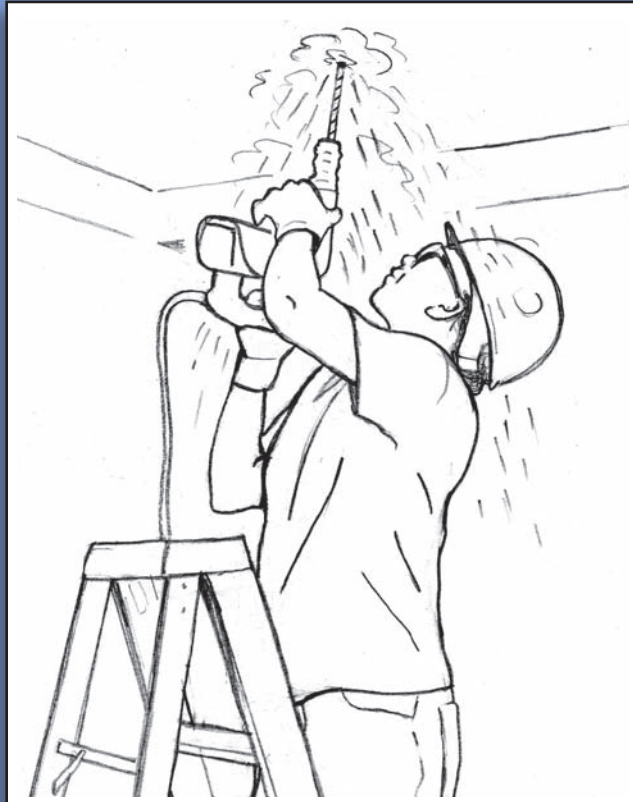


# Drilling Overhead

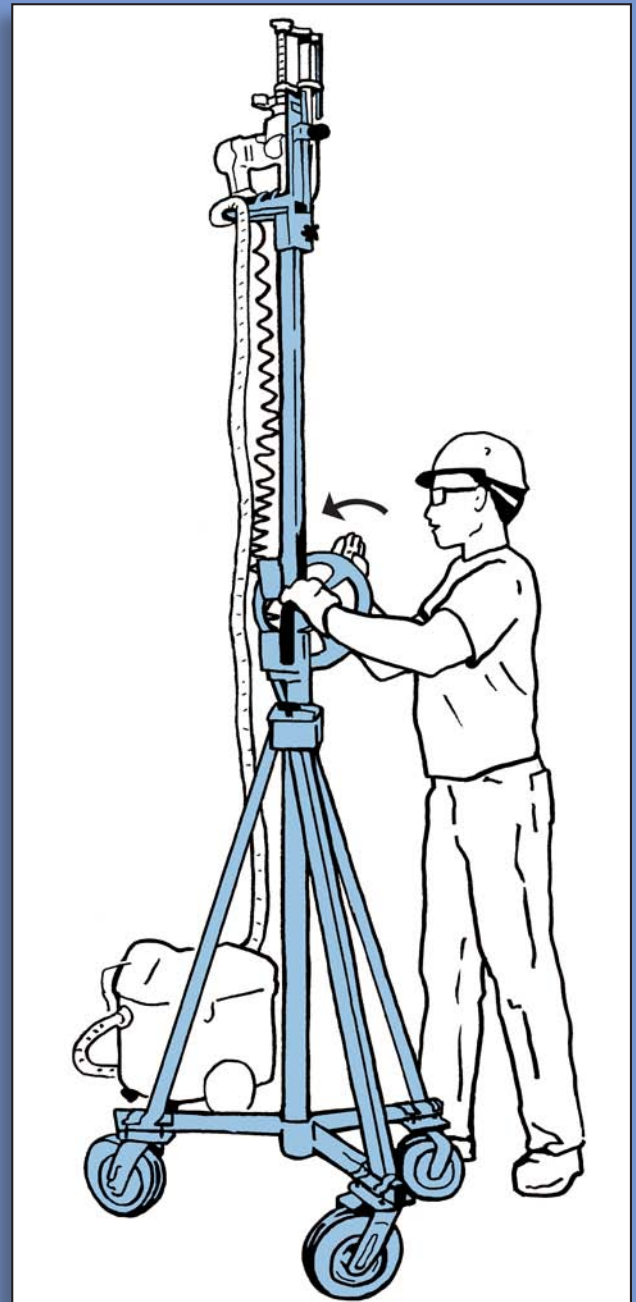
*Ways to Make  
a Tough Job  
Easier.*



**Position that can cause pain**

***Prevent shoulder,  
arm, neck and  
back problems.***

**INSIDE: Ways to prevent injuries  
while drilling overhead, for  
plumbers, pipe fitters, electricians  
and sheet metal workers.**



**These changes can prevent pain**

**MARCH 2011**

California Department of Public Health  
University of California Ergonomics Program  
California Department of Industrial Relations

## How can injuries be prevented?

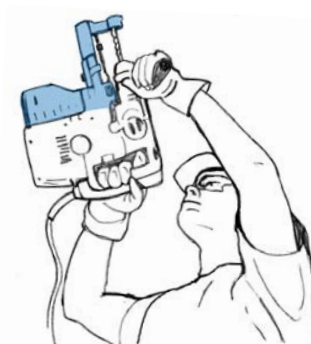
## Simple solutions to prevent injuries from overhead drilling work.

By law, every employer is responsible for providing a safe and healthy workplace. Every employer must identify all hazards of a job and take action to eliminate or reduce the hazards. Every employer must train their employees about the hazards of a job and how to do the work safely. Here are some things employers and workers can do to prevent injuries to joints, muscles, nerves and tendons:

- ▶ **Talk with others at work.** Do workers have pain and discomfort from working overhead? Do workers miss work due to pain? Are the causes of injury present: heavy lifting, awkward body positions, vibration, repetitive motions? What steps has the employer taken to reduce the risk of injury or illness?
- ▶ **Drill from a work platform, not a ladder,** as much as possible. This gives workers more flexibility where to position their body as they drill, and support if they have to reach around obstacles. It is harder to fall from a platform than a ladder when the drill bit binds and throws a worker off balance.
- ▶ **Use an 'overhead drill press' to hold the drill, rather than holding it by hand.** This new device supports the weight of the drill, and protects the driller from the awkward postures, force and vibration from holding the drill overhead. See "Overhead Drill Press" on page 3.
- ▶ **Use a drill with a clutch,** so when the bit jams the drill does not twist the worker's hands and wrists.
- ▶ **Use sharp bits when drilling.** This reduces the force required to drill.
- ▶ **Use a drill-bit extension shaft,** so a worker can hold the tool below the shoulder and closer to their chest when drilling. A sleeve of PVC pipe over the bit-extension protects hands from the spinning shaft and gives better control of the tool.
- ▶ **Use the right drill.** Drills come in different sizes and weights – provide and use a drill that's as light as possible, and still does the task.
- ▶ **Use drills designed with reduced vibration.** Many newer drills have been designed to produce less vibration at the handles. Select drills with the least vibration.
- ▶ **Alternate overhead work with other work to prevent fatigue.** Spread out the hours of forceful overhead work. Share the work among co-workers to allow the muscles to recover and prevent fatigue and injury.
- ▶ **Take regular breaks** to give workers' bodies some rest. Keep the hands and body warm.
- ▶ **Use a drill with a dust-capture system attached** to prevent concrete dust from going into the air.\* Concrete dust contains silica which can cause silicosis, a serious lung disease.
- ▶ **Use safety goggles or a face shield** to keep drilling debris out of workers' eyes.
- ▶ **Get medical care for symptoms.** Encourage employees to report pain and injuries and provide medical care for them.



**Drill-bit extension shaft with plastic sleeve; work platform.**



**Drill with dust-capture system.**

\* See Title 8, CCR, Section 1530.1. Control of Employee Exposures from Dust-Generating Operations Conducted on Concrete or Masonry Materials. [www.dir.ca.gov/title8/1530\\_1.html](http://www.dir.ca.gov/title8/1530_1.html)

# Overhead Drill Press – A Better Tool for a Tough Job

Researchers at the University of California have developed a new tool to take the load off of workers' bodies when drilling holes into concrete and metal ceilings. The "Overhead Drill Press" holds a hammer drill on the top of a column, and uses a wheel and gears to raise the drill to the ceiling. The device was developed and tested with commercial contractors and workers. The device is not a hand tool, but is specialized so an employer would need to provide it for the workers they employ.

▶ **Workers testing the overhead drill press report:**

- They are dramatically less fatigued (tired) from drilling.
- They feel less vibration during drilling.
- There is better stability and handling of the drill.

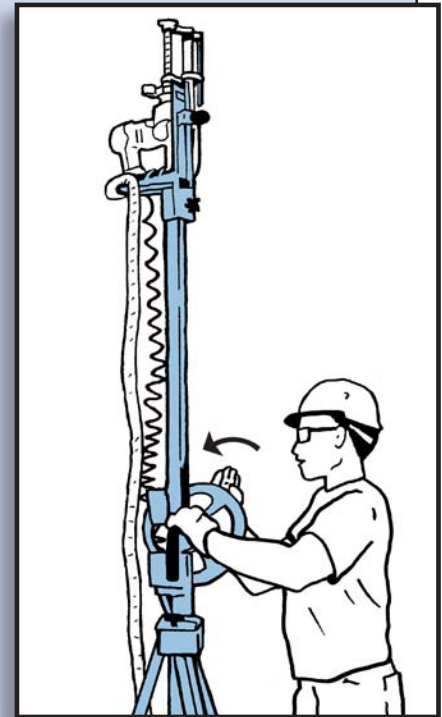
▶ Holding the hammer drill by hand, workers have to press upward with 55 pounds of force while drilling. Workers only use 6 pounds of force to turn the handle that raises the drill using the overhead drill press.

▶ Workers do not have to hold their arms overhead as much, because the wheel that raises the drill is about chest-high.

▶ Productivity (number of holes drilled) is about the same as with the usual drilling method.

▶ **Other features of the device:**

- Can drill into ceilings up to 15 feet, reducing the risk of falls from ladders.
- For higher ceilings, the device can be used in a scissor lift, if the wheeled base is removed.
- A worker using the device is farther from the noise and dust of the drill. A dust-capturing drill can be used with the device.
- The column of the device can be adjusted to vertical using bubble-levels, so drill target marks can be placed on the floor, rather than the ceiling.
- Large wheels (9") make it easy to move over uneven surfaces.



## WHAT DOES IT COST?

**Average workers' compensation claim cost for a shoulder injury?**  
**\$31,000**

**Time a worker with a shoulder injury is off work?**  
**Weeks.**

**Time until a worker with a shoulder injury can safely drill overhead?**  
**Months, or never.**

**Approximate cost of an overhead drill press?**  
**\$4,000 from the UC Ergonomics Program (sold at cost).**

## Is overhead drilling work causing pain?

- ▶ **Pain, numbness, weakness or tingling in the back, arms, hands, shoulders or neck** affects many workers who drill overhead.
- ▶ **Symptoms may start gradually.** Many people try to ignore them at first. Ignoring symptoms makes the condition worse and harder to treat. Workers should inform their employer and get medical care right away if they have symptoms.
- ▶ **Symptoms that don't go away are not normal.** They may be signs of serious injuries that can interfere with both work and personal life.



**Overhead work can injure the neck, arms, hands, shoulders and back.**

## Why do workers drilling overhead have problems with joints, muscles, nerves and tendons?

- ▶ **Awkward body positions such as holding the hands overhead and tilting the head upward** stress the muscles, tendons, joints and blood vessels of the shoulders, arms, hands, back and neck.
- ▶ **Holding arms overhead while forcefully pressing the drill upward** into metal or concrete ceilings creates intense stress on the arms, shoulders and back.
- ▶ **Repeated motions.** Repeated overhead drilling and other overhead work can cause “wear-and-tear” damage to the shoulder. These small injuries can become serious if they happen day after day without enough rest.
- ▶ **Vibration from the drill** means more force is needed to hold the drill securely. Tightening the grip on the drill can make the hand, arm, shoulder and back more tired. After years of work, vibration can also lead to fingers becoming numb and pale. This may be a sign of “white-finger,” a disease that reduces blood circulation and damages nerves. Doctors call this Hand-Arm Vibration Syndrome (HAVS).
- ▶ **Cold work.** Cold hands, muscles and joints are more easily injured by vibration and forceful, repetitive work motions.
- ▶ **Sudden movement** caused when the drill bit binds can injure the wrist, elbow, shoulder or back, and can cause falls from ladders.

## Taking action to prevent injuries

### Workers and management can form a safety committee.

A successful committee is one that has strong employer support. An experienced health and safety consultant can provide technical assistance. Here is what a safety committee can do:

- Talk to workers about their jobs and inspect equipment to identify conditions that cause discomfort or injuries.
- Meet regularly to discuss problems and possible solutions.
- Develop and test practical solutions, such as new tools and work methods.
- Encourage workers to report work-related injuries to their supervisor.



## What does the law say?

Employers must follow workplace safety regulations made by a government agency called **Cal/OSHA (California Division of Occupational Safety and Health)**. These regulations protect workers from hazards, illnesses and injuries in the workplace. Some workplace safety regulations are: the Repetitive Motion Injuries Regulation, the Sanitation at Construction Jobsites (toilets, handwashing, drinking water) Regulations, and the Fall Protection Regulations.\* If an employer violates such regulations, a health and safety complaint can be reported to Cal/OSHA. Complaints are confidential. Cal/OSHA can investigate to see if the workplace is following these safety regulations.

Cal/OSHA also answers questions about workplace safety regulations. Find Cal/OSHA's phone number in the blue Government Pages near the front of the phone book. Look under: State of California, Industrial Relations, Division of Occupational Safety and Health, Compliance or Enforcement, or visit: [www.dir.ca.gov/DOSH/DistrictOffices.htm](http://www.dir.ca.gov/DOSH/DistrictOffices.htm).

Cal/OSHA also provides a free **Consultation Service** for employers (**1-800-963-9424**). This program explains workplace health and safety regulations, and helps employers comply with them. They do not cite or impose fines. Visit [www.dir.ca.gov/dosh/consultation.html](http://www.dir.ca.gov/dosh/consultation.html).

\* Repetitive Motion Injuries (Title 8, Section 5110), available at: [www.dir.ca.gov/title8/5110.html](http://www.dir.ca.gov/title8/5110.html);  
Sanitation at Construction Jobsites (Title 8, Sections 1524, 1526 & 1527), available at: [www.dir.ca.gov/title8/sb4a3.html](http://www.dir.ca.gov/title8/sb4a3.html);  
Fall Protection (Title 8, Sections 1669 to 1672), available at: [www.dir.ca.gov/title8/sb4a24.html](http://www.dir.ca.gov/title8/sb4a24.html)

## For More Information

- ▶ **University of California Ergonomics Program.** To find out more about the overhead drill press and how to get one, visit <http://ergo.berkeley.edu/>, call **(510) 665-3403**, or write 1301 S. 46th Street, Building 163, Richmond, CA 94804.
- ▶ **Other publications about ergonomics in the construction industry:**
  - *Cal/OSHA Ergonomic Survival Guides* (for various construction trades)  
[www.dir.ca.gov/dosh/PubOrder.asp](http://www.dir.ca.gov/dosh/PubOrder.asp). Scroll down to "Construction Ergonomics."
  - *Simple Solutions: Ergonomics for Construction Workers*, DHHS (NIOSH) Publication No. 2007-122, August 2007. [www.cdc.gov/niosh/docs/2007-122/](http://www.cdc.gov/niosh/docs/2007-122/)
- ▶ **HESIS (Hazard Evaluation System and Information Service).** HESIS answers questions about workplace hazards and has many free publications available. [www.cdph.ca.gov/programs/HESIS](http://www.cdph.ca.gov/programs/HESIS)
  - **For information on workplace hazards: (866) 282-5516** (toll-free in California). Please leave a message and your call will be returned.
  - **For HESIS Publications: (866) 627-1586** (toll-free in California), visit our website, call or write for the list.
- ▶ **Workers' Compensation.** For information about workers' compensation for a work-related injury or illness see:
  - **Division of Workers' Compensation, Information & Assistance (I&A) service.** Call **(800) 736-7401** or go to: [www.dir.ca.gov/dwc/ianda.html](http://www.dir.ca.gov/dwc/ianda.html)
  - Labor Occupational Health Program publications for injured workers in English, Spanish and Chinese. [www.lohp.org/publications/workers\\_comp.html](http://www.lohp.org/publications/workers_comp.html)
  - *Guide to Getting Medical Care for Job-Related Pain That Won't Go Away.*  
[www.cdph.ca.gov/programs/hesis/Documents/jobpain.pdf](http://www.cdph.ca.gov/programs/hesis/Documents/jobpain.pdf)

**ABOUT THIS FACT SHEET** This publication was produced by the Hazard Evaluation System and Information Service (HESIS) and the Ergonomics Program of the University of California, San Francisco and Berkeley campuses. The recommendations in this fact sheet are based on research studies and published information, and on general ergonomic principles.

This publication may be copied in its entirety for educational use.

Find a pdf of this document at: [www.cdph.ca.gov/programs/HESIS/documents/DrillOverhead.pdf](http://www.cdph.ca.gov/programs/HESIS/documents/DrillOverhead.pdf).

To obtain a copy of this document in an alternate format, please contact: (510) 620-5757. Please allow at least ten (10) working days to coordinate alternate format services. California Relay Service: 711.

# HESIS

**HAZARD EVALUATION SYSTEM  
& INFORMATION SERVICE**  
Occupational Health Branch  
California Department of Public Health  
850 Marina Bay Parkway  
Building P, 3rd Floor, Richmond, CA 94804  
(510) 620-5757  
[www.cdph.ca.gov/programs/OHB](http://www.cdph.ca.gov/programs/OHB)

Edmund G. Brown Jr., Governor  
State of California  
Diana S. Dooley, Secretary  
California Health and Human Services Agency  
Marty Morgenstern, Secretary  
Labor and Workforce Development Agency  
Howard Backer, M.D., M.P.H., Interim Director  
California Department of Public Health  
John C. Duncan, Director  
Department of Industrial Relations

