



Best Practice

Title: Noise Control
Issue No.: CSDA-BP-023
Effective Date: Oct. 1, 2018

Introduction

The cutting, coring, breaking and grinding of concrete on a jobsite can be noisy. OSHA regulates the jobsite noise on construction sites through 29-CFR 1926.52 and 29-CFR 1926.101. Other controlling authorities may also additionally regulate the noise levels on specific jobsites. From time to time noise levels may need to be reduced. The purpose of this document is to share methodologies and concepts in controlling and/or reducing noise emissions on a jobsite.

OSHA PEL

The Permissible Exposure Limit (PEL) for noise on construction sites is 90dB(A) in an eight-hour Time-Weighted Average (TWA) with 5dB exchange rate between allowable duration and noise level. Engineering and administrative controls are required when noise exposures exceed the PEL. Personal protective equipment as required in subpart-E (of OSHA noise regulation) shall be provided to operators and used to reduce the sound levels to the PEL (as a TWA). The action level (AL) is 85dB(A) and operators should use hearing protection above the AL.

Hearing Damage

An operator’s hearing can be damaged by a one-time overexposure to a powerful burst of noise such as an explosion. This can cause instantaneous damage. The operator’s hearing can also be damaged by a long-term exposure to loud noises over a long period of time.

Noise exposure is measured by Sound Pressure Levels (SPL) using a logarithmic scale. For construction sites, OSHA and most other authorities typically use the A-weighted scale on slow response. Because it is a logarithmic scale, the SPL is reduced by 3dB for half the power generated.

Engineering Control Methods to Reduce Noise Exposure

Engineering controls can be used to modify the equipment or the work area to reduce the noise levels and can also be used to isolate the high-noise work area.

- Selection of the equipment used to perform the task., or substitution for other technologies to perform the same task.
 - Sometimes a quieter technology can be substituted (depending on many other considerations). For example, creating an opening using an electric core drilling machine over a pneumatic breaker.
 - Sometimes the operator can be moved away from the noise source by using a tether control or auto-feed. **Noise levels drop quickly with distance.** Based on spherical

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propagation of the sound wave, the SPL is reduced by about 6dB for every doubling of distance from the noise source. For example, 96dB at the source would be about 90dB at 10 feet away and 84dB at 20 feet.

- Working in vehicles with cabs to isolate operators from the noise source.
- Modifications to machinery:
 - By adding mufflers on engine exhaust and/or compressed air exhaust.
 - Sound damping baffles strategically placed to create quieter zones by disrupting the propagation path. Caution should be exercised because some baffles or barriers can create a radiating surface acting as a passive speaker if they are not properly sized and placed.
 - Enclosures sealed and lined with sound-absorbing material used to address thermal and air circulation for enclosed equipment.
 - Directing the exhaust port away from the work zone. High frequency sound waves like those emitted from an internal combustion engine have a directional wave pattern whereas low frequencies are more omni-directional.
- Barriers to isolate the work area to keep noise exposure in a controlled access area, or to isolate the noise emitting sources from the work area:
 - Barriers to isolate the generator, compressor or hydraulic power pack from the work area to minimize exposure to operators.
 - Barriers can be natural like foliage or existing like buildings or retaining walls.
 - Barriers can be items used by contractors for other purposes but strategically placed on site as a noise barrier like tool storage sheds, trucks or heavy equipment.
 - Barriers can be erected for isolating the noise. Some barriers can also have sound dampening properties. These barriers are often simple but effective. For example, plywood with a sound absorbing material.
 - Noise curtains, flexible vinyl or sound absorbing material curtains can be suspended or draped over items in the path of sound.
- Distance: noise levels drop by about 6dB for the doubling of the distance from the source. Running Generators: air compressors and powerpacks from a longer distance away can help minimize the noise levels in an operator's work area. Complications may include pressure or voltage drop and/or the ability to protect the hoses and cables over a longer distance.
- Using equipment that can perform the work faster and more efficiently minimize the exposure time of high noise levels.
- Silent blades can sometimes be used to reduce noise from blades. Many of the concrete cutting saws have a decal defining a maximum SPL produced from the saw, however, many times this

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rating is of the saw without a blade. Note that some blades are louder than others. Silent blade technologies include:

- Silent blades that have special cutouts to change the resonate frequency to be different than the operating frequency lower noise output.
- Silent blades that are made from a sandwiched core.

Administrative Controls

Administrative controls manage work activities to reduce exposure to high noise levels.

- Establish a noise perimeter zone and identify it as such by requiring the appropriate PPE for the noise levels within that zone. For larger work areas, hearing protection may be required on the entire site as a noise perimeter zone and additional multiple zones inside the main zone requiring hearing protection can be established if there is a higher PPE requirement such as ear muffs over ear plugs near the noise source.
- Scheduling high-noise work during specific time periods on the jobsite with multiple trades. The SPL are not added together for a sum total at a much higher SPL, but instead the increase of multiple sources might only have a minimal increase in the overall SPL. For example, two core drills at 80dB(A) operating together might produce an overall net 83dB(A) level.
- Shut down noisy equipment when not in use.
- Prohibiting high-noise work during sensitive hours (like nighttime) to minimize the impact on neighboring residences.
- Providing operators with adequate breaks away from high SPL for TWA compliance.

PPE

Ear plugs and ear muffs are typical jobsite PPE for operators to reduce their exposure to noise. With an AL of 85dB(A), a rule of thumb is that if the operators need to shout to communicate they will likely need PPE for noise exposure.

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