

Ergonomics For Scaffold Erection



Musculoskeletal Risks in the Scaffold Erection Industry

Scaffold erecting and dismantling is one of the hardest jobs in the construction trades. Scaffold erectors have a high risk of exposure to back and shoulder injuries. Erecting and dismantling scaffolds requires reaching and lifting, awkward postures (such as twisting and holding overhead), bending, and using force (when attaching cross braces and damaged parts, for example). Backbreaking work such as unloading trucks or bumping up a scaffold when the work gets too high for the masons bring about more risks.

Although there are many different types of scaffolding used, we will focus on frame scaffolding because it is the most common one used in New York and presents the largest number of ergonomic problems.

SCAFFOLD ERECTION

INSPECTION: The first, and perhaps the most important, part of scaffold erection is the inspection of the parts. This is done to make sure each part is in good condition and compatible with the system. Parts that do not fit, are bent, or pinched make it difficult to build the

scaffold and even harder to dismantle.

PLANNING: Planning is critical. Materials should be delivered as close as possible to where they will be used minimizes the amount of manual handling of frames and parts.

ERGONOMICS/SAFETY: Even with proper planning, manual lifting and carrying of frames remains part of the job. Frames are difficult to carry because of their weight and they are too wide to carry easily. Studies on the ergonomics of frame carrying have shown—and experienced users agree—that the best way to carry frames on the ground is tilted forward and balanced. Good housekeeping is extremely important in making frame carrying safer. If possible, use an A-frame cart to move scaffold frames if the work area is clean and level. When working on the scaffold, carry frames sideways. Studies have shown that the best way to lift frames is with both hands at approximately waist height. This gives you the most power and keeps your hands close to your body.

ERECTION PROCESS: Using a tape measure to space out the frames will make it easier to connect the cross braces. If cross braces are too far apart, there is a good chance that they will have to be forced together. Color-coded cross braces or cross braces with identifying marks makes it easier to get the right parts.

The mudsills are heavy, particularly if long ones (12 to 15 feet) are used. After the job, taking up the mudsills can be hard especially if they have soaked up water and are caked with mud or mortar. If the job permits, consideration should be given to using shorter mudsills—around 5 feet in length.

Planks are also heavy to lift, carry, and install. Some planks are heavier (laminated ones, for instance) and meant for heavy-duty uses. Aluminum planks are used in many cases. Mark or color-code planks with their length and weight when new. If possible, planks should be limited to 10 to 12 feet in length to make them lighter and easier to carry.

Leveling the scaffold should always be done after the first frames are set. Screw jacks are hard to turn if they

are not clean or if they are rusty. It is important to keep the screw jacks clean and in good working order. Oiling them periodically makes them easier to use.

Slide locks or spring locks are easier to use in assembling than wing nuts. Wing nuts have to be turned, which means the screws can get stripped or dirty. Slide locks and spring locks may be harder to disassemble because they require more force to take apart.

Installing guardrails is most difficult in the corners. Developing better connectors for corners would make the job easier.

As the scaffold grows in height, it requires more work to raise frames and materials. The work is easier if forklifts are used to raise the materials or if the materials are loaded from inside the building (if it is against an existing building). Wheel wells are often used to move frames and material, but an electric winch (stationed at ground level with a pulley up above) could be used instead to make the work easier.

Tying the scaffold into the structure, as required by OSHA, requires twisting tie wire that could injure the wrist. When twisting, switch hands regularly to avoid working with the same hand for too long a time.

Teamwork makes scaffold erection easier, such as having one person balance the frame while another connects the frame.

SCAFFOLD DISMANTLING

DISMANTLING PROCESS:

Dismantling a scaffold can be harder than erecting it. Taking frames apart requires the use of force while balancing yourself on a small platform (1 or 2 planks wide). It is difficult to get leverage. It is possible that connectors may have mortar on them making them even more difficult to remove. Also, frames and connections that have been forced together are much harder to disconnect.

TOOLS: One way to make disconnecting easier is to use an expansion tool operated by a lever or ratchet that is placed between the two frames and expanded an inch or two to help disconnect the frames.

INSPECTION: Make sure frames and connectors are in good condition and not bent. If possible, spray a lubricant on the connectors to make them easier to disconnect.

HOUSEKEEPING: Lowering waste or materials to the ground instead of throwing it prevents frames and connectors from being damaged. If possible, build a chute with baffles to remove materials quickly but without damage.

CLEANUP: Clean platforms and frames of mortar and other materials before dismantling them to make them lighter and easier to handle. It may be possible to spray parts with a solvent that prevents the mortar from sticking and makes them easier to clean. Often, the "yard man" will devote part of his or her time to keeping parts clean and in good working order, but it is

important to clean the parts as you dismantle them.

TOOL USE

Tools used most often are hammers, ratchets, pliers and hatchets. The tools you use should be ergonomically designed, with comfortable handles, the right size for your hand and the right weight for the job. Battery operated ratchets can be used for connecting frames.

PROTECTIVE EQUIPMENT

Hardhats, gloves, and eye protection are used in scaffold erection. Hardhats with chinstraps are recommended to prevent them from falling off. A hardhat with a built-in visor to provide eye protection makes wearing eye protection easier.

TRAINING

Laborers should be trained in ergonomics for scaffold erecting and dismantling to ensure their own safety as well as that of their fellow workers.