



11: SAFETY CONSIDERATIONS

by Amanda Gibney Weko and Joseph DeAngelis, AIA, LEED AP



DEVIL'S DETAIL

SUCCESS IN SAFETY

Today, glazing products and assemblies provide many of the qualities that both the design community and the public have come to expect in their buildings. Consequently, glass is being used throughout the world more extensively and creatively as a building material. To meet the growing demand and associated challenges of glass work, glazing contractors and installers must consider a myriad of factors as they prepare for and approach each project.

Previous editions of the Devil's Details described the production and fabrication processes for different glazing assemblies. A major factor in delivering a successful project that every glazing contractor must tackle is the best means for furnishing and installing the work. Foremost among those decisions is accessing the areas where their work will be performed. In addition to their knowledge and expertise with a multitude of glazing assemblies, glaziers must be proficient in the operation of specialty construction equipment necessary for them to perform their work. Ultimately, glaziers spend much of their time working from aerial lifts or swing stage scaffolds to access elevated and remote locations.

ELEVATED WORK

Aerial lifts and swing stage scaffolds are some of the most common equipment used to perform work at elevated areas. These devices have evolved over time to replace traditional pipe scaffolding. OSHA defines aerial lifts as "any vehicle-mounted device, telescoping or articulating, or both, which is used to position personnel."

Operating instruction for these devices starts early during apprenticeship at the Finishing Trades Institute with The National Glaziers, Architectural Metal, and Glass Workers Educational Program. During instruction, apprentices learn the safe operation and use of a suspended scaffold, beginning with secure anchorage. (Image 1)

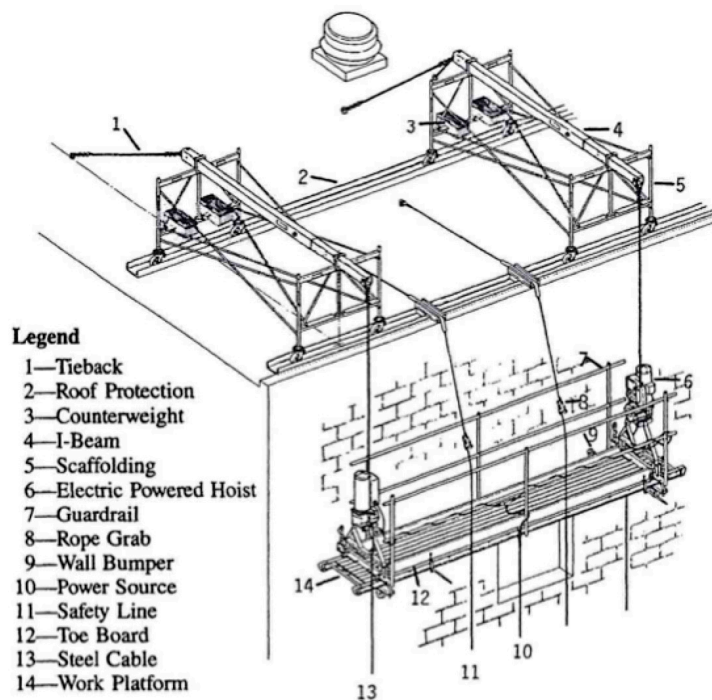


Image 1: Anatomy of a swing stage scaffold



First, the weight of the scaffold and its occupants must be calculated to verify that both can be supported by the structure to which it will be attached, and by individual scaffold components that make up the anchorage system. Swing stage scaffolds are designed to be raised and lowered via wire rope attached to a hoist, and must be capable of supporting the personnel and their tools and materials. They are typically staged or accessed from the ground or rooftop, and then raised or lowered to the required elevation.

FALL PROTECTION

Since most glazing work involves great heights, instructors spend a considerable amount of time on the topic of fall protection. If working on any scaffold 10 feet or more above the ground floor, fall protection is required and consists of either a personal fall arrest system or guardrail system. Often, this includes a safety harness attached by a short lanyard or rope grabbing device attached to a line that is rigged to a separate portion of the building's structure. (Image 2) There are various types of safety harnesses. All must be inspected regularly and replaced when they are past their useful lives, an assessment tracked by a date stamp visible on the harness. (Image 3)

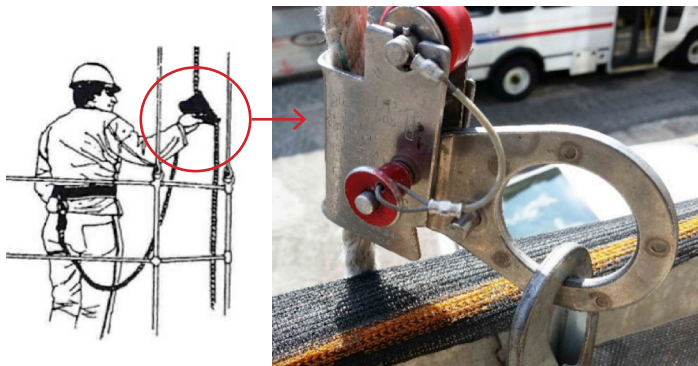


Image 2: Rope grab

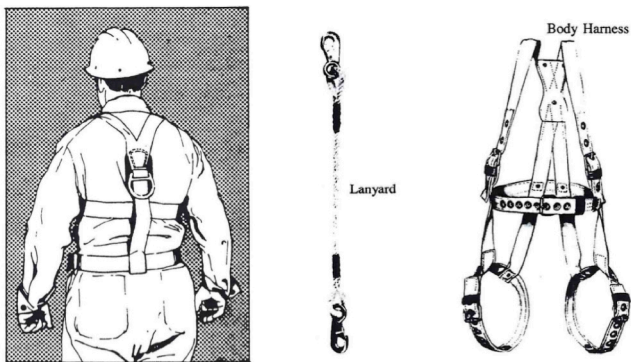


Image 3: Harness types

Right: waist, chest, and shoulder harness;
center: lanyard; right: body harness

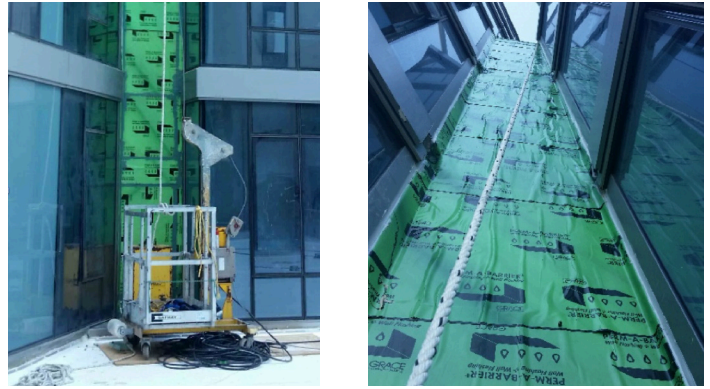


Image 4: Unique hoisting methods and special use work baskets can be configured to fit specific jobs or conditions, such as working in tight areas.

SWING STAGE SCAFFOLDS

Swing stage scaffolds can be configured according to the requirements of each job. (Image 4) Regardless of the size, the work area of a suspended scaffold is the platform that supports the workers. Before each use, safety checks must be performed on the platform and the scaffold structure, taking into account the anticipated work that will be performed from the platform.

It is critical that suspended scaffolds be assembled in compliance with all applicable standards. In addition, extreme caution must be used along with rigorous safety practices. When staging scaffolds from the roof, a review must be conducted to ensure the roof and rooftop structures are capable of supporting at least four times the anticipated load.

Additional safety measures include verifying that no obstructions will prevent the platform from ascending or descending, and thoroughly inspecting the wire rope for damage on a daily basis by paying close attention for kinks, corrosion, or other damage.

CONSIDERATIONS

Often, the glazier will be required to perform welding operations from a suspended scaffold. This requires special care to protect the wire rope from the welding torch or electrode.

Extreme weather, excessive loads, or damage to structural components can all affect a scaffold's stability. Since suspended scaffolds are made of metal and sometimes used in proximity to power lines, attention must be paid to avoid the risk of electrocution. Through review of all proposed work locations is typically performed to verify proper clearance to reduce this risk.



Image 5: A Competent Person is specially trained and responsible for workers' safety

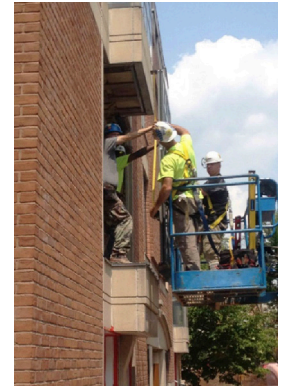


Image 6: Aerial platform lifts

THE COMPETENT PERSON

Typically, a designated person trained in areas critical for safety on suspended scaffolds and lift equipment will perform safety reviews. This person, commonly known as a Competent Person, is specially trained and responsible for workers' safety.

According to OSHA, a Competent Person is defined as "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them." (Image 5)

Assessing both the abilities of the personnel who will use the scaffold and the erection, maintenance, and use of the scaffold or lift, are additional responsibilities of the Competent Person.

AERIAL LIFTS

In addition to swing stage scaffolds, aerial lifts require specific training regarding both the operation and safety unique to this type of equipment. OSHA defines aerial lifts as "any vehicle-mounted device used to elevate personnel, which includes extendable boom platforms, aerial ladders, articulating boom platforms, and vertical towers." (Images 6, 7, and 8)

Aerial lifts have become popular on job sites due to their mobility and flexibility. Before use, motorized aerial lifts require review of the many elements powered by and including the engine. Proper fluid levels including oil, hydraulic fluid, fuel, and coolant must be checked. The wheels and tires, battery and charger, horn, gauges, lights, alarms, steering, and brakes must all be reviewed.



Image 7: Articulating aerial lifts



Image 8: Mast climbing work platform

HAZARD SAFETY

Before operating a motorized aerial lift, the operators must ensure that work areas have been inspected for hazards and any necessary corrective action undertaken before operating the lift. Hazards may include holes, unstable surfaces created by loose dirt, operating clearances, site slopes or bumps, debris or obstructions, and overhead or adjacent electric power lines.

As with swing stage scaffold requirements, personal protective equipment and fall protection are required when operating aerial lifts. Safety measures typically include the use of body harnesses attached by a lanyard to the basket. Here as well, a Competent Person must verify the load capacity of the aerial lift will not be exceeded, taking into account the combined weight of the workers, tools, and materials.

CONTINUING SAFETY

Safety considerations don't end with the completion of construction. Glazing assemblies will eventually require maintenance, including window washing, replacement of seals, and replacement of broken or failed insulating glass units. Future access to all of these components is critical to maintaining and servicing the building safely. It is prudent to recognize this during the design of the building. Seeking the advice of a reputable glazing contractor early in project will ensure these issues are considered and addressed during the design.

REFERENCES

Glaziers, Architectural Metal and Glass Workers Training Manual.

Scaffolding Awareness Student Guide. The International Union of Painters and Allied Trades Joint Apprenticeship and Training Fund.

29 CFR 1910.67 Powered Platforms, Manlifts, and Vehicle-Mounted Work Platforms. US Department of Labor: Occupational Safety and Health Administration.

All images courtesy of TBS except illustrations courtesy International Finishing Trades Institute.

The safety training shop (pictured below) at the Finishing Trades Institute provides hands-on opportunities to learn safety practices.

Graduates of the Finishing Trades Institute have successfully completed The National Glaziers, Architectural Metal, and Glass Workers Educational Program. This program couples classroom instruction with on-the-job training, provides comprehensive education to apprentices, and teaches that only through efficient and continued education does a competent and mature journeyman develop skills. Likewise the journeymen make a commitment to work diligently, learn new techniques, and improve on those already learned, to maintain an attitude that promotes learning, to be efficient in working techniques, and to exercise a high degree of maturity in all matters related to the job.



About the Devil's Details

The AGI educational series illustrates and describes common glazing challenges as a means to communicate best practices for the design and construction industry, not as a sole source for design guidance. AGI recommends design professionals consult with an AGI contractor regarding specific project challenges. AGI contractor profiles may be accessed at www.theagi.org. To share a devilish detail of your own, contact info@theagi.org.