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Technical Note

MANAGEMENT OF STRUCTURES COATED WITH LEAD

1. INTRODUCTION

This Technical Note provides guidance to contract managers involved in the specification of works where lead-containing paints are known or suspected to be present. The Note refers to statutory requirements, procedures to be carried out prior to the tendering stage, standard practices and procedures for industry, and client responsibilities during operation of a contract involving lead-containing paints. The procedures referred to in the Note may also be suitable for the management of hazardous coatings other than lead-containing paints.

2. THE PROBLEM

Paint films containing in excess of 1.0 percent lead by weight of the dry film are defined as lead-containing paint.

Lead-containing paints were used for many years prior to 1970 to provide corrosion protection for steel bridge structures and steel road-side hardware. While the coating system remains intact, there is no significant health hazard or pollution threat. However many of these structures now either have paint coatings which require maintenance or have become obsolete and require removal. In both cases, management of the lead is required to prevent human exposure to lead and to prevent releases of lead to the environment. As bridges are located in public places such as urban areas, waterways and other infrastructure, the dangers to public health and to the environment by conventional methods of paint removal without containment are very high.

The structures protected with lead-containing paints may require structural repair work or up-grading of capacity during their lifetime. Welding, cutting or cleaning using heating processes such as electric arc, oxy-acetylene, oxy-gas, plasma arc also liberate lead to the environment and are defined as lead processes.

3. STATUTORY REQUIREMENTS

(a) Employee exposure

In Victoria, personnel or employee exposure to lead is controlled by the *Occupational Health and Safety (Lead Control) Regulations 1998*. The Regulations define a range of lead processes, which include the removal of lead-containing paints by abrasive blasting or other mechanical means, and the use of electric arc welding, thermal cutting and similar techniques on steel coated with lead-containing paint. The principal objectives of the Regulations are to require:

(i) the employer (or client) to control lead exposure at the source, including containment if appropriate,
(ii) the employer to provide effective equipment, facilities, training and monitoring at lead process workplaces, and
(iii) certain duties to be to prescribed to persons at lead process workplaces.

(b) Environment exposure

Environmental exposure to lead is controlled by the *Environment Protection (Prescribed Waste) Regulations 1998*. The Regulations apply to the removal of lead-containing paint from steel bridges, and prescribe that lead-containing waste be contained and controlled from source to final disposal. Where bridges are sited over waterways, the *State Environment Protection Policy: Waters of Victoria 1988* is also applicable.

4. TREATMENT STEPS AND OPTIONS FOR LEAD-CONTAINING PAINT

AS 4361.1 B *Guide to lead paint management B Part 1 : Industrial applications* provides guidance for and is directly applicable to the management of bridges and other structures coated with lead-containing paint. The Standard sets out guidelines in the form of a decision path, which may be used to manage the maintenance or treatment of a structure coated with lead-containing paint. The Standard may also be applied, to the treatment of coatings where the paint film contains less than the minimum amount of lead to be classified as lead-containing, or where other hazardous material may be present in a coating. The Standard details the following steps of the decision path:

(a) Assessment of the presence of lead:

The presence of lead in the paint on the bridge should be confirmed, and, if present, the level and extent of the lead presence determined. Evidence can be obtained from historical painting records, and from field and laboratory testing. Testing shall be performed by a laboratory accredited by NATA for testing to the methods of AS 4361.1 Appendix A.

(b) Selection of painting strategy

The painting strategy for the structure should be developed after a coating condition assessment, conducted following the procedures outlined in AS 4361.1 Appendix B; and consideration of factors such as service life, operational requirements, proximity to the public and other facilities, effects of painting activities on the environment, corporate policy and risk level. Several maintenance strategies are available:

(i) no painting,
(ii) overcoating,
(iii) spot or localized repair,
(iv) total coating removal and replacement, or
(v) demolition and replacement of the structure.

(c) Risk Assessment and control level for emissions

Each proposed strategy should be accompanied by an assessment of risk to public health, other workers and the environment as described in AS 4361.1 Appendix C. A determination of the appropriate level of emission control for dust and debris can then be made.

(d) Paint removal and containment system combinations

The Standard requires consideration of factors including function, design life, service environment, condition of the existing coating system, effective coating systems for the service environment, occupational, public and environmental hazards associated with lead paint removal, cost of treatments, and the interactions of these factors.

(e) Painting strategy approval and contract specification

Based on confirmation of the lead presence, the condition assessment, the situation parameters, the risk level and the required emission control level, the bridge manager should be able to formally approve the appropriate painting strategy. Preparation of a contract specification to put into effect the approved painting strategy should commence at this stage.

For the treatment of a bridge classified as a lead-process workplace, a paint application contractor should be selected who is certified for Class 5 : Complex Steel Structures C Removal of Hazardous Materials (Category M) under the Painting Contractor Certification Program (PCCP).

The containment design is the responsibility of the contractor, who will optimise numerous factors to meet the regulatory and specification requirements to deliver the required painting strategy and emission control level. These factors include:

- emission potential and productivity of the removal method (refer AS 4361.1 Appendix D),
- surface preparation,
- bridge configuration and size, and access,
- ventilation requirements and containment system components.

AS 4361.1 Appendix E discusses the components of a containment system and the need to meet specific emission control levels and the emission generation potential of the various paint removal methods. There are a number of design guides published by the Steel Structures Painting Council (USA) that may be referenced by the contractor. These guides are referenced in AS 4361.1.

(f) Environmental pollution control and emissions monitoring

The contractor has responsibility for the implementation of environmental pollution control measures. These should be established in consultation with the EPA and the local water authority. The submission of a detailed Pollution Control Plan should be a hold point in any contract involving lead-containing paints. Note that ultimate responsibility for environmental control resides with the client or facility owner.

Monitoring of emissions during the lead-process work (localised repair, coating removal, or demolition) is performed to ensure that adequate controls are in place to protect the environment, the public, and other personnel. Monitoring of air, ground, water and sediment may be carried out. Procedures for monitoring, including selecting sampling sites and interpretation of results are given in AS 4361.1 Appendices F, G and H.

(g) Occupational exposure to lead and worker protection

The Regulations mandate that employers provide biological monitoring of blood and urine of employees once they achieve threshold lead exposure times, and the monitoring must be carried out at set intervals. The employer must send the results of biological monitoring to the Victorian WorkCover Authority within seven days of the availability of the results. Biological monitoring may only be carried out by persons approved by the Victorian WorkCover Authority.

AS 4361.1 Appendix I provides procedures for protection and training of personnel at the lead-process workplace. These procedures provide greater detail than is contained in the Regulations, and compliance with the Standard should ensure compliance with the Regulations. The Standard requires that a written compliance plan be developed and implemented prior to commencement of work and that a responsible person be on-site to implement and maintain the compliance plan.

The Regulations contain limits for blood and urine contamination, which if exceeded, mandates that the employee be withdrawn from the lead-process area. The Standard adopts an exposure limit based on the airborne concentration of lead in the employees breathing zone, and assumes that initial protective measures set by the lead-paint removal method will be adequate to meet the airborne exposure limit. If the limit is not met, the Standard requires that other protective measures need to be implemented.

(h) Waste management

The debris from lead-paint removal is itself hazardous and must be managed from source to final disposal in landfill. The bridge manager, as the generator of the hazardous waste, has responsibility for any disposal permits or licences, and should approve the selection of waste hauliers and landfill sites proposed by the paint applicator. AS 4361.1 Appendix J provides guidance in the management of the various waste streams. EPA Information Bulletins list hazardous waste transporter permit holders and approved disposal facilities for prescribed waste. There are only a small number of permit holders and disposal facilities for lead wastes.

(i) Project completion, cleaning and clearance

As each stage or portion of the work is completed, the containment must be cleaned and cleared prior to each move or dismantlement. Equipment, re-usable supplies and materials, and adjacent facility structures must also be cleaned and cleared. AS 4361.1 Appendix J provides methods and procedures for the clean-up and final evaluation of these items.

On completion of work, the level of site contamination must be assessed and if necessary remedial work carried out to remove contamination. Clearance of ground, water and sediment within the project site can be established using the procedures of AS 4361.1 Appendices G and H.

5. WELDING AND SIMILAR PROCESSES

Welding or thermal cutting of steel coated with lead-containing paint creates lead fumes, which are toxic. The lead-containing paint should be removed prior to welding, in accordance with the requirements of AS 4361.1, for a band of 25 mm either side of a welding line, or for a band of 100 mm either side of a flame cut line. During welding, mechanical ventilation by local exhaust systems and personal respiratory protection will be necessary if the lead-containing paint has not previously been removed.

6. REFERENCES

Occupational Health and Safety (Lead Control) Regulations 1998, Victoria

Environment Protection (Prescribed Waste) Regulations 1998, Victoria

State Environment Protection Policy : Waters of Victoria 1988, Victoria

AS 4361.1 B *Guide to lead paint management B Part 1: Industrial applications* Standards Australia, Homebush 1995

Painting Contractor Certification Program, *Certified Contractors*

EPA Information Bulletin *Waste Management Guide – List of Permit Holders* Publication 422

EPA Information Bulletin *List of Treatment and Disposal Facilities for Prescribed Waste* Publication 423

7. CONTACT OFFICERS

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