Fall protection for construction workers on conventional structural steel, of the type used in high-rise buildings, is fairly simple: build guardrails at the building wall lines as floors are completed and around floor openings; and use other fall protection methods until guardrails are in place. This type of structural steel frame has the mass and strength needed to attach personal fall arrest systems (PFAS) and safety nets.

The Occupational Safety and Health Administration (OSHA) has requirements for workers erecting structural steel. These can be found in 29 CFR 1926 Subpart R (Sections 750 through 761 and appendices). These are available as free downloads from www.osha.gov; click on “Standards,” then click on “Construction,” and scroll down to the appropriate section. Specifically, the standards for engineered metal buildings are found in 29 CFR 1926.758; and those for fall protection in 1926.760.
The engineered steel building presents greater challenges, since it is a form of lightweight construction. It is designed with long roof spans, high ceilings, and enough strength to support itself, the snow and wind loads require by building codes, and any other designed loads that the building frame will carry. There may be enough strength to attach PFAS at designated locations, often using special connectors to the building frame or metal roof. Attachment of guardrails is usually not possible due to the lack of strength at the point of attachment; and due to the need to bolt or weld the guardrail brackets to surfaces that will be visible in the finished building, or that will be exposed to the weather when the building is complete. In this type of building, heavy interior loads like mezzanines are often supported from structural steel supports that are independent of the building frame and its foundations. In photo 1, the column in the center is part of the building frame. The column on either side of the center column is part of the separate support system for the pre-cast concrete plank mezzanine inside the building.
Photo 2 shows a community sports and activity center under construction. The roof will be 35-40 feet above the floor when it is complete. The building will enclose several acres, including a soccer field at the far left; an ice arena for hockey and skating at the far right; and a multi-purpose space in between that can be configured for basketball, volleyball, tennis, and other athletic activities.
Because of the light weight of this building, the assembly of the structural frame is usually done from aerial work platforms. Photo 3 shows steel erectors working from telescoping boom aerial work platforms while connecting bracing between structural steel and the purlins that will support the roof.
Photo 4 shows part of the interior of the same building with the steel banding and membrane that will support the insulation below the roof. Please be aware that this membrane and banding are usually not strong enough to be considered fall protection according to OSHA's 29 CFR 1926.760.

Fall protection for the installers of the roof panels at the perimeter of the building will be provided by aerial work platforms. Fall protection for the rest of the roof will use PFAS and patented anchors that clamp to the ridges and standing seams of the roof panels. The PFAS will use retractable lifelines which are required to withstand 3,000 pounds dynamic load, rather than static lifelines whose anchors are required to withstand 5,000 pounds dynamic load.

The OSHA standards require that the contractor using PFAS have a rescue plan in place should a worker fall and be stopped by a PFAS. Many contractors assume that calling 9-
1-1 is plan enough. Although most emergency response agencies have aerial apparatus or can get them under mutual aid agreements, the ground conditions on most construction job sites are not suitable for driving or supporting these types of vehicles.

A simple plan used by some contractors is to stop work immediately if there is a fall; to call 9-1-1 for emergency medical services; and to use aerial work platforms that are already on site to gain access to the worker who is suspended by lifeline and harness. If the fallen worker is uninjured and alert, his harness can be disconnected and reconnected to an anchor point in the aerial work platform; and he can be lowered to the ground. On arrival, emergency responders will have to deal only with a medical assessment and transport for further evaluation and treatment, rather than with a technical rescue. This type of plan must be in writing; workers must be trained in using the plan and rescue equipment; and the plan must be exercised periodically.

If the fallen worker is unconscious, the contractor employees can use an aerial work platform to support him, reducing the possibility of compression injuries from the fall protection harness; and wait for rescue personnel to arrive to assess, package, and lower the patient to the ground.

Visits by fire companies and fire inspectors to these job sites provide the opportunity for emergency responders to discuss rescue procedures with contractor supervisors before any incident happens; and to become acquainted with the all-terrain equipment that is already on site and that is more suitable for work at this location than truck-mounted aerial apparatus.

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