not accommodate the width of emergency vehicles are one barrier to reaching the fire scene. Another is bridges that have been constructed over streams and irrigation ditches. Generally, these structures are not engineered to handle the weight of engines and water tenders. On top of these limited access issues, poorly marked or missing house numbers, especially in the case of long driveways and buildings that are not readily visible from the road, also have an impact on response.

Limited Resources

Limited fire department resources, especially from the staffing perspective, should be a huge concern for the incident safety officer. The challenges of recruitment and retention in rural volunteer fire departments are certainly part of that equation. In attempting to answer the question of what is adequate staffing on the fireground, two National Fire Protection Association (NFPA) standards provide guidance, NFPA 1710 and 1720.

How do you determine whether your department falls under which standard? I have been told that that determination rests on whether the department is career or volunteer. What about combination departments? That little gray area relates to a department being substantially more career than volunteer. In other words, do volunteer firefighters supplement the career firefighters or vice versa? Some departments may fall under both, if career firefighters are used for daytime staffing and volunteers provide coverage at night.

NFPA 1710 concerns personnel deployment and response times to fires and medical emergencies, and is designed primarily for communities with career firefighters. Because of that, NFPA 1710 is more specific as to those items than 1720. NFPA 1710 calls for 14 people to

Rural Water Supply Challenges



Photos by Jay K. Bradish/IFPA

A Smethport, PA, Volunteer Fire Department engine acts as the water-supply engine drafting out of a portable tank to supply an attack engine at the scene of a fatal residential fire in a remote rural area. Tankers from Port Allegheny, Smethport and Eldred Township supplied water to the scene from a drafting site one mile away. The supply engine and portable tank were positioned to allow for simultaneous tanker drops and to maintain one-way emergency traffic so that tankers could access two sides of the portable tank. A portable pump was also placed in a nearby pond, supplying a five-inch line to the portable tank.

Of all the challenges faced by rural firefighters, water supply tends to be the critical benchmark in a successful fireground operation. Knowledge of the water supply types and locations within your response area is a great place to start. What is the closest pond, river access or dry hydrant?

Training is a must in rural water supply operations. In most rural fire departments, this is not a procedure that is performed every day. Training should take place often enough to make sure that the apparatus operators maintain the skills needed to carry out these tasks.

The distance between the water supply and the fireground must be factored into what type of rural water supply operation is required. Drafting from a static source to feed a supply line at the scene and performing a water shuttle are two very different operations. Whatever your decision, the water supply must be capable of delivering the needed fire flow for the duration of the incident.

Offloading site considerations need to include not blocking access to the incident with portable tanks, as well as having room for the tenders to dump water. While staffing is always a challenge, you should have enough personnel working the site to allow for a safe and efficient operation.

—Thomas W. Aurnhammer



A Bradford Township, PA, Volunteer Fire Department engine supplies water to an attack engine at a residential fire 1,000 feet from the highway. A Ludlow Volunteer Fire Department tanker supplies water to the portable tank. The portable tank and tanker dump operations were positioned to allow for one-way traffic past the scene on a major highway.

be gathered on the fireground to perform specific tasks prior to initiating an interior fire attack. On the other hand, NFPA 1720 requires only that the fire department identify minimum staffing requirements to ensure that a sufficient number of members are available to operate on the fireground safely and effectively.

NFPA 1720 provides additional guidance in what it refers to as "rural" and "remote" demand zones. The rural demand zone demographics are defined as a region with a population less than 500 within a square mile area. A response time of 14 minutes and a gathering of six personnel on the fireground for 80% of responses is called for here. In the remote zone, described as areas with a travel distance greater than eight miles (using the ISO travel formula), NFPA 1720 calls for four people on the fireground, with no response time recommendation, 90% of the time.

While this staffing information must be factored into the Safety Incident Action Plan to ensure that members get back to the station in relatively the same condition they were in when the response started, some advances in fire suppression technology can also assist us in maintaining that goal. Compressed-air foam systems (CAFS) and Class A foam can increase safety on the fireground. A large percentage of firefighter injuries and deaths are related to stress and fatigue. It has been reported that the use of CAFS and Class A foam has decreased firefighter fatigue through deployment of lightweight hoses, rapid fire knockdown, reduced overhaul times, and less exposure to heat and products of combustion. The use of this technology should take into consideration other safety issues that include corrosiveness, slip and fall hazards, and the impacts of potential equipment malfunctions. Lightweight portable monitors are another advancement that can increase safety on the fireground. One firefighter operating a lightweight portable monitor for just a few seconds in a "blitz" attack can darken a fire down to the point where interior handlines can be deployed with a greater level of safety.

The advent of the lightweight portable monitor was one of a number of items that have been developed over recent years that have caused me to ask whether we have come "full circle" in our firefighting strategies and tactics. What do we do on the fireground if we do not have enough personnel to mount an interior attack? Not taking any action will certainly increase



The use of compressed-air foam may increase safety on the fireground.

your level of firefighter safety; however, it doesn't do much for meeting the community's expectation of the fire department. These thoughts caused me to go back and reexamine Lloyd Layman's classic text, *Attacking and Extinguishing Interior Fires*.

First published in 1953, Chief Layman's research, experimentation, experience, and skills in the indirect-attack method of firefighting were developed at the U.S. Coast Guard Firefighting School and the Parkersburg, WV, Fire Department. The work done by Chief Layman was considered groundbreaking at the time. For the rural incident safety officer, the book contains information that may help solve part of the low-staffing/fireground-actions equation.

I will provide the caveat that the indirect-attack method is not applicable in every fire. Trapped occupants and other life safety issues may not make this your tactic of choice. I simply present the method here as another tool for the firefighter safety tool box. To avoid oversimplifying this method, the primary purpose is to transfer the excessive heat from the interior of the building to the outside atmosphere. The atmospheric displacement created by the indirect application of a fog stream through an outside window at or near the area of

major fire involvement should produce a rapid generation of steam within the compartment or room. The effectiveness of the indirect-attack method can be estimated by observing the volume of smoke and condensing steam coming from the building during the attack. As Chief Layman noted in his book, training in the fundamentals and techniques in the indirect method of attack must be emphasized.

Other fireground activities such as the development of a water supply, placement of ground ladders, disconnecting utilities and stretching additional lines can be accomplished as additional resources begin to arrive at the scene. Automatic aid and mutual aid agreements will assist in addressing staffing at the incident. Getting help as soon as possible, especially if that help is coming from a considerable distance, can address some of the staffing problems. The incident safety officer must consider personnel accountability and be prepared to add these additional responders into whatever system is being used.

While I have taken a broad overview of incident safety in the rural environment in this segment, part two will take a closer look at specific rural challenges and what the incident safety officer must consider to ensure safe operations.