

Safe at Any Height by David Evangelista, PE



For years, workers have been "free climbing" the high steel in arenas to hang sports banners from the home team's latest championship, perform maintenance work on scoreboards and lighting, or to rig the circus that just arrived in town or the latest rock tour. New OSHA regulations have increased awareness of the hazards associated with this work. Installation of a properly designed fall protection system addresses these hazards, resulting in safer work practices; improved compliance with OSHA regulations; and reduced liability to building owners, managers and designers.

OSHA Regulations

In February 1995, OSHA enacted regulations that focused attention on fall hazards. In general, this regulation stipulates that "...each employee on a walking/working surface with an unprotected side or edge which is six feet or more above a lower level shall be protected from falling..." This regulation, known as "CFR1926 SubPart M", was developed specifically for fall protection in the construction industry. Nevertheless, it has been unofficially adopted as the universal standard while OSHA continues efforts to develop the regulations for fall protection in the workplace.

Enactment of this new regulation has increased awareness within our industry of the dangers associated with working at heights. In arenas, riggers working at high elevation are at greatest risk. Any time these workers leave the confines of the catwalk and venture onto the steel beams, they are in danger of a fall which could result in serious injury or a fatality.

In several instances, arena management has been cited by OSHA officials for allowing riggers to work without protection. In at least one instance, a fine has been levied. Continued failure to provide protection can result in an increase in such fines to as much as \$70,000 per occurrence for what is termed a "willful violation."

Types of Systems

The OSHA regulations recognize several different types of fall protection systems, including guardrails, safety nets, fall arrest systems, positioning device systems, warning line systems, controlled access zones and safety monitoring systems. Of these systems, the fall arrest system best meets the needs of employees working on high steel.

In a properly designed fall arrest system, the worker wears a full body harness and is equipped with an arresting device, such as a shock absorbing lanyard or self-retracting lifeline. These devices are required to have specific performance characteristics, including maximum free fall distance, deceleration distance and arresting force. In an arena setting, this equipment is used in conjunction with a horizontal lifeline. When properly installed, a horizontal lifeline will permit the worker to attach onto the system prior to leaving the catwalk and travel along the beam or

truss to the work location.

Design and Installation

The design and installation of a horizontal lifeline system requires specialized knowledge and training. Design alternatives include highly elastic single span synthetic cable systems, multi-span stainless steel cable systems or systems that include an in-line shock absorbing or energy dissipating device. The performance of the system is dependent on the total length of the cable, the system's elasticity, maximum single span length, cable pretension and maximum number of workers attached to a cable at any time. To comply with OSHA regulations, the structure to which the horizontal lifeline is attached must be capable of supporting the significant loads which develop in the cable during a fall. Typically, this requires a review or analysis of the supporting structure. For these reasons, OSHA requires that the design of horizontal lifeline systems must only be performed by qualified persons.

Building owners, managers and designers have long recognized the revenues that can be generated from booking touring performances. They are also aware that by rigging the sound and lights for these shows, sight lines are improved, making more seats available for sale. Recent arena designs have provided for increased roof truss capacities and additional structural members specifically to accommodate rigged shows. To protect the riggers, an effective fall protection system can be designed and installed during new arena construction or as a modification to existing arenas. Implementation of such a system will provide a safe working environment for riggers and other workers, resulting in improved compliance with OSHA regulations and reduced liability to building owners, managers and designers.

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