

Lead in Construction

Training on the hazards of lead at
construction worksites



Developed by the Division of Occupational Safety & Health (DOSH)
for employee training
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Lead in Construction

We will cover the following topics:

- Health hazards of lead
- How you are exposed to lead
- How to control your lead exposure
- Respiratory protection
- Medical monitoring
- Medical removal
- DOSH Lead standards



The topics covered in this training are those required in the DOSH standard on lead in construction. We want to make sure that when you work with lead for this company on this construction project, you are fully aware of the hazards of lead and how to protect yourself. The DOSH rules require that we provide you with this training if you are exposed to lead above the 'action level' in the air which is 30 micrograms per cubic meter. This is an extremely small amount, but because lead is so toxic, this amount is really low. More about lead limits will follow. "

Health Hazards of Lead

Lead is hazardous to your health if it gets in your body. Here's what it can cause:

Headaches, tiredness and insomnia



Loss of appetite and stomach pain

Pain, weakness or twitching in your muscles

Reduced sex drive and birth defects

Kidney damage

Permanent brain and nerve damage



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“These are not all the health effects. It can also cause constipation, high blood pressure, sterility and other reproductive effects. The more lead you get into your body, the worse the effects. If you happen to bring home lead dust on your clothing or tools and your kids are exposed, it can cause brain damage, mental retardation, behavior problems and slowed growth in them as well. Children are much more sensitive than adults to the effects of lead.”

Health Hazards of Lead

Effects on Reproduction

Lead is especially harmful to the fetus in a pregnant woman.



Lead is also harmful to men or women trying to have children.



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“Women and men who are of child-bearing age should be especially careful about their exposure to lead. Lead can effect men by causing impotence, reduced sperm count or even sterility.”

Health Hazards of Lead

Effects of Lead on Children

Children are very susceptible to effects of lead.

The amount that can harm them is much less than adults.

It is important not to take any lead dust home on your clothing.



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“Just a little bit of dust on clothing can get spread around your house where children can get exposed. Children exposed to too much lead will suffer brain damage and permanent mental retardation. Even low exposures to lead can lead to learning and behavior problems. Lead was taken out of household paint and gasoline several years ago because of the concern of children’s exposure.”

Health Hazards of Lead

Is there a safe amount of lead?

There is no real safe amount of lead, but there are levels that cannot be legally exceeded. This is called the "permissible exposure limit" or PEL.

In the air: no more than 50 micrograms per cubic meter

In your blood: no more than 40 micrograms per deciliter.



Red Blood Cell

Both these limits are in the DOSH regulations on lead.

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“ 50 micrograms per cubic meter is extremely tiny amount in the air. As a comparison, think of a single drop of oil in a 55 gallon drum of water.

A cup of coffee is approximately one deciliter. A gram is about one packet of sugar. A microgram is one millionth of a gram. So 40 micrograms in one deciliter of blood is also a very, very small amount – one granule of sugar in the cup of coffee, as an approximate comparison.

Obviously, lead is not hazardous if it can't get into your body. However, in construction there are several ways lead can get into your body.”

Lead "Action Level"

When the amount of lead in the air is above the "action level" of 30 micrograms per cubic meter, we are required to:

- Conduct air monitoring
- Provide medical surveillance
- Provide training

The Action Level is 60% of the permissible exposure limit (PEL)

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"We conducted initial sampling which revealed that the amount of lead in the air was above the action level. We will continue to do air monitoring at least every 6 months unless our latest air monitoring shows the levels have dropped below the action level. We will do air monitoring at least every 3 months if any monitoring results show levels are above the permissible exposure limit.

We will provide "medical surveillance" – basically free medical exams to see if you have too much lead in your body – if the level of lead in the air exceeds the action level for more than 30 days in a year. More details about it later in this training.

We are providing this training because our air monitoring showed you were exposed to levels of lead in the air above the action level.

The action limit is 60% of the permissible exposure limit (PEL) – again an exceedingly small amount in the air. "

How can lead get in your body?

You can get lead into your body by:

Inhaling lead dust or lead spray paint,



Inhaling lead fumes from welding or burning lead paint,



Swallowing lead dust on your hands from eating, drinking or smoking.



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“Fortunately, lead cannot go through your skin. Lead dust can come from sandblasting, grinding, sanding, sawing, or cutting on structures containing lead paint or other lead products or coatings. Lead has no odor even when burned, so you can’t tell when you are inhaling it. When lead gets into your body, some of it is excreted quickly, but if you keep getting it into your body, it gets stored there for a long time and it’s adverse health effects can last for a long time or become permanent.”

Some Jobs Where You Could be Exposed to Lead

Steel bridge painting or repair,



Removing lead-based paint on old buildings or houses,



Grinding or sandblasting lead paint on metal structures,



Cutting or removing lead pipe in old buildings,



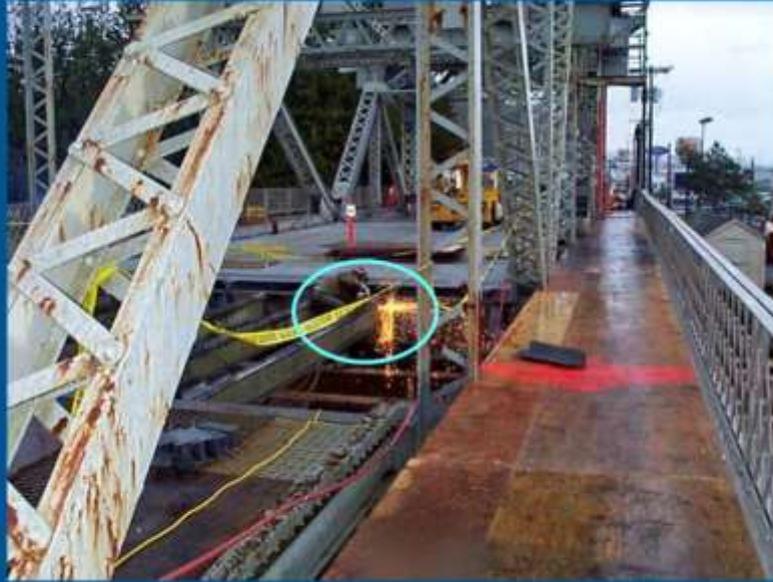
Using solder that contains lead.



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“Other activities could include cutting or stripping lead-sheathed cable, heating some roofing products, remodeling old houses or buildings with lead paint or cleaning up demolition sites where there is lead dust.”

Lead Paint on Bridges



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[optional slide] “ Bridge work frequently results in lead overexposure since they are almost all covered with lead paint. This photo is from an actual bridge repair job shows a worker grinding or torch cutting on lead coated bridgework. He was later found to have high lead levels in his blood. DOSH has found several bridge repair jobs over the years where employees were overexposed to lead.”

Bridge paint removal in an enclosure



Work done
inside this
enclosure

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[optional slide] “Some bridge paint removal requires capturing all the paint residue so it doesn’t end up in the environment, like the stream beneath this bridge. However, using enclosures like this increases the lead exposure to workers. Supplied air respirators are most likely required for workers in the enclosure on this job.”

You work around lead at this jobsite in the following activities or locations:

[Describe or list specific jobs or activities where employees are or may be exposed to lead at your worksite here.]

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[Point out where lead warning signs are located, if you have them. Warning signs are required wherever employees are exposed to lead above the permissible exposure limit of 50 micrograms per cubic meter.]

The following products used or objects found on
this worksite contain lead:

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[This slide is to give more details about your employees lead exposure. Lead-based paint is the most common product typically found on older buildings and steel bridges or other painted outdoor metal structures.]

Air Monitoring

We conducted and will continue to conduct air monitoring of lead in the air by attaching an air sampling device to employees working around lead like the photo on the right . You have the right to observe this monitoring.

Results of our air monitoring are as follows:



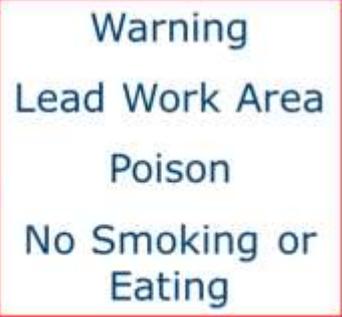
14

[You can present air monitoring records on this slide or the results can be posted in an accessible location or passed out as a handout. The results should be compared to the action limit and the Permissible Exposure Limit (PEL).]

Warning Signs

Warning signs are posted at the entrance to any area where the levels of lead exceed the DOSH permissible limits.

No one can enter these areas without a respirator or protective clothing.



Warning
Lead Work Area
Poison
No Smoking or Eating

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[Point out where lead warning signs are located, if you have them. Warning signs are required wherever employees are exposed to lead above the permissible exposure limit of 50 micrograms per cubic meter. You can add any other requirements you may have for employees who enter these posted areas.]

What personal protective equipment is needed?

coveralls



work shoes



gloves



respirator



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“The respirator is used to keep you from inhaling lead dust or fume. Respirators are required if the amount in the air exceeds 50 microgram per cubic meter, the permissible limit. Coveralls, gloves and separate work shoes are used to keep lead dust off your clothing, body and hands. You must also wear them when the amount of lead dust in the air exceeds the legal limit. ”

Types of Respirators for Lead

In some jobs involving lead exposure, you may need a respirator.

The type of respirator worn depends on the amount of lead in the air.

We will provide you with the proper respirator and provide medical evaluations, fit-testing, and additional training



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Respirators are required if the amount in the air is more than the Permissible Exposure Limit (PEL). We provide the respirators at no cost to you. Respirators with cartridges are always the "P100" type which provide the highest filtering capacity of the various types of cartridges. You can tell them by the pink color of the cartridges. If the amount of lead in the air is more than 10 times the permissible limit, then we must provide you with respirators that provide better protection. If the levels in the air are really high, we must provide you with supplied air respirators where you get clean uncontaminated air from a backpack tank (like the lower photo) or a compressor through an airline respirator.

Employer: Training on the use of these respirators can be done here or separately.

Respirator Requirements

The type of respirator that must be used depends on the level of lead in the air:

A half-face cartridge respirator provides protection to levels **10 times** above the permissible limit for lead.



A powered air purifying respirator (PAPR) can provide protection from **25 to 1000 times** above the permissible limit depending on the manufacturer and how it is designed.



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The two respirators pictured here are both called “air-purifying respirators” since contaminated air is filtered by the attached cartridge filters when you inhale. In some cases, the level of lead in the air may be so high we would be required to have you wear supplied air respirators which deliver clean air to the facepiece from a tank or an air compressor.

Using Respirators

Respirators must be worn at all times when the amount of lead in the air is above the legal limit.



Respirators must fit properly to prevent leaks.

You must have a respirator medical evaluation before you wear a respirator.



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“Taking your respirator off just for minute can overexpose you to lead in the air. Respirators are only as good as they fit. If they leak, you will have a false sense of protection. A medical evaluation is required because respirators themselves cause some stress to the body, especially if a person has lung or heart problems.” [If your employees wear respirators, they will need further training on their use, limitations and maintenance.]

Respirators Must Fit Properly

You must have a respirators with cartridges fit-test before you can use them.



You can't have a beard when you wear a tight-fitting respirator.



We will train you on how to use your respirator.

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“A beard prevents a tight fit, even a day’s growth may cause leakage. You must be clean shaven to wear a tight-fitting respirator. We will cover the use of specific respirators you use in separate training.”

Respirators required at this jobsite

[Describe or show the respirators required here.]

Work Practices to Reduce Lead Exposure

There are several ways you can reduce your lead exposure:

Always wear your respirator in the areas where it is required,



Don't eat, drink or smoke in the area where there is lead,



When you take a break, wash your hands before eating, drinking or smoking.



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[You can talk here about where any eating areas or facilities are located, or where employees should eat, drink and smoke away from the area where they are or could be exposed to lead. Also point out where washing facilities are located.]

Work Practices to Reduce Lead Exposure

Use separate work clothing,



and boots,



Keep your street clothing in
a clean place,



Don't wear your work
clothing or boots home,

Launder clothing at work.



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“ These procedures will prevent you from taking lead dust home on your clothes.”

More work practices to reduce lead exposure

Don't remove dust by blowing down or shaking out your clothing.



Take a shower or wash your hands and face at the end of the shift when required.



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“ Blowing down or shaking out your work clothing will just create lead dust which you or others could inhale. Showers are required when feasible on jobs where the permissible exposure limit of lead in the air is exceeded.” [Indicate whether showers are required on this job and where they are located. If showers are not feasible on a particular construction worksite, employee must wash hands and face at the end of the workshift.]

What are some other work practices?

Don't dry sweep or blow down dust containing lead,



Use a high-efficiency vacuum to clean up lead dust.



Use water when grinding, sanding or cutting objects containing lead,



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“Instead of sweeping, use a vacuum cleaner with a special high efficiency filter. A regular vacuum will not filter out the very fine lead dust. Water works well with grinding, sanding or or cutting, but not in sandblasting. The only protection is a respirator or sandblasting hood with fresh air supplied by a hose.”

Other methods of controlling lead dust

Natural or exhaust ventilation can reduce lead levels in buildings or confined areas.



or



Exhaust fan

Some grinders and sanders have exhaust ventilation attached.



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“ Natural ventilation by opening doors or windows or the use of an exhaust fan which blows outdoors or into a filter bank is recommended indoors. At outdoor construction sites, large fans can blow dust away from a worker.” [If you use exhaust ventilation directly on sanders or grinders, mention them and the necessary maintenance required to keep them operating properly. Floor fans are not recommended in enclosed areas or when other employees work nearby since the fan will just blow the lead dust around.]

What controls and work practices we use to reduce your lead exposure

[List specific jobsite controls and work practices here]

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[If showers are available on the job, you may want to repeat that showers at the end of the day are required.]

What medical monitoring is needed?

Anyone who is exposed to lead above the "action level" must be provided blood tests.



If the amount of lead in your blood is more than 40, we will send you for a medical exam.

Blood tests will be routinely done if you are exposed to lead for 30 or more days per year.



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“ Remember, the action level is an amount or concentration of lead in the air or 30 micrograms per cubic meter. This is 60% less than the amount where you are required to wear a respirator. We must offer an initial blood test even if the level is above the action level even for one day. If you are exposed to 30 micrograms per cubic meter or more in the air for more than 30 days, additional blood tests must be taken. Remember, lead blood levels are measured in units called micrograms per deciliter of blood. If you have more than 40 micrograms per deciliter in your blood, you may develop health problems.”

More about blood sampling

After the first blood sample is taken, we must take more 3 more blood samples for the next 6 months – every two months.

After that, we must take blood samples once every 6 months.

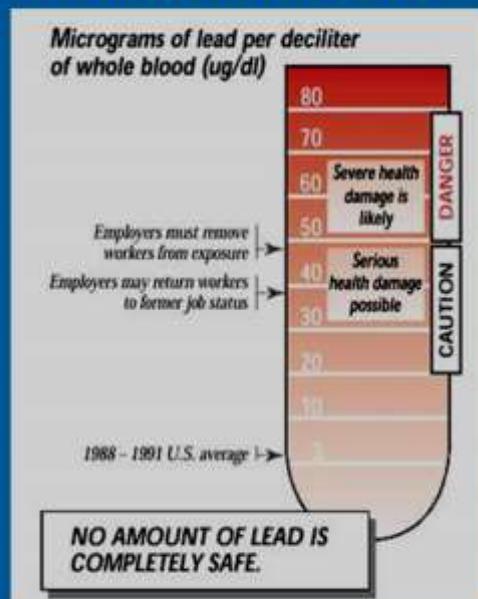
If the level in your blood exceeds 40, we must continue to take blood samples every two months until it drops below 40.

Blood samples are taken at no cost to you and you will be notified of the results.

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Blood samples are not absolutely required, but we must offer them to you. Naturally, if you are concerned about your health and the possible health problems you might have working around lead, it would make sense to have the blood samples taken. [Employer: you can make blood sampling a condition of employment.]

Blood Lead Levels



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“ This picture shows the effects of different amounts of lead in the bloodstream. The safe limit for children is much less – about 10. That is why it is important to avoid bringing lead dust home on dirty work clothing.”

More about medical exams

If the amount of lead in your blood exceeds 40, you will be provided with complete medical exams by a doctor, annually.

You can request an exam or review of the findings by a second doctor.

We do not see the entire medical exam report, only the blood test results and whether or not you have a medical condition that precludes you from working around lead or wearing a respirator.



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If the two doctors can't agree on their findings, you can actually ask for a third doctor's opinion.

Our Medical Surveillance Program

Describe the details of your specific medical surveillance program here

Medical Removal for Lead Exposure

If the amount of lead your blood is above 50, you will be temporarily removed from the lead job.

You can't return to that job until your blood level drops below 40.

Your blood must be tested monthly until the lead level drops below 40.



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“We are doing everything possible to prevent your blood levels from going above 50. But if blood tests show the level is above 50, we are required by the DOSH lead regulations to take the actions outlined on this slide. We also have to do a medical removal if advised by a doctor. “

Medical Removal

Why is medical removal required?

Medical removal is required because of the serious health effects of lead.

Your body will gradually rid itself of lead over time.

You do not lose any earnings, seniority or benefits and you can return to former job status when blood lead levels drop.



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“Some lead is stored in bones, and it can take quite awhile for that lead to leave the body. We will try to find other work for you to do away from lead until your blood lead levels drop below 40. When your blood lead levels drops below 40, you will get your old job or a comparable paying job back.”

Employer: while you may be able to prevent blood lead levels of your employees from exceeding 50, you still need to let them know about these regulatory provisions.

What is lead chelation?

“Chelation” is the taking of certain drugs that help rid the body of lead.

It is a form of treatment for high lead levels in the body.

It is not allowed on a routine basis.

Only a doctor can authorize and supervise lead chelation.



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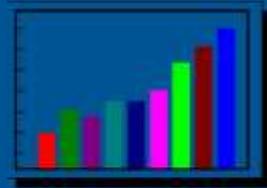
“ Lead chelation can only be done by a doctor who monitors it closely. We cannot give these drugs to you. It can't be done routinely to keep your blood lead levels down because over the long run, the chelation drugs can themselves be harmful to your health. In a severe case of lead poisoning you would probably be sent to a hospital or clinic and have the chelation drug given to you intravenously. In less severe cases, an oral pill is given. If the doctor believes you need to take a chelation drug, you will be informed in writing, and you can ask for a second opinion. “

Medical and Air Sampling Records

You have the right to see any of your medical records related to lead.



You also have the right to see results of our air sampling for lead.



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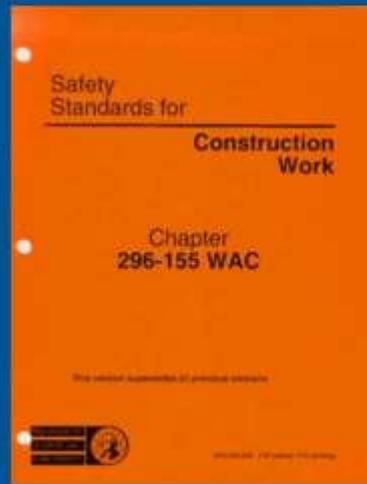
“Medical records are kept at the doctor’s office and you can ask for them. Blood sample results will be given to you. We have to keep the air sampling records for 30 years and you can see them even if you no longer work for us. [If you have any past records of air samples taken at the job site, inform your employees where these results can be viewed or post them or give affected employees copies.]

DOSH Lead Regulations for Construction

DOSH lead regulations for construction is found in the construction safety standards.

It contains much more information in detail.

A copy of this standard is available.



[Click on image above to link to rule](#)

[More information on lead](#)

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“The DOSH lead standard for construction is part of the Safety Standards for Construction Work. The points we have covered here are required in this standard.”

Lead in Construction

The next 5 slides are optional quiz questions.

Question 1

How can you get lead in your body?

- a) Being in a building with lead paint
- b) Getting lead dust on your hands and then eating
- c) By breathing lead dust
- d) None of the above

“ b) And c) are correct. Just being in building with lead paint will not result in lead going into your body. The paint would have to be handled, burned, scraped or sanded to get it on your hands or in the air where you would inhale it.”

Question 2

Why can't you wear work clothing home when you work around lead?

- a) They are dirty and smelly.
- b) The dust you bring home can make your kids sick.
- c) You can wear your work clothes home if you blow them off first.
- d) Your boss will get mad at you.

“ b) is the correct answer. Your work clothes may indeed be dirty and smelly and make your boss mad, but lead dust in your house is special hazard for kids and for you too. Blowing off clothes with compressed air is also a no-no, since people will just inhale the dust, and you won't get it all anyway.”

Question 3

Why must you be clean-shaven to wear a respirator?

- a) The respirator will slide off a beard.
- b) We want a clean-cut look in this company.
- c) The respirator will leak even with short stubble.
- d) Beards interfere with breathing through a respirator.

“ c) is the correct answer. Our company policy is no beards or stubble are allowed when wearing a respirator for this safety reason.”

Question 4

What is the allowable amount of lead in your blood?

- a) no lead at all
- b) up to 20 micrograms per deciliter
- c) up to 40 micrograms per deciliter
- d) lead is not found in blood.

“ c) is the correct answer.”

Question 5

Which of the following is not a good work practice to control lead exposure?

- a) Blowing dust off your clothing at the end of the day.
- b) Using water on a grinder
- c) Using an exhaust fan to suck away lead dust.
- d) Taking a shower at the end of the workshift.

“ a) is not a good work practice and should be avoided since it just blows dust into the air where you could inhale it.”