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Best Practices for the Demolition of Residences with Lead-Based Paint

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Background

Older housing with lead-based paint (LBP) is known to be a major source of exposure to lead in both adults and children in Oregon. Despite a 1978 federal law banning residential use of LBP, many homes still contain it, providing a pathway (through paint chips and dust) to exposure.

Oregon has delegated authority from the Environmental Protection Agency to enforce regulations to limit lead exposure during renovation, repair and repainting of residences with LBP, however there are no federal regulations for controlling lead dust from demolitions. Oregon Senate Bill 871, which was passed in the 2017 legislative session, aims to close the regulatory gap by allowing local permitting authorities to adopt an ordinance for controlling lead dust from demolitions that includes requirements for:

a. A permit to demolish;
b. A lead-based paint certification for contractors performing demolitions;
c. A set of best practices chosen from a list developed by the Oregon Health Authority (OHA), in consultation with the Oregon Department of Environmental Quality (DEQ) and the Construction Contractor's Board (CCB).

In 2016-17, DEQ completed a literature review of lead dust from demolition activities, compiling known research from US and international sources. It is clear from the literature that demolition activities generate lead-containing dust, and that this dust can travel 400 feet from the source (Jacobs et al., 2013). It is also clear that demolition activity can contribute to lead levels in interior residential floor dust, and can result in elevated blood lead levels in children (Lucas et al., 2014, Patridge et al., 2004, Rabito et al., 2007). While much of the literature looked at demolition of multiple housing units at once, lead dust was also found to be generated and dispersed from individual single-family demolitions (Jacobs et al., 2013). Limited data suggests that deconstruction (the systematic dismantling of a structure, typically in the opposite order it was constructed and without the use of heavy machinery) results in much lower levels of dust dispersion than demolition, however this practice was still a contributor to lead dustfall close to the worksite (Ayodele, 2014).

Purpose of this Document

This document contains best practices for controlling lead dust and debris required by Senate Bill 871 (2017). Local permitting authorities may choose to adopt some or all of these practices to implement and enforce in their own jurisdictions. Organizations from the US and around the world have published guidelines on how to limit dust generation at demolition sites, and some include specific requirements when lead-containing paint is present. Guidelines from these other jurisdictions have been used as a basis for the best practices in this document and are listed in the References section of this document.

Frequently Asked Questions

A companion document answering frequently asked questions (FAQ) should be referred to while reviewing these best practices. The FAQs define key terms and provide further guidance on implementation of a demolition program for the purpose of containing lead particles.

Related Training

OAR 333-068 defines the required training described in Section 1 (1)(b) of Senate Bill 871 (2017). Please review this rule, as well as the FAQs, for further guidance on documentation of training as required when a contractor applies for a demolition of a pre-1978 residence.

Best Practices for the Demolition of Residences with Lead-Based Paint

A local city that adopts an ordinance regulating the demolitions of residences containing lead-based paint may require one or more of the following Pre-Demolition, During Demolition, or Post-Demolition practices.

1. Pre-Demolition

A. Create Dust Management Plan

1. A dust management plan is developed and implemented that includes, but is not limited to, site specific dust control measures and monitoring processes (e.g. monitoring of dust deposition and airborne particulate matter less than 10 microns, or PM_{10}, and visual inspections to ensure there is no visible dust leaving the site).
2. Designate a "dust suppression manager" who will be the responsible party for implementing the dust plan. This individual is the direct contact for concerned neighbors, municipalities, and regulatory agencies, and has a process to record and respond to air quality complaints.

B. Participate in Extra Training

1. Individuals engaging in demolition have completed any local training program that is required by local ordinance, related to dust and demolition practices, which is in addition to the mandatory lead-specific certification required by SB 871 (2017) and defined in OAR 333-068.

C. Distribute Neighbor Notification Door Hangers

1. At a minimum, all properties adjacent (as defined in the FAQs) to the site are notified between 72 hours and two weeks in advance, using mail, flyers or door hangers. Information on these hangers includes but is not limited to:
   - Address of house being demolished;
   - Name and contact information of person(s) accountable for air quality and dust issues;
   - Lead Dust control methods to be employed by contractor;
   - Health and safety information for the general population, as well as where to find specific detailed information for vulnerable populations (children under 6 and pregnant women). General information includes: closing windows; keeping children away from the site and out of dirt; and, wiping down any surfaces affected by fugitive dust. (See FAQs for more guidance)

D. Conduct a Pre-Demolition Inspection

1. A pre-demolition inspection is conducted by the local permitting authority or other third party to assess the structure, site and dust management preparation.

2. During Demolition

A. Apply Selective Deconstruction Techniques

Removing selected materials prior to mechanical demolitions reduces the chance of lead paint dust becoming fugitive dust emissions or migrating to soil or storm water runoff.

1. Remove painted materials from the residence before mechanical demolition using hand tools and techniques to minimize visible dust creation. Target the following painted surfaces which typically have higher lead content than interior components: exterior trim; siding; soffits; railings; windows; doors; and porches.
2. During the removal of exterior painted materials, use plastic sheeting to cover the ground extending at least 10 feet from the perimeter of the structure. If a property line prevents 10 feet of ground covering, erect vertical containment or other protections for neighboring properties.
3. Wet materials prior to hand removal to help prevent dust generation. Place all materials that are removed in a covered dumpster or wrap in 6 mil plastic and contain in an area that prevents the release of, and access to, dust and debris.

B. Perform Whole House Deconstruction

Whole house deconstruction means demolition via the systematic dismantling of a structure, typically in the opposite order it was constructed and with minimal use of heavy machinery. The primary purpose of deconstruction is to recover building materials for re-use. The re-use of building materials conserves resources and has environmental benefits. Whole house deconstruction may also limit dust generation because materials are not crushed onsite as occurs with mechanical demolitions.
Lead-safe whole-house demolition practices include:

1. The ground is covered with 10 feet of plastic sheeting when removing select exterior components to help contain any lead paint chips and prevent soil contamination.
2. Painted materials are wetted prior to removal to prevent dust generation.
3. Lead-painted materials are disposed of and not reused.
4. Water is applied to painted material piles to limit dust generation.
5. All loose materials are contained or covered with plastic overnight.
6. All materials placed in dumpsters are covered or wrapped in 6 mil plastic.
7. Any materials being mechanically loaded into trucks or dumpsters are wetted.

C. Apply Wet-Wet-Wet Demolition Practices

This practice involves pre-wetting the structure to be mechanically demolished, wetting during demolition, and wetting during material loading. Dust suppression by water uses a dispersal point close to the position of dust generation in order to be most effective in both dust suppression and minimizing the volume of water used, and thus run-off containing lead particles. Ideally, this practice results in zero

visible dust emissions. However, if visible dust is generated, adjust the wetting techniques to control emissions by increasing the volume of water or increasing the area over which the water is applied. The aim is to use the least amount of water possible while still controlling fugitive dust emissions. This measure should be paired with erosion control measures as outlined in 2J. Non-potable water is used where possible and appropriate. The best practices for wet demolition are:

1. Water is applied to the exterior and interior of building surfaces prior to initiating demolition activities as well as continuously during the knock-down phase to prevent dust generation.
2. During the knock-down phase, water is applied directly to the materials being crushed to prevent dust generation.
3. Water is applied to debris during handling, crushing, and loading. During working hours, water is applied to uncovered storage piles.

D. Enclose Chutes, Cover Dumpsters and Piles, and Minimize Drop Heights

This practice involves enclosing debris pathways and storage areas, as well as limiting the height of materials dropped from the upper levels of a structure or into a waste trailer for hauling.

1. Chutes that are used to drop materials are enclosed to contain any fugitive dust.
2. When moving debris from building to ground level, or when loading debris onto trucks, drop heights are minimized to 8 feet or less.
3. Dumpsters are covered with non-permeable plastic or contained when not in use. Prolonged storage of debris is avoided. During non-working hours, piles are covered with plastic sheeting.

E. Erect Barriers and Fencing

1. Fencing is erected around the perimeter of the site to keep adults and children out of the demolition site.
2. Enclosures, curtains or shrouds are used during demolition to confine dust generation.

F. Limit Demolition Activity During Excessive Wind

1. Demolition activities involving heavy machinery are postponed when wind speeds exceed 25 mph.
2. Wind measurements are taken on-site using handheld devices immediately prior to the demolition and at any point during the demolition when weather patterns change significantly. Wind measurements are documented in the dust management plan and made available upon request during inspections or in a post-demolition report.

G. Monitor for Airborne Dust

1. Sampling and analysis is performed for airborne concentrations of particulate matter as a proxy for lead dust.

H. Minimize Transportation Impacts

1. Trucks and dumpsters are covered when transporting loads away from the demolition site.

I. Post Signage

1. Signs are posted during the demolition project that identify:
    a. That a demolition is in progress;
    b. That entry is prohibited;
    c. The contact information for a city representative with enforcement authority over the project; and
    d. The contact information for the dust suppression manager for any dust concerns.

J. Minimize Soil and Water Runoff

1. Sediment fencing is installed to keep mud and debris from washing off-site.
2. Silt fencing installed or "bio-bags" (wood chips/straw) are placed around the perimeter of the project.
3. A gravel construction entrance is installed for vehicles and machinery.
4. Earth stockpiles are covered with weighted plastic and are checked regularly for movement and erosion.
5. Instead of washing away accumulated mud, the mud is scraped or swept manually or removed with a vacuum sweeper.

K. Conduct a Demolition Inspection

1. During the demolition, an inspection is conducted by the local permitting authority to verify that dust control procedures are being implemented as planned and documented and no visible dust is leaving the site.

L. Minimize Dust from Site Cleanup Activities

1. Cleanup techniques are used that minimize dust generation, such as wet sweeping, using sweeping compound, or vacuuming with sealed HEPA vacuums.

3. Post-Demolition

A. Vacuum Hard Surfaces

1. Sealed HEPA vacuums or similar cleaning devices are used to clean debris from paved and other hard surfaces close to the demolition site following demolition operations. .

B. Produce a Post-Demolition Report

1. Reports and other documentation from the demolition contractor are produced at the conclusion of the demolition activity.

C. Conduct a Post-Demolition Inspection

1. The site and surrounding area is inspected to verify it is free of demolition debris, is conforming to the dust management plan, and does not pose a public safety hazard. If paint chips or dust from the demolition is found on surrounding buildings or hard surfaces, it is removed with sealed HEPA vacuums.

D. Cover Bare Soil

1. If property is to remain vacant, bare soil on the site is covered with sod, grass seed or ground cover that minimizes soil erosion.

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