

## **Proactive Safety Professionals Create Successful Fall Protection Solutions: A Case Study**

**Marjory E. Anderson, CSP  
Safety Engineer  
Architect of the Capitol  
Washington, DC**

**Kevin E. Wilcox, PE. CSP  
Principal  
LJB Inc.  
Dayton, OH**

### **Introduction**

Safety professionals often have contact with a variety of people in a variety of different occupations. Although it is the job of the safety professional to ensure safe operations, achieving safe conditions involves many different people and roles. Proactive safety professionals can create successful fall protection, and other project solutions, by reaching out to other professions – teaching them about safety and involving them in the process of reducing risk.

To illustrate how being proactive with other professionals can contribute to overall safety success, a case study from the Architect of the Capitol (AOC) will be used. AOC is charged with the care and preservation of the nation's historic buildings and treasures. Buildings include the U.S. Capitol, House and Senate office buildings, dorms, and day care centers, as well as off-campus facilities such as warehouses and industrial facilities. Project types include renovation, construction, and demolition, involving various sites both on and off Capitol Hill. With the variety of project types and locations, AOC personnel have a wide variety of experience in engineering, architecture, design, and, of course, safety.

### **The AOC Success Story: The Beginning**

Although some of the AOC's actual work tasks and sites are different from a typical industrial or commercial organization, others echo those found in private industry settings. The breakdown of responsibilities has obvious parallels. Within a manufacturing company, the safety department may set policies, but the various manufacturing departments have to execute those policies. For the AOC, the Safety and Occupational Health Branch acts as the central safety office (AOC Safety) and develops policies and procedures. Then, the various AOC jurisdictions – such as the Senate, Botanic Garden, or Library of Congress — act as satellite offices or departments and are charged with implementing the policies.

In 2006, AOC Safety learned the current fall protection systems in place throughout the Capitol campus needed to be certified. The certifications were to be completed in accordance with ANSI Z359 standards to allow for third-party inspections and to ensure proper use. In the process of attempting to certify the systems, a number of significant deficiencies were identified; therefore AOC Safety personnel recommended a new course of action: design and install new systems, rather than modify the existing systems.

Many meetings ensued to develop understanding and reach consensus among AOC engineers, architects, and historians. It took time, patience, and hard work to develop this new project, and to positively and proactively address any deficiency.

It is not surprising that the systems, which were once thought to be compliant, came to be viewed as inadequate. At first glance, many perceive fall protection to be simple. In fact, it is commonly boiled down to “ABC” – Anchorage, Body Support, Connector.” The reality is that fall protection is actually very complex, from both the engineering and behavioral safety aspects. A seemingly innocent change during construction, such as moving an anchor two feet to avoid a roof drain, can change a system from a travel restraint system to a fall arrest system. This change has significant repercussions on equipment, procedures and training provided to workers. Inattention to a horizontal lifeline detail, such as friction around corner supports, can lead to a system that is taught at one end and sagging to the point that it lies limp on the roof on the other end.

The goal of these initial meetings was to determine how the agency would proceed. Several legitimate concerns needed to be addressed. AOC safety professionals worked with team members to solicit other points of view and were willing to compromise on some issues in order to develop the best solution. Fall protection solutions not only have to comply with OSHA regulations, but they also must be practical and beneficial to the environment in which they will be utilized. It is imperative to work with other members of project teams to address all concerns by the best means feasible.



**Exhibit 1. This photo shows an example of an existing, deficient horizontal lifeline system.**

## The AOC Success Story: From All Angles

The various professionals involved all brought different viewpoints and concerns to the discussions. Architects and historians were concerned with maintaining the historic aesthetics of the buildings. This may sound like a frivolous concern to the average safety professional, but when dealing with historic structures, it is anything but frivolous. Buildings constructed 100 or 200 years ago were constructed to very different standards. Buildings were commonly more decorative and often excluded features we see as standard today. For example, the oldest staircases in the U.S. Capitol Building have never had handrails, and the roofs did not include guardrails.

For safety professionals, it is tempting to challenge the importance of history and aesthetics in light of the ethical and moral obligation to save lives. However, picture what the U.S. Capitol Building would look like today if a standard 42-inch, safety yellow guardrail were installed around the flat roof and the dome, as illustrated in Exhibit 2. Working on historic buildings always requires creativity and outside-the-box thinking. The group had to work together to determine if current codes could be met with the use of historic looking materials, or if there was another option for protecting employees.



**Exhibit 2. This graphic illustrates what the U.S. Capitol Building would look like with standard guardrail—highlighting the need to incorporate aesthetics into safety decisions.**

On the other hand, the engineers were concerned that new penetrations in roofs would cause other maintenance and deterioration problems. AOC-maintained buildings were constructed

between 1793 and 1980. As buildings age, maintenance challenges can develop, and no one wanted to exacerbate those issues. For example, roofs develop leaks as they age, and building materials settle. Adding new penetrations to the roofs to install new fall protection systems could easily lead to more and larger leaks. Therefore, the group researched whether the current systems could be reused to any extent, or if there was better technology for sealing new penetrations.

In addition to the members of the project team, AOC employees who needed to work on the roofs around the Capitol campus – the eventual users of the fall protection solutions – had their own concerns. To be practical, the designed systems needed to be integrated into their existing jobs, without creating obstacles to completing their required tasks. In short, the new systems had to be designed so that the employees would be willing to use them and still be able to complete their job functions. To provide the assurance of 100 percent protection for workers, the solutions developed had to ensure that every space on the roofs that needed to be reached could be without employees having to disengage the fall protection and possibly increase the risk to life and safety.

These user concerns were extremely important and had to be considered as integral to the design. Safety professionals must always remember that, no matter how compliant a system is with safety regulations, it is pointless if it won't be used. If solutions are impractical, difficult to use, or become an obstacle to task completion, the likelihood of proper usage drastically decreases.

In an effort to adequately address these concerns, AOC Safety developed a Fall Protection Committee comprised of AOC employees and safety professionals. Meetings were held to determine what tasks required using fall protection, how these tasks were accomplished, and what employees were looking for in a fall protection system. The information gathered proved invaluable to the project, and provided significant direction to the design process. Employee input should always be sought out by safety professionals since the workers know the intimate details of the tasks they complete. Because of this, employees also can tell project teams what may work and what may not, potentially avoiding redesign and retrofit difficulties in the future.

## **The AOC Success Story: Expert Consultation**

AOC Safety began by working with an external fall protection consultant who was hired to complete the initial certification project, to develop a method to answer concerns, and prove deficiencies. The consultant confirmed that there were other means to provide fall protection, aside from railings. Also, the consultant explained that the type of material used for railings was not specified by regulations. As a result, compliant railings built of more attractive wrought iron, brass, or other materials could be used to preserve historic aesthetics. Railings also could be concealed when not in use, as was eventually implemented on the Supreme Court building. The railing shown in Exhibit 3 folds down when not needed, and is hidden by a trim piece that is painted to match the marble façade.



**Exhibit 3. To maintain the building's aesthetic and historic value, the new guardrail on the roof of the Supreme Court Building folds down when not in use.**

Next, the consultant addressed the concern of penetrations by showing that systems were available that required fewer penetrations than the current systems. In addition, the consultant created design concepts that would reuse as much of the existing equipment as possible. This addressed the immediate concerns for maintenance and aesthetics. Still, the question remained: How would we decide what could be reused and what couldn't?

The final answer was to conduct load testing on individual anchor points. This process resulted in confirming which anchors would be useable in the new systems, and provided verification that the deficiencies noted by the consultant were legitimate safety issues. It became clear that the issues with the existing systems needed to be addressed. The team made a conscious effort to focus on the present condition and the new fall protection standards. This collaborative attitude included bringing the previous project team on board to work on the new systems.

## **The AOC Success Story: The Journey Continues**

Due to the shared vision of the project team and their work to proactively coordinate efforts, AOC Safety was able to implement new systems that meet the most current ANSI standards. Regardless of how tedious the efforts may appear to be, safety professionals will ultimately be more successful when they reach out to other professionals and end users by involving them in the decision-making process. By doing this, safety professionals can further educate their colleagues and provide the safest work environments possible for them.

Although the following recommendations may seem obvious, applying them will make a positive difference for any safety program.

- Don't sit back waiting for the project team to find you. Seek them out, talk to them, and explain what you need.

- Have some recommendations in your back pocket. These recommendations may not be what are ultimately chosen as the solution to the problem, but it shows that you are willing to work with other professionals on their turf.
- Above all: listen, listen, listen. Developing a mutually agreeable solution is much easier when you fully understand others' unique points of view.

It is through efforts such as these that safety professionals can build strong working relationships with project team members. In fact, at the AOC, engineers, architects, and project managers actively seek out AOC Safety personnel to ask questions regarding safety requirements. This has made safety important to everyone and a focus on every project. Although it has been a four-year process, the journey was as worthwhile as achieving the final results.

While safety professionals ultimately strive to have their safety programs be self-sustaining, most are not. Given the complexities of fall protection, and the countless sources of misinformation available to well-meaning, but ill-informed designers, a successful fall protection program will only be maintained by proactive safety professionals. If you think your work is done and move on to another safety program, you will likely come back in a year to realize that all your hard work, education, and momentum has worn off. A fall protection program, as any safety program, will only stay meaningful when safety professionals remain constantly engaged. As we learned at the AOC, in the end, it is all worth the effort.