



MnDOT steel
structure
paint removal
program
for employees
(February 2013)

Your Destination... Our Priority



MnDOT steel structure paint removal program – in-house paint removal

The information referenced below is specifically for MnDOT personnel performing paint removal operations. It is anticipated that MnDOT personnel will remove non-lead paint or remove a total surface area of less than 500 square feet of lead paint. In agreement between the MnDOT Bridge Office and the Office of Environmental Stewardship, MnDOT will only use the dry blasting product Blastox™ to remove paint from bridges or other structures, which should result in non-hazardous blasting waste (mixture of blasting media and paint particles following blasting application). Contact us if any other type of blasting media is being considered for use.

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Determination of Lead Content in Bridge Steel Paint

Legal Definitions of Lead and Non-Lead Paint

- Lead paint is defined as paint that has a lead concentration equal to or greater than 0.5% (5,000 ppm) by weight as determined by laboratory analysis or XRF measurement.
- Non-lead paint is defined as paint that contains less than 0.5% (5,000 ppm) total lead by weight as determined by laboratory analysis or by XRF measurement.

Determining Lead Content

Any of the three methods listed below may be used to determine lead content of paint.

Lead Determination Methods

1. Review paint records of structure to determine the presence of lead. Because the structure may have several layers of paint, relying on paint records for determining lead content must include review of all paints present on a structure including the primer.
2. Laboratory Analysis - Sample paint coating(s) on the steel structure for lead concentration and submit for laboratory analysis ([see sampling procedure](#)).
3. Field Analysis - The Office of Environmental Stewardship can make a determination of the lead content using an XRF field instrument. Contact [Harold Bottolfson or Luke Bistodeau](#) with the Environmental Modeling and Testing Unit for more information. When possible, please request sampling at least six months in advance.

Sampling Procedure to Determine Lead Content of Bridge Paint

Number of samples to collect

Assuming the bridge or structure has a uniform paint coating(s) over entire structure, the following number of samples should be collected:

- Girder Bridge - a minimum of one paint sample collected from a girder.
- Truss Bridge – a minimum of one paint sample collected from a truss and one from a girder. Truss and girder samples should be analyzed separately.

If portions of the bridge have been repainted so that the entire structure does not have a uniform paint coating, a minimum of one sample must be collected from each different coating system and analyzed separately.

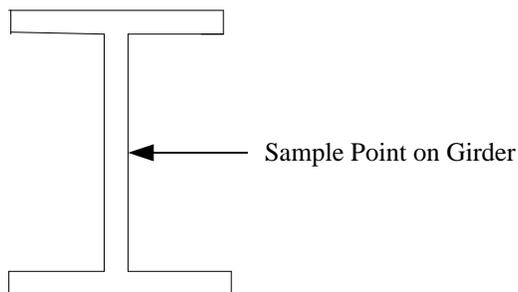
Sampling Equipment

- Paint scraper*
- Sealable plastic bags (zip lock)
- Permanent ink pen
- Clean, unused paper towel

*Use a new paint scraper for collecting samples from the structure. This technique reduces the risk of transferring lead contamination from one project to another.

Sample Collection

- Using a permanent ink pen, label the plastic bag(s) with the following information:
 1. Name or number of bridge
 2. Name of Sampler
 3. Name of Project Engineer
 4. District
 5. Date of sample collection
 6. Unique number for each bag. Example: 1, 2, 3...
- Paint scraper should be new or wiped with a clean, unused paper towel between every sample collected.
- Sample should be taken on girder at mid-height of wide flange beam (see diagram below).



Cross Section of Wide Flange Beam

- Truss sample should be collected from flat surface area.

- Scrape down to bare metal. Carefully capture all paint chips in plastic bag while scraping.
- Scrape until a minimum of five grams (approximately ¼ cup) of sample has been collected.
- When sampling has been completed, use pen to label area on structure adjacent to sampling point with the same unique sample number and date placed on sampling bag.
- Submit samples to Dave Iverson, Office of Materials and Road Research, MS 645 for analysis. Samples can also be taken to a Minnesota Department of Health certified lab.

Lead Paint Removal Containment and Posting Requirements

The purpose of providing containment is to prevent release of lead and other particulate matter into the environment. Containment protects human health and the environment and is required regardless of whether the paint contains lead or not. All abrasive paint removal operations require some measure of containment.

Posting Requirement

The name and phone number of the contractor performing the lead paint removal operation must be posted in letters and numbers at least four inches high on a vehicle or sign at the site of operation from beginning to completion of paint removal operation. Posting is not required for non-lead paint removal operations.

Containment Methods for Lead Paint Removal

Containment required for removing lead paint from structures is based on the following factors:

- Proximity of surface water

Distance from work area to sensitive properties – residences, child care facility, school, playground, public use facility, commercial facility, natural protected area, industrial facility and agricultural facility. Only that part of the bridge undergoing paint removal must be considered when determining the distance from sensitive properties. See [Containment Classification Form](#) for definitions of sensitive properties.

These factors are used to determine the containment classification from Class I (least restrictive) to Class IV (most restrictive). Containment requirements must be included in the project contract or special provisions. Use the [Containment Classification Form](#) to determine the required containment for abrasive blasting paint removal operations.

Wind Speed Limitation

Regardless of the containment class being used, the paint removal operation must stop whenever wind speeds render the containment ineffective in containing the blasting residue.

Containment Guidelines

Following is guidance on methods used to attain dry abrasive blasting containment requirements for the various classes.

Class I Containment Requirements

Application

Methods presented in this section apply to lead paint removal by abrasive blasting with Class I Containment. Bridges meeting [Class I Containment criteria](#) are not located within the threshold distances for surface water or sensitive properties. For portions of the bridge where curtains and ground protection are not feasible because of woody vegetation or other factors, a Class II suspended containment method shall be used.

Ground Protection

Use impermeable tarps to prevent deposition of blasting residue on soil and vegetation. Overlap tarps at least 1-1/2 feet and weight them down to prevent separation, except on woody vegetation. The tarps must cover the surface of all bare soil and vegetated areas inside the

curtains (see paragraph below about curtain placement) and shall extend a minimum of 30 feet in all directions outside the curtains. Hard-paved surfaces such as bituminous and concrete paving may be left uncovered as long as the pavement is unbroken.

Curtains

Use 100% impermeable curtains that are in good condition (no rips or holes) to contain blasting residue and lead paint particles generated from beams, trusses and girders. The curtains must overlap at least three feet unless the edges can be completely fastened together.

- Girders and undertrusses. Suspend curtains from the bridge deck so that the work area is contained on all sides. The curtains must extend to the ground tarp and be anchored in-place or to the platform if suspended above the ground.
- Overtrusses. Suspend curtains on both sides of each truss beginning from a height greater than the point of paint removal and extending down inside of the curtain containment area suspended from the bridge deck.

Following is another method that can be used if the bridge is closed to traffic:

Suspend curtains around the entire outside perimeter of the trusses beginning from a height greater than the point of paint removal and extending down to the roadway pavement or, if present, inside of the curtain containment area suspended from the bridge deck.

Class II Containment Requirements

Application

Methods presented in this section apply to lead paint removal by abrasive blasting with Class II Containment. Bridges meeting [Class II Containment criteria](#) are located within the threshold distance for surface water but not within the threshold distance for sensitive properties. This containment class requires use of the Class I Containment methods and the following additional requirements to protect surface water:

Protection of any Surface Water

One of the following options must be applied to prevent blasting residue or other particulate matter from entering any surface water:

- Suspend impervious tarps horizontally beneath the bridge deck or suspend nets lined with impermeable tarps horizontally beneath the bridge deck;
- Suspend scaffolding beneath the bridge deck that supports a platform lined with impervious materials;
- Secure a barge or a raft covered with impervious materials beneath the bridge and use impervious materials as curtains to direct blasting residue onto the raft or barge; or
- Collect blasting residue from a frozen water surface with ground tarps as required in Class I Containment, except that the ground tarps must extend beyond the bridge deck in a downwind direction to a distance greater than the highest point of paint removal.

Curtains

The curtains used to contain the girders and trusses shall be suspended outside the painted surfaces beginning from a height greater than the point of paint removal and extending down to the horizontally suspended tarps, platform, raft or frozen water tarp or inside of the barge. Blasting residue must not escape from between the curtains and horizontal impervious material.

Protection of Narrow Bodies of Water

These methods may be applied as an alternative for protection of narrow surface water bodies. It is assumed that ground tarps will be placed beneath portions of bridge overlying soil.

- Suspend an impermeable tarp across the underside of the bridge deck at a point more than halfway across the water body with the bottom edge anchored at the farther bank so that it overlaps the ground covers, seal the spaces between the beams above the tarpaulin and perform paint removal operation on contained portion of the bridge. Repeat containment procedure on opposite side of bridge and perform remaining paint removal.
- Place a platform above and across the water surface and cover the platform with impermeable tarps. The platform should overlap the ground tarps. The curtains used to contain the girders and trusses as described in Class I Containment shall be suspended outside the painted surfaces beginning from a height greater than the point of paint removal and extend down to the ground tarp or platform. Blasting residue must not escape from between the curtains and ground tarp or platform.

Class III Containment Requirements

Application

Methods presented in this section apply to lead paint removal by abrasive blasting with Class III Containment. Bridges meeting [Class III Containment criteria](#) are located within the threshold distance for sensitive properties but not within the threshold distance for surface water. This containment class requires use of the Class I Containment methods and use of negative air pressure to protect sensitive properties.

Abrasive blasting in total enclosure with negative air pressure

Conduct abrasive blasting inside a totally enclosed workspace while maintaining less-than-atmospheric air pressure inside the enclosure and use a dust collector with filtration of exhaust air to eliminate dust emissions.

Class IV Containment Requirements

Application

Methods presented in this section apply to lead paint removal by abrasive blasting with Class IV Containment. Bridges meeting [Class IV Containment criteria](#) are located within the threshold distance for surface water and for sensitive properties. Class IV Containment must meet the following requirements to protect surface water and sensitive properties:

- Class I Containment
- Class II Containment - tarps suspended beneath work area to protect the waterway
- Class III Containment - dust collection system and negative air pressure to protect sensitive properties

Containment Classification Form

Determination of Lead Content in Bridge Steel Paint

Bridge Number _____

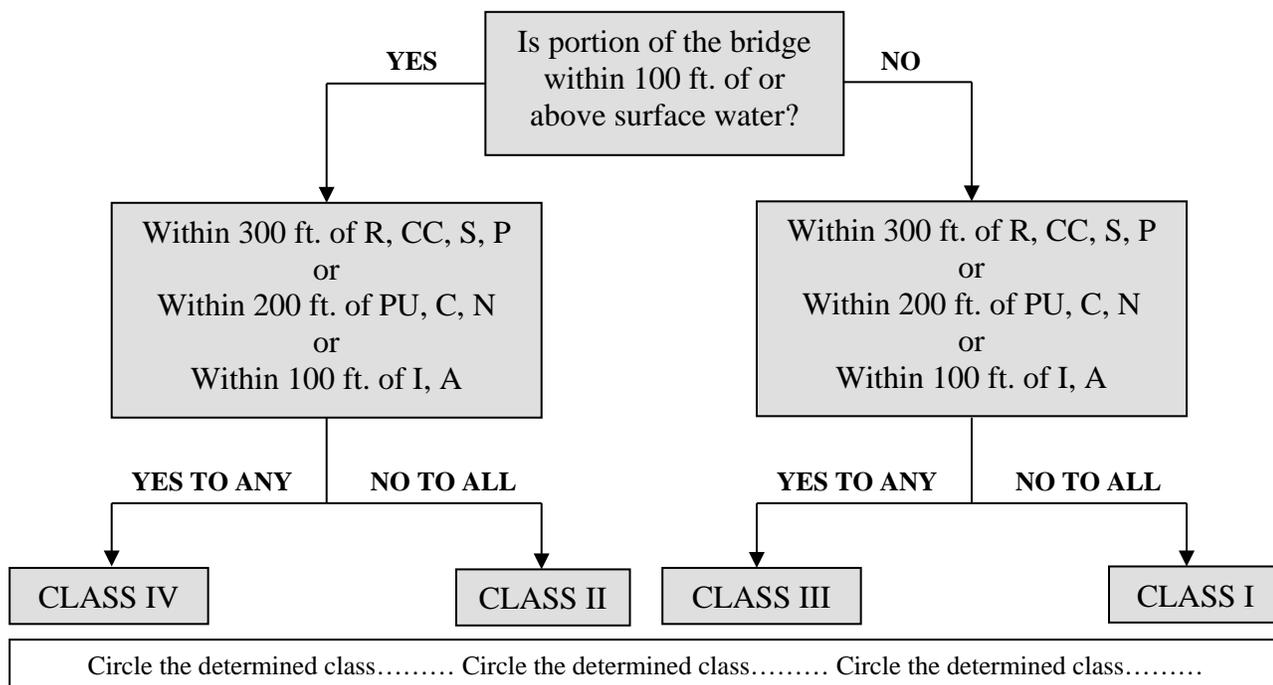
It was determined by the following method that the existing paint system (does) (does not) contain a lead concentration equal to or greater than 0.5%, 5000 ppm.

- Record Review (attach records reviewed).
 - Reviewed Original Plan and Proposal.
 - Reviewed Inventory Records.
 - Reviewed Historical Documents.
- Sampled and tested the in-place paint system(s). Average lead content is _____ ppm (attach lab test results).
- Field Testing (attach XRF analysis)

Name of Reviewer: _____

Signature of Reviewer: _____ Date: _____

Containment Class Determination



**R = Residential, CC = Child Care, S = School, P = Playground, PU = Public Use,
C = Commercial, N = Natural Protected Area, I = Industrial, A = Agricultural**

Signature of Reviewer: _____ Date: _____

Definition of Sensitive Properties

Definitions:

Residential Property: A single family or multi-unit building for human habitation.

Childcare Property: A building that incorporates a place where children are cared for or supervised during any time of the day or year.

School Property: A public school, non-public school, church or religious organization building in which a child is provided instruction.

Playground: An area designated for children's play including a school playground, childcare building playground, a play area of a public park or an area that contains permanent play equipment.

Public Use Property: A building used by the public, recreational area or public parking lot.

Protected Natural Area: A designated national park, national wildlife refuge, national wild and scenic river, natural center or environmental learning center. An area designated by the Minnesota Department of Natural Resources (Mn/DNR) as a wildlife management area, scientific and natural area, state park, research natural area, waterfowl protection area or area of special interest. A site officially registered with any unit of government through the scientific and natural area program of the Mn/DNR or a site of occurrence of unique plant or animal life identified by the natural heritage program of the Mn/DNR.

Surface Water: A permanent water body such as but not limited to the following: rivers, streams, creeks, lakes or ponds.

Containment Method for Non-Lead Paint Removal

Containment is required for removal operations of non-lead paint to prevent release of particulate matter into the environment. The containment must protect ground areas and water bodies within the project area.

Ground Protection

Tarps must be placed on the sides of the structure and be of sufficient length to contain the blasting residue. A tarp(s) must also be placed on the ground beneath the structure in the work area. The width of the ground tarp must meet the outside edge of the side tarps. A ground tarp(s) is not required for hard-paved areas as long as the pavement is not cracked. The ground tarp must be installed in a manner that prevents blasting residue from escaping (fastening to side tarps or elevating edges. Adjacent edges of side and ground tarps must overlap a minimum of six inches or be fastened together to prevent releases.

Waterway Protection

Provide tarps on the sides of the structure and suspended beneath the work area. Tarps must be sufficient in length and width to protect the waterway below the work area and capable of catching and holding blasting residue.

Wind Speed Limitation

The paint removal operation must stop whenever wind speeds render the containment ineffective in containing the blasting residue.

Abrasive Blasting Waste Management

Removing paint by dry blasting with the product Blastox™ should produce a blasting waste that is non-hazardous. This greatly reduces cost and requirements in handling, transport and disposal of the waste. Proper management of abrasive blasting waste must meet the following requirements:

- [Daily Collection/Cleanup – during and at completion of the project](#)
- [Storage and Labeling](#)
- [Sampling Waste – to verify that the Waste is non-hazardous](#)
- [Transport, Disposal and Documentation](#)

Abrasive Blasting Waste Daily Cleanup

Abrasive blasting waste is a mixture of used blasting media, paint particles and other debris produced during the paint removal operation. This waste must be properly collected and stored during and upon completion of the paint removal operation.

Collect all abrasive blasting waste from inside and outside the containment area at the end of each work day. This waste can be collected by vacuum or manually. Do not use air pressure or a water stream that will redistribute the waste material. This can result in greater volumes of waste by spreading contamination. Wetting for dust control is acceptable as long as application of water does not spread contamination.

Nonhazardous Abrasive Blasting Waste Storage, Labeling and Transport

Storage Containers and Labeling

Abrasive blasting waste may be stored in drums or roll-off boxes. Containers holding the waste must be kept closed except when adding waste. Storage containers must be labeled “Non-Hazardous” and “Abrasive Blasting Waste”.

Following are additional drum storage requirements:

- The drums must meet the requirements of 49 CFR identification codes 1A2 (steel 55-gallon drum with removable head) or 1H2 (plastic 55-gallon drum with removable head) and clearly display the UN number.
- The drums must be clean and in good condition (no dents, rust, etc.).

Storage Location

Non-hazardous abrasive blasting waste can be stored at the project location or if necessary, it can be stored temporarily at the MnDOT District Headquarters. If blasting waste from different paint removal projects are being stored simultaneously at the Headquarters, keep the wastes from lead paint and non-lead paint projects separate.

Transporting blasting waste to Headquarters location

- Waste must be transported in drums meeting 49 CFR 1A2 or 1H2.
- Make a written record of when the waste was shipped from the project site to the MnDOT District Headquarters storage location and when the waste was shipped from the Headquarters to the disposal site. Completion of a manifest will be required when transporting the waste to the disposal site.
- The record of transport and location of Headquarters used for temporary storage must be kept in project file permanently.

Sampling Abrasive Blasting Waste

Even though it is expected that dry blasting with the product Blastox™ will produce a non-hazardous waste material, laboratory analysis must be completed for verification. Appropriately trained MnDOT personnel must collect a minimum of one random sample of the blasting waste for analysis. The sample must be analyzed by a Minnesota Department of Health certified laboratory to determine if the blasting waste is non-hazardous. This determination must be made before the waste can be transported.

Sampling Equipment

- Chain-of-Custody (COC) form.
- Disposable spatula dedicated for each sample.*
- Sample bottle provided by the laboratory.
- Permanent ink pen

Note: The laboratory can supply the COC, disposable spatula and sample bottle.

* A new spatula shall be used for each sample collected. This technique reduces the risk of transferring contamination from one sample to another.

Sampling Procedure

- Using a permanent ink pen, label the sample bottle with the following information:
 1. Name of bridge or bridge number
 2. Name of sampler
 3. “MnDOT” and District
 4. Date of sample collection
 5. Unique name “Abrasive Blasting Waste”. Also assign a unique number to each sample if more than one sample is submitted for analysis
- Sample should be collected a minimum of six inches below the surface.
- After sampling, discard disposable spatula in the trash.
- Properly complete COC form. Include reference to the trunk highway and bridge number on the form.
- Request analysis for the following on the COC form: TCLP for RCRA metals and pH.
- Deliver sample to the laboratory with the COC form. Sign the COC form when transferring sample to the laboratory. Laboratory personnel accepting sample will also sign COC form and provide a copy of the completed form with all signatures. Completed COC form must be stored in project file.

Laboratory Results

Upon receipt of the analytical report from the laboratory, forward the lab report to the District Safety Administrator for review. The District Safety Administrator will verify if the lab results demonstrate that the Waste is non-hazardous.

Paint Removal by Hand Scraping or Power Tools

There are fewer regulations when hand scraping or power tools are used to remove paint as compared to abrasive blasting. Sufficient tarps must be used as ground cover and as curtains to contain paint particles within the work area. This containment minimizes impacts to air and soil. Ground cover is not needed over intact paved areas that can be swept to recover paint particles. Paint particles must be cleaned up daily.

Power Tools with Vacuum Systems

Ground cover and curtains are not required if the power tool is equipped with a vacuum to prevent visual air emissions.

Transportation and Disposal

Consult your District Safety Administrator for proper waste management procedures. Non-lead paint particles can be brought back to MnDOT District Headquarters in a container with a secured lid (5 gallon bucket with lid) and managed as an industrial waste. This waste can be disposed of at a mixed municipal solid waste landfill or industrial landfill permitted by the Minnesota Pollution Control Agency. The container must be labeled “Non-Lead Paint Chips”.

Lead paint particles can be brought back to MnDOT District Headquarters in a container with a secured lid (5 gallon bucket with lid) and managed as a hazardous waste. This waste can be disposed of with MnDOT hazardous waste contractor. The container must be labeled “Hazardous Waste” and “Lead Paint Chips”.

Documentation

Submit a written record of the following information to the District Safety Administrator:

- work site (location of bridge or other structure)
- date of paint removal work
- lead or non-lead paint determination
- quantity of paint chips generated
- statement that the paint chip waste was sent to the MnDOT District Headquarters
- disposal location

Transportation and Disposal Requirements

The blasting Waste must be [sampled and analyzed by a certified laboratory](#) and determined to be non-hazardous prior to transport and disposal. Once the waste is confirmed to be non-hazardous, a non-hazardous waste manifest or a scale ticket must be used to document transport and disposal of the material. Following are guidance on the manifest process and scale tickets.

Non-Hazardous Waste Manifest Procedure

- 1) Obtain a non-hazardous waste manifest from a Minnesota Pollution Control Agency permitted mixed municipal solid waste or industrial landfill.
- 2) The generator (MnDOT) and the transporter shall both sign the non-hazardous waste manifest.
- 3) MnDOT retains a copy of the manifest signed by the generator (MnDOT) and the transporter. Retain this copy in the project file.
- 4) Once the transporter has delivered the waste to the disposal facility, the disposal facility will sign the manifest. The disposal facility is required to send a copy of the manifest to the generator (MnDOT) within 35 days after receiving the waste. If the MnDOT representative who signed as the generator has not received the manifest confirming disposal of the waste, the MnDOT representative shall contact the disposal facility and request the manifest. The MnDOT representative shall also inform their District Safety Administrator that the manifest has not been received.
- 5) Retain the final manifest with all three signatures (generator, transporter and disposal facility) in the project file.

Scale Tickets

A scale ticket is provided by the landfill that receives the waste material. The scale ticket must have the following information:

- Description of waste material.
- Date waste material is received.
- Quantity of waste material received
- Generation site of waste material.
- Landfill name and address.

Retain scale ticket in project file.

Disposal

Notify the District Safety Administrator prior to disposal. Non-hazardous abrasive blasting Waste must be disposed of at a mixed municipal solid waste landfill or industrial landfill permitted by the Minnesota Pollution Control Agency. Contact [Mark Vogel or Jackie Klein](#) with the Office of Environmental Stewardship for any other MnDOT-approved disposal facilities.

Required Documentation

- Sample Chain of Custody & Laboratory Results of Abrasive Blasting Waste
- Manifest or scale ticket disposal record

Just-In-Time Training

It is recommended that MnDOT Bridge Maintenance Workers receive training on environmental requirements for abrasive paint removal prior to conducting the work. This training is provided upon request by [contacting Mark Vogel or Jackie Klein](#) in the MnDOT Office of Environmental Stewardship.

Painting Operation and Waste Management

Following the paint removal operation, the structure is ready for painting. Painting operations typically produce used solvent and oil-based paint sludge that must be managed properly.

- Used solvent can either be reused or disposed of as hazardous waste. It is illegal to evaporate used solvent. Any used solvent not reused must be disposed of through MnDOT's current hazardous waste disposal contractor.
- It is illegal to dispose of oil-based paint sludge in the garbage or to allow oil-based paint to dry by evaporation. Oil-based paint must be disposed of through MnDOT's current hazardous waste disposal contractor.

Waste Reuse and Disposal Guidance

For further assistance on reuse and disposal procedures, contact the MnDOT District Safety Administrator or consult MnDOT's Regulated Materials Manual at:

<http://www.dot.state.mn.us/environment/regulatedmaterials/>