Hazmat Survival Tips: 10 Initial Response Considerations for First Responders

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Beyond the Rule of Thumb; Survival Tip 46

By Steven De Lisi

First responders learn a considerable amount of information during their basic training, including how to safely respond to incidents involving hazardous materials. Unfortunately, there are almost always "disconnects" between academia and the real world. Hazardous materials response is no exception. This is not to say that basic training is inadequate, but that real-world exposure helps first responders learn what is *really* important to ensure their survival. The 10 initial response considerations discussed in this column are based on personal experience in dealing with numerous incidents and represent items first responders sometimes overlook despite their training and best efforts to manage an incident effectively.

1. Hazardous materials vs. chemicals. The first step to survival is to recognize that any incident can involve chemicals. Despite our regular use of the term "hazardous materials," the term "chemical" is really more appropriate, because terms such as "hazardous materials" and "hazardous substances" are often used in a regulatory context with specific definitions. As a result, some first responders are misled to believe that many chemicals are not a problem because they are not a "hazardous material" as defined by state or federal guidelines. Nothing could be further from the truth. All chemical products likely have some dangerous characteristics, and first responders must be prepared to investigate further. Remember, too, that chemicals can be the original source of a problem because of their accidental release or misuse, or they can be potential exposures caused by other incidents such as fires or structural collapse that threaten the integrity of containers. Without this "attitude adjustment," first responders may downplay the potential for harm when someone on-scene tells them not to worry about the incident because the stuff involved is *not* a hazardous material. When you hear this, remember they are really telling you that the stuff is not a "regulated" hazardous material. It could still hurt you.

2. Chemical involvement that is known, suspected, or discovered. Incidents involving chemicals can be divided into three general categories: (1) those in which the involvement of the chemical is known (overturned gasoline tank truck), (2) those in which the presence of a chemical is suspected (three people unconscious at a chemical warehouse); or (3) those in which the involvement of chemicals is discovered *after* your arrival, such as when you respond on an EMS call for difficulty breathing and discover during patient assessment that the victim has been using a chemical without appropriate personal protective equipment (PPE). The latter category is the one that can get first responders into trouble, because they may fail to act accordingly once they determine that chemicals are involved. After this determination is made, they need to

immediately reevaluate their tactics and, at the very least, put distance between them and the potential sources of exposures. This is sometimes a difficult call when dealing with a potentially contaminated patient, since there may be some reluctance to leave the area if it could lead to charges of abandoning a patient. The best-case scenario is to take the patients with you if they are able to walk. Of course, you can also carry the patient to a safe area, but bear in mind that you may become contaminated while doing so. Remember that this is an EMS call, so you likely were not wearing any PPE except for rubber gloves. Therefore, leaving one or more patients to protect first responders from chemical contamination can present a moral dilemma that can be addressed only on a case-by-case basis. Regardless of whether you leave the area with or without the patient, you must make a decision and act promptly.

3. Means to detect the presence of chemicals. You can determine that a chemical could be involved in an incident by detecting odors, visually observing various characteristics, and by comments from the complainant and bystanders. Detection by odor should always be accidental rather than intentional. If you smell something odd, take that as a clue that a chemical is out of its container. STOP AND RETREAT. The odor may have nothing to do with the incident, but why take a chance until you know for sure?

Detection by visual observation can be related to seeing released product, whether as a vapor cloud, mist, or a liquid or solid spill. Never forget, however, that some chemicals are odorless and colorless, so you cannot detect their presence by sight and smell. You can be exposed and not even know it.

First responders are also taught early in their career that visual identification includes container labels, Department of Transportation (DOT) placards, and signs using the National Fire Protection Association Standard 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*, to identify hazards of materials for emergency response. Remember, though, that there are numerous exceptions and exemptions when using these means of identification. Never interpret the absence of an identification sign to mean that no chemicals are present. Of course, it is of utmost importance that you are a safe distance away when using these visual cues. Picking up a potentially damaged container to read the product label is dangerous to say the least.

Comments from the complainant or bystanders may provide valuable firsthand knowledge regarding the involvement of chemicals in an incident. However, personal experience has shown that all too often these same individuals can be contaminated with the chemical about which they are talking. This can be a very real problem, especially if you invite them into your vehicle on arrival so that you can discuss the particulars of the incident. Always determine their level of involvement with the incident and, if appropriate, begin efforts for decontamination and possible medical treatment. Better safe than sorry!

4. Arrival on-scene. When you arrive at the scene of an incident where there is known or suspected involvement of hazardous materials, STOP a safe distance from the

scene. Just because the complainant or a bystander is waving at you to come closer doesn't mean that all is well. Often, they just think you are lost because you stopped short of the incident. During most incident critiques I have attended, the chief complaint usually was that the first-arriving units parked too close to the source of a release or in an area that allowed them to be easily exposed to a chemical. Of course, this may not apply to incidents when the involvement of chemicals is discovered after your arrival. When this occurs, relocate the vehicles as soon as possible, and be sure to inform additional units responding to hold back a safe distance.

Another concern regarding arrival on the scene of incidents where chemicals are known or suspected to be involved is that first responders may get “tunnel vision” and completely ignore other hazards at the scene, such as fires, potential for explosions, downed power lines, or unstable vehicles. At one training evolution, instructors staged a motor vehicle accident that involved a cargo van transporting a small radioactive source that had struck a utility pole. The first responders did all the right things in identifying the material involved. Unfortunately, two of them “died” because, in their zeal to address the chemical hazards, they failed to observe that a power line had fallen onto the van. They made that discovery only after they touched the vehicle.

5. Isolate, evacuate, and deny entry, This is of the utmost importance because [took out comma] no matter the outcome of an incident that involves chemicals, it is always worse when there are injuries or deaths. Although this might seem like common sense, it always amazes me when first responders are reluctant to close roads or evacuate buildings. All too often they fear accusations of “over-reacting” and creating an “inconvenience,” yet I know of no one who has any regrets for shutting down an interstate route or closing a business. However, I know of those who wish they could do it all over again once they discovered that they failed to act swiftly enough to protect the public and their fellow first responders from exposure to dangerous chemicals. **Remember that an inconvenience is temporary. Dead is forever.**

Actions related to isolation, evacuation, and denying entry are not limited to the initial site of a chemical incident; they apply also to potential exposures. On some occasions, there are homes and businesses just beyond a tree line, and first responders may fail to see these buildings because of the foliage. Unfortunately, airborne vapors or debris from explosions can easily find their way to these exposures. Don’t forget to check the surrounding area beyond just what you can see.

Also, remember to consider weather factors, such as rain that can wash away spilled solid and liquid materials into storm drains, and nearby bodies of water, such as creeks and streams. They can create downstream exposures that include industrial water intakes and recreational areas. Of course, weather conditions are subject to change, so be sure to check on weather forecasts, and act accordingly.

6. Obtain emergency response information. First responders are taught during basic training that they should use the *Emergency Response Guidebook* (*ERG*) and material safety data sheets (MSDS). However, numerous misconceptions often accompany this training. The first one is that when using the *ERG*, first responders must remember the

warning contained in the book's introductory pages "There may be limited value in its application at fixed facility locations."

When dealing with MSDS, first responders are often told that these documents are available at any business on demand. The reality is that the use of MSDS is usually reserved for use by employees who USE a chemical, not those who sell the chemical at a retail outlet or handle it in a warehouse for storage. Although you may find MSDS at these latter locations, don't count on it. Remember that, despite what some may believe, there is NO requirement that the MSDS to be attached to shipping papers. For additional information on the use and availability of MSDS, read Hazardous Materials Survival Tip #4.

The Chemical Transportation Emergency Center (CHEMTREC) is another valuable source for immediate emergency response information, but remember that CHEMTREC is a subscription service for those who manufacture and ship chemicals, so that there may be limited information available on chemicals from companies that do not register with CHEMTREC.

Without a doubt, the best means for obtaining information on a chemical is to contact the manufacturer. They are the people who make, use, and otherwise handle the product on a daily basis, and they know what makes it blow up and how it can make you sick. Contact telephone numbers for these businesses are often found on container labels or on the MSDS; when they are not, you can often find these numbers through directory assistance. Of course, these telephone numbers may be useless during incidents that occur outside of normal business hours. In this case, call directory assistance to obtain the telephone number of the local emergency dispatch center of the community where the manufacturer or shipper is located. Once in touch with the dispatchers, you will often discover that they have after-hour contact numbers for most businesses in their jurisdiction.

7. Defensive vs. offensive. When dealing with a release or a potential release of a chemical, you must decide on your level of intervention. Decisions to engage in offensive operations that include attempts to stop a release *must* take into considerations equipment *and* training. Although it may seem simple enough to close a valve or reposition a leaking drum, remember that if someone gets hurt doing so, the equipment they used, including their PPE, and their level of training *will* be called into question, especially if the state labor department investigates the incident. The potential for civil suits and fines is not out of the question.

As with all decisions during emergency incidents, first responders have only seconds or minutes to act while those who critique these decisions have days, weeks, and sometimes months to complete their investigation. If you can safely isolate an area and wait for personnel with appropriate equipment and training to arrive on-scene, there is usually no rush to proceed. As an example, firefighters once responded to an incident involving a minor leak from a chlorine ton cylinder located outdoors at a factory. After speaking with representatives from the facility, it was determined that the leak could be stopped by simply closing the valve. However, firefighters on-scene were trained only to

the “operations” level and, despite the fact that it was simple to turn the valve handle, they were not trained to “stop” releases. Their structural firefighter clothing was also not designed for chemical exposure. The first responders considered their lack of training and appropriate equipment, along with the fact that there was no immediate risk to the public because of the isolated location of the incident site. Based on these factors, they decided to wait for a hazardous materials team staffed with “technicians” and chemical protective clothing to close the valve. Although there were some questions about why the firefighters could not have made a “quick” entry, there was little to be gained if the responders had stopped the leak, but there was much more to lose in terms of the potential for personal injury, damage to equipment, and potential lawsuits and fines. Don’t forget the moral issues if your decision results in someone’s getting hurt or killed when you could have safely assumed a defensive posture. Always remember to make an informed decision based on weighing risk vs. benefits.

8. Anticipate the worst. Always thoroughly assess all incident factors before acting. They include aspects of the incident that may not be readily visible or that appear to be of no consequence at the time. Unfortunately, these overlooked aspects can create major havoc, so complete a critical analysis of all activities. In one situation, a piece of construction equipment had tipped over while operating on an embankment. During this mishap, a hydraulic line broke, and the fire department responded to contain the leaking fluid. This was easily accomplished, and the fire department stood by while a wrecker service attempted to upright the machine. What the responders failed to do, however, was disconnect the battery cables, and as the machine was repositioned, the engine somehow started, resulting in the entire scene’s being sprayed with hydraulic fluid through the broken line. When the responders were questioned as to how this could occur, the only answer given was that no one thought about the batteries.

During another incident, gasoline was being transferred from a highway cargo tank that had overturned down an embankment. First responders did not secure the tank in its original position, and as the liquid level in the tank dropped, the center of gravity changed and the tank shifted, resulting in its striking one of the emergency response vehicles.

Remember to anticipate changes that could occur during the incident. These changes could involve weather but may also include reduced lighting and staffing issues. If you respond to an incident at 9:00 in the morning, consider that it could last past sunset. Although some just assume that they will use the overhead lighting from their apparatus, you may not want to commit a high-priced vehicle to a chemical emergency where vapors could remove all the chrome and damage hydraulic lines. Instead, portable rental lighting is often a viable option, but these items need to be ordered and on-scene *before* it gets dark.

9. Notifications. Never forget that numerous individuals and agencies have an interest whenever a chemical is released from its container. These agencies include regulatory agencies, such as environmental and public health; enforcement agencies such as police, motor carrier safety, and occupational safety; and those responsible for protecting underground utilities. Notify local and state highway departments whenever

there is damage to a road surface or road shoulder. Any motor vehicle accidents that occur later as a result of this damage could result in charges of negligence against the fire department for failure to notify the highway department of the need for repairs.

Additional notifications include property owners and tenants and industrial assets downstream of incidents that could be affected by contaminants entering water intakes .Also notify local hospitals whenever first responders are engaged in operations that could result in chemical exposure. In that way, the emergency room doctors can be better prepared to react if someone is injured from chemical exposure.

The “responsible party” is to notify the National Response Center of a release of a material that exceeds its “reportable quantity.” First responders *cannot* make this notification on behalf of the responsible party.

Research telephone numbers and points of contact for agency notification before an incident, and be readily available with a checklist. Using such a list will prevent you from overlooking anyone. When making these calls, be sure to keep a record of when the call was made and the point of contact.

10. Establish an effective incident command system. Command and control of resources during incidents necessitates effectively delegating the responsibility for numerous tasks. First responders do not typically use these tasks on a routine basis, so they may sometimes be overlooked. At the very least, sector responsibilities should include the following:

***Scene control*.** This is not limited to traffic control but also includes control of areas that have been evacuated and ensuring the integrity of isolation barriers. Simply placing barrier tape or road cones may not be adequate. Instead, you need someone who can coordinate the efforts of others to ensure that NO ONE enters unsafe areas. There have been situations in which citizens have inadvertently entered a hot zone, such as when a bicyclist rode out of a wooded area directly into a hot zone that had been established around a leaking drum, or when a person walking his dog along a sidewalk was not deterred when confronted with barrier tape (the individual simply lifted the tape, walked under it, and kept on going). Scene control is a never-ending operation, and the person responsible for this task must ensure that strategic points are continuously monitored.

Hazard control. This includes defensive and offensive operations. Besides ensuring the safety of personnel, the individual responsible for hazard control must work closely with those assigned to logistics to ensure that all necessary equipment is available. Remember that equipment for these types of incidents may not always be readily available; sometimes, first responders may have to improvise. This individual must also ensure that those assigned to hazard-control tasks have the proper training and equipment. On some occasions, as when dealing with cleanup contractors who assist first responders, the hazard control officer should request copies of training records for the contractor’s employees. Remember that the contractor’s employees are working side by side with first responders, so make sure these employees know what they are doing.

Medical. In a chemical exposure, the individual assigned as the medical officer must have access to information related to patient care. The medical officer must be capable of conversing intelligently with personnel from the chemical manufacturer, local hospital ER staff, and representatives from the local poison control center instead of attempting to interpret information provided in documents such as the *ERG* and MSDS. Some first responders may be out of their comfort zone when dealing with a chemical they have never encountered, so you must be confident this person's ability to manage patient care effectively. The medical officer must also ensure that patients are decontaminated prior to receiving any level of medical care. This necessitates that this individual "hold back" EMS providers who may be anxious to treat patients while ignoring their own safety. He must be organized, disciplined, and capable of thoroughly documenting all activities that take place related to patient care.

Public protection. During a chemical emergency, the pace of activities is considerable. The individual assigned to deal with notifying the public and setting up shelters must make decisions quickly. Furthermore, he may be faced with questions from the public regarding chemical exposure and possible health effects. He must be capable of providing appropriate information while establishing confidence in your operation. This is not always something that can be accomplished by the department's public information officer, since he may not be familiar with how to describe a chemical's health effects in a manner that does not create unnecessary alarm in the community.

As an example, during one incident, latex paint had been introduced into a community's domestic water supply. The local emergency operations center was activated to deal with the many facets of the response. At one point, the individual responsible for public protection received a call from a woman who was frantic because she was pregnant and had consumed a glass of potentially contaminated water. Her question to the public protection officer was, "Will my baby die?" The person who responds to this question needs to have the facts and the ability to communicate in a compassionate manner.

*** After more than 25 years in emergency services, I have learned that immediate threats posed by emergency incidents will eventually subside. Left on their own, all fires will go out, all leaks from damaged containers will end, and pressure vessels exposed to excessive heat will either withstand the thermal assault or explode. When we arrive on-scene, we can allow the incident to take its natural course, or we can intervene in an attempt to change the outcome. Remember, though, that our goal must always be to create a *better* outcome than the one that would occur naturally and to do so in a manner that does not expose our personnel or the public to unnecessary risk.

Steven De Lisi

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