

---

**SITE MANAGEMENT FOR PERSONAL PROTECTION**

---

For many participants, management issues were equally, if not more, important than equipment concerns to the personal protection of emergency responders and others at terrorist-incident sites. Such issues included establishing effective management structures and practices on-site, risk assessment and communications, and PPE enforcement. This chapter reviews key management tasks and functions emergency responders carried out—both in the initial response and during sustained campaigns—at the terrorist-attack sites, as they relate to health and safety and personal protective equipment.

**COMMANDING AUTHORITY**

A continuing refrain throughout the conference was the need to rapidly establish a single controlling authority or unified command. A smooth and expeditious transition from initial chaotic response characterized by independent service commands to a coordinated incident command with either a single commander or a unified command structure was seen as desirable. Health and safety officials, as well as special-operations personnel, lamented the lack of a unified authority and command structure at the World Trade Center site, a situation initially caused by the loss of key leaders during the building collapse, but one that persisted for several months after the terrorist attack. The absence of an overall authority had important implications for responder health and safety.

Health and safety officials said that the lack of a clear command structure at the World Trade Center thwarted efforts to enforce PPE use and risk-reduction behaviors. A host of organizations from the federal, state, and local level, as well as the private sector, had representatives either permanently or periodically on site. Panelists reported that the PPE standards and procedures they were supposed to follow varied widely. Some organizations had no standards or procedures at all. After the initial response, for example, the City of New York partitioned the site and hired four contractors to remove debris. Each contractor

was subject to U.S. Occupational Safety and Health Administration (OSHA) rules, faced the possibility of worker's compensation claims, and was responsible for its own workforce. However, contractor policy on PPE varied, and as a result, employees working next to each other were wearing different levels of protection.

At the Pentagon, inner and outer perimeters were established early on, and a clear command structure made enforcement of PPE more straightforward. Attendees cited similar successes at the Murrah Federal Building in Oklahoma City. A firefighter summed up the situation in Oklahoma City: "You didn't have to wear personal protective equipment, but if you didn't wear PPE, you didn't work on site."

I guess it was about day three or four that [a person at the Pentagon response] actually put together a safety team briefing, because everybody had their own safety officer, if you will. USAR had theirs, we had ours, FBI had theirs, Army had theirs. So we finally put together a unified command of safety officers who met once every 12-hour block to bring back all the information and decide what was going to be appropriate safety precautions, gear, etc. . . . If you were operating here, it was going to be this. We came up with what the appropriate [PPE] level was, what filter would we wear in our filter masks. Not just the first one that you come across, but which level of filtration will be correct.

—Firefighter-special-operations panel member

Finally, there was a consensus among health and safety specialists that a unified and clear chain of command helped address information-flow issues. The absence of such an authority at the World Trade Center made coherent information gathering and dissemination difficult and hindered the specialists' ability to assess and report hazards. A high-level, unified command at the Pentagon was seen as improving health and safety specialists' access to key decisionmakers on site, a key communication issue. Related to this, clearer site control helped to coordinate information provided to site workers and the media and enhanced its credibility.

## INCIDENT DEFINITION

Incident definition and transition is another complex management-policy challenge. One health and safety panel member said, "The biggest problem is, when does a situation go from a routine fire where the fire department is in control to become a disaster? When does authority change?" This issue has major implications for PPE requirements, since different kinds of equipment will be called for at a fire site than at a biohazard or chemical hazard site.

[It's] what we call in the fire service a "continuing size up." What's your initial problem? Plane into the building. Second problem? Fire. You've got people involved in both cases. . . . So you're operating in a fire mode as you gather more information, as you determine, "Hey, the second plane hits, maybe I'm dealing with a terrorist event."

—*Firefighter-special-operations panel member*

At some point, site operations transition from rescue to recovery. This has important ramifications for other aspects of site control, such as PPE supply and enforcement. Defining that point can be both politically difficult and emotional. Views expressed by several special-operations and federal-and-state-agency panel members suggested that officials' realization that there would be a long, sustained campaign at the World Trade Center site came slowly. Within a few days, most believed that no one was going to be found alive in the rubble. Nevertheless, the improvisational approach to PPE use and supervision characteristic of the initial, "urgent" phase of the response (characterized by the principle "risk a life to save a life") was allowed to go on far too long, in the view of these panelists. This resulted in unnecessary risks being taken.

Conversely, as time passes, some hazards also decline. For example, as noted by members of the trades panel, the dust at the World Trade Center began to settle, and people did not require as high a level of breathing protection as they did initially. However, scaling back the level of protection and ensuring that everyone at the site receives accurate information as conditions change is a perpetual challenge. Again, a central site authority can facilitate this process. This issue is not minor, because emergency procedures to save a life may justify accepting a level of risk that is not warranted in recovering the dead.

## SCENE CONTROL

A second recurring refrain was the need for immediate and effective perimeter or scene control. Initially, at the terrorist-attack sites, this consisted of responders personally "holding people back" and isolating the scene. As the response evolved, it was necessary to erect a hard perimeter—in this case, a chain-link fence—to make sure that only essential personnel, operating under the direction of the scene commander, were on-site.

Initially, the World Trade Center site had more than 30 access points. Three months after the attack, the number had been reduced to five. The Pentagon site was secured relatively quickly, largely by means of erecting a fence and establishing entry and exit points. The need for rapid emplacement of a perimeter fence was prompted by lessons learned from the Oklahoma City bombing. It was noted in the plenary sessions of the conference and in the EMS panel that

site evacuations occurred in response to concern about a secondary explosive device in Oklahoma City and a second incoming airplane at the Pentagon. These evacuations facilitated rapid site isolation and control: Once everyone evacuated, the command structure was able to set up a perimeter to keep nonessential personnel out.

In Oklahoma City we had the same problem: Everybody was coming. What saved us was we had the second bomb scare and we evacuated everybody. That allowed the PD to put up a hard perimeter. The National Guard, I think, is the best, because they're not going to do the police officer a favor, they're not going to do the fireman a favor, and once we got our perimeter, you weren't getting in, no matter who you were.

—*Firefighter-special-operations panel member*

Establishment of perimeter control at the sites was determined by several factors. One was location. The World Trade Center and the Murrah Federal Building were located in urban areas, making scene control more difficult. Perimeter control at the Pentagon was much more manageable: The site was easier to isolate because the Pentagon is surrounded by freeways, parking lots, and park land, and the very large building itself formed part of the barrier. Furthermore, the federal, state, and local agencies involved were accustomed to working with each other and had practiced emergency-response drills. Several firefighters agreed: “What made it [effective] was the training that we do all the time with the other jurisdictions, commands, and knowing the people.” In addition, at the Pentagon, armed and uniformed military personnel were nearby and available to assist in controlling access relatively early.

Perimeter control facilitated enforcement of PPE standards, training, and decontamination. If the PPE standard was a hard hat and a Tyvek™ overgarment, that standard could be monitored and enforced at the controlled entry points. Persons who were not equipped either donned protection available there or did not enter the site: The use of personal protective equipment became part of the “admission ticket” needed to participate in the Pentagon response.

By the time the MPs were in place the next morning [September 12], plus Virginia State Police as well as county police, we had pretty good control. Then they ended up getting in a chain-link fence. We actually went to an ID system that was set up. It wasn't that great. But finally, within a period of time, you actually had to show ID. They had a picture ID that they printed for you right there, and somebody had to vouch for you and/or show your ID to get in. But that was days into the process.

—*Firefighter-special-operations panel member*

The need for appropriate credentialing was viewed as another essential aspect of perimeter control. Health and safety officials reported considerable confusion and inconsistency at the World Trade Center over who should be allowed into the site and what constituted credentials. In the early phases of the response, said one representative, occupational-health-and-safety personnel had difficulty getting into the site, while “anyone who showed up in scrubs” was admitted. Another panelist reported, “I couldn’t get in with a federal ID, but I could have gotten in with a PD shirt or a bunker coat.” In contrast, commanders at the Pentagon made use of federal ID badges to create a credentialing system that went into effect within the first few days of the attack there. Trades panel members indicated that putting site control in the hands of an agency from outside the local area, such as the National Guard, was a good strategy. Using an outside agency increases the potential for uniform enforcement of rules to keep out individuals who are not authorized to be on the site.

Proper credentialing was cited as critical for the management and safe activities of volunteers, off-duty responders, and other interested parties (including the media and VIPs).

## INTERNAL PERIMETER CONTROL

Control of the site perimeter is only part of the scene-control task. Some panelists indicated that it is also necessary to establish control within the site, particularly with an eye to identifying zones with different levels of hazard and consequently different PPE requirements. At the World Trade Center, officials attempted to do this by painting a green line to delineate an interior perimeter within which personal protective equipment use was required. But this did not work well, in large part due to poor information dissemination and the lack of a central authority to enforce the boundary lines. “I didn’t see no green line,” said one emergency medical responder. Ultimately, by requiring special “confined space entry” permits to get to the below-grade-level areas at the World Trade Center site (after significant amounts of rubble had been removed), the New York City Department of Design and Construction was able to enforce specific PPE requirements and track personnel in these areas.

I think what needs to be established quickly are zones. Everybody that was at Ground Zero didn’t need the same respiratory protection [as] somebody that was outlying with just debris, construction, and traffic kinds of issues. . . . Early on, zones need to be firmly established and recognized.

—*Firefighter-special-operations panel member*

The concept of inner and outer perimeters was widely endorsed by health and safety officials as critical to allowing health and safety responders to function effectively.

## PERSONAL PROTECTIVE EQUIPMENT ENFORCEMENT

Enforcement of PPE use varied significantly between the initial and sustained response phases. It was widely acknowledged that emergency responders assumed higher risks in the initial stage of their efforts to rescue victims.

[It's] the nature of fire rescue, of law-enforcement personnel . . . when you're confronted with a situation with the potential loss of life, that you will respond. It's not a second thought, you will respond to do what is necessary to rescue individuals wherever they are. We've violated probably every precautionary measure established by NIOSH, etc., but I think when you're confronted with the realities of life, people are going to do what their instincts tell them, and that's to save lives. They'll think about the consequences secondary.

—*Law-enforcement-panel member*

However, several panelists noted that significant risk-taking behavior became somewhat regularized at the World Trade Center site and continued long after the urgency from which it stemmed had passed. Similarly, over the sustained response campaign, enforcement of PPE use at the World Trade Center was seen as significantly more variable than it was at the Pentagon. For example, federal and state panelists noted that enforcement of PPE regulations at the World Trade Center site was, in some instances during the sustained-response phase, purposely relaxed or waived, because a strict enforcement of rules would have required shutting down the entire response operation. Greater variation in PPE use at that site was also due to the fact that regulatory agencies appear to have focused on helping the responders do their jobs safely rather than on citing them for noncompliance. As one federal-and-state-agency panelist noted, when OSHA representatives first arrived on the scene, they acted in an advisory capacity, making sure that workers “understood how things were changing on-site, and what may need to start happening.”

Conference attendees highlighted state and federal agencies as very important for enforcing use of personal protective equipment at incident sites. Vesting PPE enforcement authority in an “independent” organization that is not directly involved in the response itself was seen as positive. Having an independent enforcement authority reduces the potential for interagency conflicts—for example, police (with their unique set of standards for personal protective

equipment and practices) trying to enforce measures on the local fire department.

Twice that I know of, they were going to shut down the World Trade Center site completely because of environmental and health issues. They were really pushing for this. Calmer heads prevailed because, can you imagine the political and social impact of just shutting down the World Trade Center at that period of time early on?

— *Federal-and-state-agency panel member*

At the World Trade Center, Pentagon, and Oklahoma City sites, a host of federal, state, and local-level response organizations sent representatives. Members of these groups follow the rules or standard operating procedures and levels of attention of their parent organizations with respect to personal protective equipment. Over time, a wide variation in PPE use makes enforcement difficult. One picture passed around the trades panel showed four workers next to each other, each wearing a different level of breathing protection: One had an SCBA, one had a half-face respirator with canister filters, one had a dust mask, and one had no breathing protection (however, as one panelist noted, he was wearing a hard hat). Such wide variances in PPE use made enforcement difficult: “He’s not wearing it, why should I?” was the attitude among many, said a trades panel member. In addition to variation by organization, special-operations personnel noted, PPE enforcement varied by shift supervisor and from squad to squad.

Several instances of variation in PPE enforcement at the World Trade Center were noted in the panel discussions. Protection from falls was available at the site in the form of harnesses and ropes, but according to members of the trades panel, its use was spotty. The equipment takes time to install, and, initially at least, personnel were loath to delay rescue efforts to install it. Another issue was the use of cranes with personnel baskets to lift and position workers. While the practice is common elsewhere, workers at conventional construction sites in New York City are not permitted to use personnel baskets. As a result, they were unfamiliar with the stringent safety procedures required.<sup>1</sup>

Similarly, visibility-enhancing garments, which were available at the World Trade Center site, were not universally worn, in spite of the fact that the hazard of being struck by a vehicle or piece of equipment was relatively high. Once the debris-removal effort progressed from the initial bucket brigade, the site had a large number of vehicles moving around it, from Gators (small, wheeled utility

---

<sup>1</sup>An occupant in a personnel basket should be secured by a harness with the ropes attached above the ball on the crane cable, but apparently this rarely occurred at the World Trade Center site.

vehicles) to heavy construction equipment. The site operated 24 hours a day, and the dust hampered visibility. The personal protective equipment that was available worked well enough, and supplies were ample. Information and enforcement were the issues.

It's a timeliness issue. Are we saving a person's life now or going to get the equipment to put on first? What wins? The person does. It's as simple as that.

—*Law-enforcement panel member*

Beyond enforcement, a principal determinant of PPE use, according to a consensus among firefighters, was whether it was interfering with their job. A case in point was Personal Alert Safety Systems (PASS), which, among other functions, sense if the wearer has stopped moving for a significant interval. The large number of false alarms at the World Trade Center motivated most firefighters to turn them off or leave them behind. "People won't turn them on because of the nuisance alarms," declared a special-operations panelist. Several other panelists pointed out that the weather was relatively mild during the responses to the terrorist events. If the weather had been hot or cold or rainy, PPE performance and use could have been much worse. Clearly, perceiving hazards also provides an incentive for workers to wear PPE. After an article appeared in a local newspaper discussing the threat posed by asbestos fibers used in a portion of the construction at the World Trade Center, respirator use increased dramatically. Finally, positive incentives can also boost PPE use. A trades panel member noted that PPE tended to be worn at the World Trade Center site if it were somehow related to the incident. As one member put it, "Anything with a flag on it got worn."