

Chipping the Barrel

Hazards of Cleaning
Ready-Mixed
Concrete Trucks



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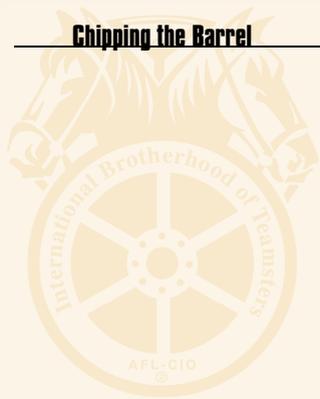
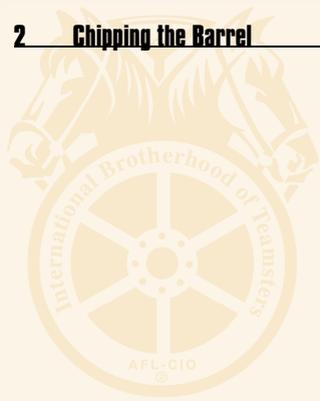


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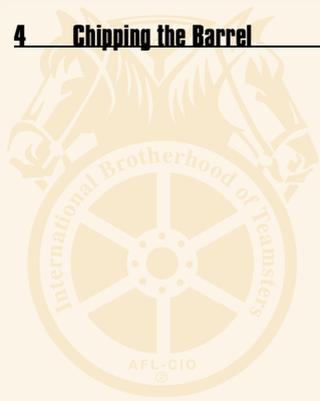
The Problem

Ready-mixed concrete trucks are equipped with a rotating mixing drum mounted on the truck chassis. During loading, transport, and delivery to the construction site, the mixing drum is constantly rotated to prevent concrete hardening within the drum. The cleaning of the mixing drums becomes necessary as the drum interior becomes coated with hardened concrete. Workers are required to enter the mixing drums periodically to remove the hardened concrete. This cleaning operation presents many hazards to the workers including confined space, hazardous energy, respiratory hazards, and noise, all of which require the employer to implement comprehensive programs to address each hazard.

The Purpose

The purpose of this publication is to inform you of the primary hazards associated with the cleaning operation so that you and your fellow workers can protect yourselves.





SECTION I

Permit-Required Confined Space

The Occupational Safety and Health Administration (OSHA) considers ready-mixed concrete mixing drums “permit-required confined spaces”. According to OSHA, a permit-required confined space (permit space) “means a confined space that has one or more of the following characteristics:

1. Contains or has a potential to contain a hazardous atmosphere;
2. Contains a material that has the potential for engulfing an entrant;
3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
4. Contains any other recognized serious safety or health hazard.”

Entry into permit spaces is generally governed by a comprehensive program that includes provisions for detailed hazard evaluation, written entry permits, employee training, and emergency planning.



Employers requiring workers to enter ready-mixed concrete mixers must comply with all requirements set forth in 29 CFR 1910.146 “Permit-Required Confined Spaces” even if this work is contracted to a third party.

The OSHA standard requires that the employer:

1. Implement measures to prevent unauthorized entry into the drum;
2. Identify and evaluate the hazards of the drums before employees enter them;
3. Develop and implement the procedures and practices necessary for safe permit space entry operations;
4. Provide the following equipment at no cost to employees:
 - Testing and monitoring equipment;
 - Ventilating equipment;
 - Communications equipment;
 - Personal protective equipment;
 - Lighting equipment;
 - Barriers and shields;
 - Equipment for safe ingress and egress (ladders);
 - Rescue and emergency equipment; and
 - Any other equipment necessary for safe entry into and rescue from the drum.
5. Evaluate conditions inside the mixing drum when entry operations are conducted prior to entry and during entry;
6. Provide at least one attendant outside the drum for the duration of the operation;

7. Include in the permit program the means and procedures to enable an attendant to respond to an emergency affecting one or more of the drums being monitored without distraction from the attendant’s other responsibilities as outlined in the standard;
8. Designate the persons who are to have active roles (for example, authorized entrants, attendants, entry supervisors, or persons who test or monitor the atmosphere in the drum) in entry operations, identify the duties of each employee, and provide each employee with the training required;
9. Develop and implement procedures for contacting rescue and emergency services. **Just dialing 911 is not sufficient!** The employer must have a system set up with a local emergency service with confined space rescue capabilities and training;
10. Develop a system for the preparation, issuance, use, and cancellation of entry permits;
11. Develop procedures to coordinate entry operations when employees of more than one employer are working simultaneously as authorized entrants in a drum. This will prevent accident and injury due to a lack of communication and coordination;
12. Develop and implement procedures (such as closing off a drum and canceling the permit) necessary for concluding the entry after entry operations have been completed;

13. Review entry operations when the employer has reason to believe that the measures taken under the permit space program may not protect employees;
14. Review the permit space program, using the canceled permits retained within one (1) year after each entry and revise the program as necessary, to ensure that employees participating in entry operations are protected from hazards within the drum.

-Entry Permit-

Before entry into a drum is authorized, the employer must document the completion of measures required by the standard by preparing an entry permit. The entry permit must identify:

- The permit space to be entered;
- The purpose of the entry;
- The date and authorized duration of the entry permit;
- The authorized entrants by name;
- The personnel, by name, currently serving as attendants;
- The individual, by name, currently serving as entry supervisor, with a space for the signature or initials of the entry supervisor who originally authorized entry;

- The hazards of the drum to be entered;
- The measures used to isolate the drum and to eliminate or control hazards before entry;
- The acceptable entry conditions;
- The results of initial and periodic tests performed, accompanied by the names or initials of the testers and by an indication of when the tests were performed;
- The rescue and emergency services that can be summoned and the means for summoning those services (911 is not sufficient);
- The communication procedures used by authorized entrants and attendants to maintain contact during the entry;
- Equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment, to be provided for compliance with the standard;
- Any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety; and
- Any additional permits, such as for hot work, which have been issued to authorize work in the drum.



The employer must also provide training so that all employees whose work is regulated by the standard have the understanding, knowledge, and skills necessary for the safe performance of the duties assigned.

- Training must be provided to each affected employee.
- The training must establish employee proficiency in the duties required and shall introduce new or revised procedures.
- The employer must certify that the training is being conducted.

SECTION II

Control of Hazardous Energy (Lockout/Tagout)

The OSHA Lockout/Tagout standard (29 CFR 1910.147) covers the servicing and maintenance of equipment and machinery that could cause injury to employees if unexpectedly started or energized.

Employees performing cleaning activities inside mixing drums are covered by this standard because unexpected startup of the mixer can cause serious injury or death to the worker.

Employers requiring workers to enter ready-mixed concrete mixers must comply with all requirements set forth in 29 CFR 1910.147 “Control of Hazardous Energy” even if this work is contracted out.

Under the Lockout/Tagout standard, employers are required to:

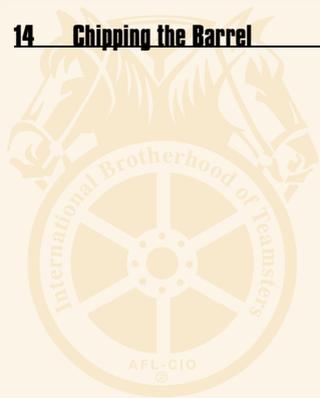
1. Develop an energy control program consisting of energy control procedures, employee training, and periodic inspections to ensure that procedures are being followed;
2. Use locks when equipment can be locked out;
3. Ensure that new equipment or overhauled equipment can accommodate locks;

4. Use additional means to ensure safety when tags rather than locks are used;
5. Identify and implement specific procedures (usually in writing) for the control of hazardous energy including preparation for shutdown, equipment isolation, lockout/tagout application, release of stored energy, and verification of isolation;
6. Institute procedures for releasing isolated equipment including machine inspection, notification and safe position of employees, and removal of the lockout/tagout device;
7. Obtain standardized locks and tags which indicate the identity of the employee using them;
8. Ensure the locks and tags used are of sufficient quality and durability;
9. Require that each lockout/tagout device be removed only by the employee who applied the device;
10. Conduct inspections of energy control procedures at least annually; and
11. Adopt procedures to ensure safety when equipment must be tested during servicing, when outside contractors are working at the site, when a multiple lockout is needed for a crew servicing equipment, and when shifts or personnel change.

The employer must also provide training so that all employees whose work is regulated by the standard have the understanding, knowledge, and skills necessary for the safe performance of the duties assigned.

The following lockout/tagout procedures should be used as a guide to preparing the truck for work inside the mixer drum:

- Do not enter the mixer drum until all of the mixer controls are disconnected or tagged out and the truck's engine is locked out! Simply removing the key from the ignition can lock out the engine.
- Tell everyone who may be affected by the work (foreman, mechanics, drivers) that the truck will be out of service.
- Park the truck, set the brakes, and chock the wheels. Place an "Out of Service" poster on the truck.
- Remove the ignition key and keep it in your pocket; or disconnect the batteries; or relieve the air pressure on trucks that use an air starting system.
- Lock or tag all of the mixer controls on the truck and in the cab.
- Secure the drum to prevent it from rotating or turning.



SECTION III

Respiratory Hazards

OSHA's Respiratory Protection standard (29 CFR 1910.134) requires that the employer provide respirators when necessary to protect the health of workers. The standard also requires that the employer establish and maintain a respiratory protection program. Employers requiring workers to enter concrete mixers to chip them out must comply with all requirements set forth in the Respiratory Protection standard even if this work is contracted out.

The primary respiratory hazard associated with chipping operations inside mixing drums is crystalline silica. Silica is an ingredient of ready-mixed concrete that becomes airborne during jackhammering operations. Exposure to silica causes silicosis, a disabling, nonreversible and sometimes fatal lung disease caused by overexposure to respirable crystalline silica. More than one million U.S. workers are exposed to crystalline silica, and each year more than 250 die from silicosis. There is no cure for the disease, but it is 100 percent preventable if employers, workers, and health professionals work together to reduce exposures. OSHA has established a Permissible Exposure Limit (PEL) for silica. When working



at concentrations above the PEL, all employees are required to wear respiratory protection if the hazard cannot be controlled through other means.

Employers requiring workers to enter ready-mixed concrete mixers must comply with all requirements set forth in 29 CFR 1910.134 “Respiratory Protection”.

The **Respiratory Protection Program** must include the following provisions:

- Procedures for selecting respirators for use in drum cleaning;
- Medical evaluations of employees required to use respirators;
- Fit testing procedures for tight-fitting respirators;
- Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations;
- Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators;
- Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations;

- Training of employees in the proper use of respirators;
- Procedures for regularly evaluating the effectiveness of the program.

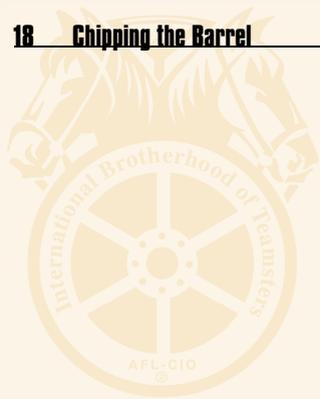
In addition to establishing a Respiratory Protection Program that specifically addresses mixer drum cleaning operations, the employer must provide a **medical evaluation** to determine the employee’s ability to wear a respirator.

The employer must also provide effective **training** to those employees required to wear respirators. The training must be comprehensive, understandable, and recur annually, and more often if necessary.

The employer must provide a variety of choices of respirators for employees so that each employee can select a respirator that fits properly and comfortably.

According to the National Institute for Occupational Safety and Health (NIOSH), assuming that all atmospheric testing requirements have been satisfied, it is recommended that the workers wear any air-purifying, full face-piece respirator with a high-efficiency particulate filter, preferably a powered air-purifying respirator, for adequate respiratory protection during the drum cleaning operation .





SECTION IV

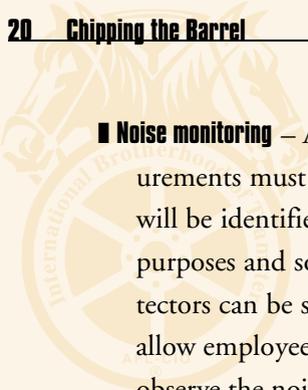
Noise Hazards

NIOSH studies have shown that drivers involved in mixer chipping operations are at risk for noise-induced hearing loss. Chipping operations inside the concrete mixing drum using a jackhammer or pneumatic chipper can reach sound levels of 102 to 113 decibels. OSHA's Occupational Noise Exposure standard (29 CFR 1910.95) requires that an employer implement a hearing conservation program when employees are exposed to sound levels in excess of 85 decibels when averaged over an 8-hour work shift.

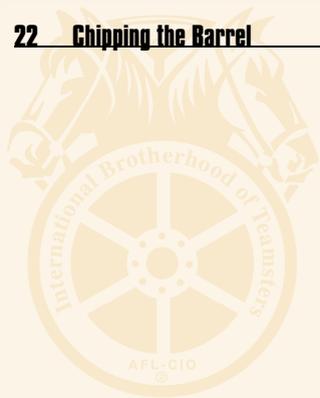
Employers requiring workers to enter ready-mixed concrete mixers must comply with all requirements set forth in 29 CFR 1910.95 "Occupational Noise Exposure" if the workers are exposed to noise above the OSHA action level of 85 dBA.

The hearing conservation program consists of noise monitoring, noise control, audiometric (hearing) tests, hearing protection, employee training and education, and record keeping.



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- **Noise monitoring** – Actual noise exposure measurements must be collected so that workers will be identified for audiometric testing purposes and so that proper hearing protectors can be selected. Employers must allow employees or their representatives to observe the noise monitoring procedures.
 - **Noise control** – Noise control in chipping operations is probably most easily obtained through the use of hearing protection such as earplugs or earmuffs. It is very difficult to control the noise at its source or along its path inside a mixing drum.
 - **Audiometric testing** – Audiometric testing is the only way to evaluate whether or not the hearing conservation program is working. The goal of audiometric testing is to identify workers who are beginning to lose their hearing and to intervene before the hearing loss becomes worse.

- **Hearing protection** – If workers performing chipping operations are exposed to noise levels in excess of 85 dBA over an 8-hour work shift, then the employer is required to provide hearing protection. The employer must provide a variety of choices of hearing protectors for employees to choose from so that each employee can select a device that fits properly and comfortably.
 - **Employee training and education** – This involves teaching workers the effects of noise, the advantages and limitations of hearing protectors, and the purpose of audiometric testing. Workers who understand the mechanism of hearing loss will be more motivated to protect themselves.
 - **Record keeping** – The employer must keep each worker's exposure records and audiometric test results on file for future reference and in the eventuality of a workers compensation case.
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SECTION V

Conclusions

The purpose of this educational material is twofold.

First, a lot of ready-mixed concrete companies are contracting out mixer chipping work because they are under the false impression that they do not have to establish these programs if they use a third party. On the contrary, the employer cannot avoid responsibility for the safety and health of the workers by contracting the work out. Furthermore, the employer must implement the confined space and lockout/tagout programs regardless of who performs the work. Armed with this information, the local union can negotiate to keep this work in-house and ensure that the work is done safely.

Second, if the local union already performs this work, or if the local union decides to negotiate for this work, the union representatives must be informed of what is required of the employer. The programs must be developed and implemented by the employer. These programs are required by OSHA to protect workers while they perform this potentially hazardous work.

The employer is required by OSHA to provide copies of these safety and health programs to the local union upon request.



