

Variations of inverted drill presses for drilling overhead.

Exposure: The task requires workers to work with their hands and elbows above their shoulders, holding a power tool to drill holes for setting and tapping in thousands of "Par" bolts. This results in exposure to musculoskeletal risk from **awkward posture, forceful exertion, vibration and repetitive motion.**

Intervention: An inverted drill press was used to hold the core drill, reducing **awkward posture, forceful exertion** and exposure to **vibration.** The instability of a small scissor lift (used for lifting the press to the point of operation) made the process less effective. It was best utilized when attached to a larger lift or stabilized directly from the floor. The inverted press reduced time to complete the work.

Material: Drill Press alone \$821.00. Core Drill \$1,000.00 plus \$200-\$300 per drill bit. Manufactured by Norton Construction Products and sold through Clipper and Pro-Cut.

Conventional method
→



Core Drill

Inverted Drill Press

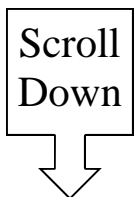
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Intervention: This worker created a jig to assist in holding the drill in place overhead for the three to five minutes it takes to drill through this steel “C” beam. It was built on-site using a thirty six inch length of one inch pipe, capped at both ends, all-thread, one inch ring hanger and a three eighths inch beam clamp.



Shoulder mounted assist

(More to follow)

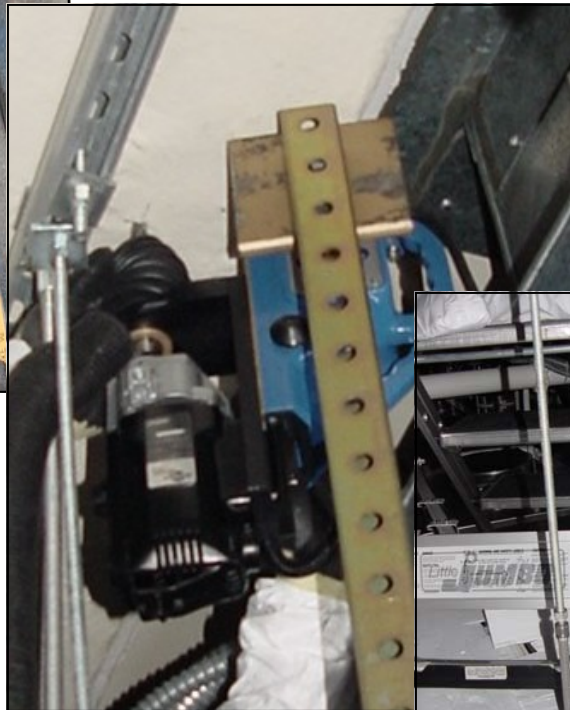


Exposure: Carpenter crews needed to drill holes into overhead steel beams in a confined space. The job called for a Mag drill but the beams were covered with fire retardant material preventing the drill from being mounted magnetically on a beam as it was designed to function. Therefore, the worker was required to hold this heavy drill above his shoulders while drilling into an overhead beam resulting in **awkward posture, forceful exertion** and **static posture**. In this particular application the point of work was in a very limited space making access extremely difficult,

Intervention Process: A stand was designed and built that allows the drill to be mounted to the stand, taking the tool out of the hand of the worker. The stand is made of tele-strut and a gravity pin that locks the stand when extended to the correct height for use. A plate was installed to the top end of the stand for mounting of the Mag drill. The stand allows the worker to complete the job with their arms/hands below their shoulders in a more neutral posture. It also removes the force required to hold the tool while drilling the hole.



Fixture side



Stand base

Scroll
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Intervention Process: A fixture was designed and fabricated in a shop off site to hold a drill for doing overhead work. This inverted drill stand takes the tool out of the hands of the worker. The fixture, rather than the worker, holds the drill in place. The point of operation of the fixture is below the workers shoulder level. The design of the fixture eliminates the workers exposure to musculoskeletal risk factors.

Materials: The drill press is fabricated out of stainless steel for a cost of approximately \$500.00. The main shaft is made with an inner and outer tube welded to a metal base for stability. A gear mechanism is welded to the inner tube and a gear wheel is welded to the outer tube to raise and lower the stand with a simple latch to lock the wheel in place when positioning the drill. Steel hose clamps secure the power drill to the drill stand. An electrical on/off switch was mounted just below the gear wheel allowing the electric drills to have a close shut-off source. A long extension cord has been wired into the on/off box to bring electrical power to the stand.



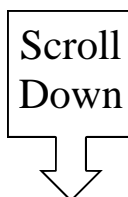
Retracted



Extended for operation.



Power outlet



Exposure: Sheetmetal workers were drilling hundreds of holes into the underside of a concrete deck using a power drill. This required them to hold a power drill or roto-hammer above their shoulders while applying force, exposing them to **awkward posture**, **forceful exertion** and **static posture**. The drilling took several minutes requiring a **static posture** with their neck in **hyperextension** to watch their work. They were also required to capture all dust and particles generated by the drilling with a vacuum.

Intervention: The crew designed a fixture and mounted the drill which takes the tool out of the hand of the worker allowing them to bring their hands down below the shoulders while accomplishing the task. It also removes the **force** required to hold the tool while drilling the hole. The fixture is built with tele-strut, mounted on a plywood base and activated with a foot pedal which moves the drill up into the concrete.

Materials: Cost of materials was approximately \$50.00, plus ½ day for an individual to build..

