

Safe Work Instruction - Installation of, Repairs and Cut-ins to Wastewater and Water Mains

DO NOT use this plant* unless you have been inducted in its safe use and operation by an Authorised Experienced Operator

This SWI may not cover all possible hazards and risks and should be referred to as a control measure in the risk assessment process. Additional training may be required for high risk plant. Site and task may change required PPE.

PERSONAL PROTECTIVE EQUIPMENT



Eye protection must be worn



Long and loose hair must be contained or covered.



Hearing protection must be worn



Foot protection must be worn



Hand protection must be worn



Half face mask respiratory protection fitted with a P2 filter cartridge must be worn



Head protection must be worn



High visibility clothing must be worn



Protective body clothing must be worn

POTENTIAL HAZARDS AND RISKS

- Crushing**
Crushing due to plant tipping or rolling over
Crushing due to collapse of trench
- Manual Task Injury**
Manual task injury from incorrect manual handling techniques
- Electrical Shock or Burn**
Electrical shock or burn from plant contact with live electrical conductors
Burn injury from acute exposure to high power laser beams
- Slip, Trips, Falls**
Slip, trip, fall due to uneven or slippery work surfaces
Slip, trip, fall due to steep working surfaces
- Struck by Moving Object**
Struck by moving object due to work pieces being ejected
Struck by moving traffic or plant
- Other**
Exposure to asbestos
Injury due to plant malfunction or misuse
Irritation from excessive dust
Confined space entry

PRE-OPERATIONAL SAFETY CHECKS

- ✓ Obtain the relevant plans and paperwork before proceeding to the site (service locations) and identify the type and size of the main to be worked on
- ✓ Obtain the permission from property owners if conducting planned work on private property. Ensure owners are aware of the extent of work and how it will impact them and their property. Advise owners of commencement and completion of work before leaving the property
- ✓ For minor water repairs and planned work, all potentially affected customers as well as Shoalhaven Waters customer service staff should be notified 24 hours in advance
- ✓ In case of emergency water repair, notify the Councils after hours service or Shoalhaven Waters customer service staff before isolating the relevant section of main. Ensuring to only isolate the smallest possible area to have the least effect on customers water supplies
- ✓ If the leak is determined to be a broken back and the extent of the leak is minor, the repair may proceed under pressure
- ✓ If it is suspected utility lines are in the area, ensure you have the correct "Dial Before You Dig" plans available BEFORE you start work

- ✓ Complete WorxOnline site-specific risk assessment
- ✓ Complete the appropriate pre-operational plant checklist
- ✓ If a Traffic Control Plan is required, both standard and modified TCP's used must be documented as per Traffic Control Plans Procedure. If there is any unforeseen difficulty with the use of the generic TCP, the worker should consult with the co-ordinator to design a specific TCP for the job

Note: At a minimum, the truck's 'Workmen Ahead' sign and flashing lights are to be used. Alternatively, if possible the truck should be parked off the road reserve (Road Reserve is the area from the property boundary to property boundary which includes the road and footpath areas)

OPERATING PROCEDURES

- ✓ Keep clear of moving plant parts
- ✓ Operate plant to the conditions of the work area
- ✓ Take photos of the proposed worksite prior to and upon completion of work, highlighting existing problems and defects (cracked concrete, broken tree limbs etc.)

- ✓ Install erosion and sedimentation controls as required
- ✓ Isolate and apply appropriate tagging/lockout systems to any Valves, Pump Stations and Gravity Mains etc. Refer to Energy Isolation Procedure P29. Contact co-ordinator to organise pump out trucks if necessary
- ✓ Excavate the minimum size and depth necessary to safely conduct the work. If necessary install shoring etc. Refer to SafeWork NSW Excavation Work Code of Practice and SWI Trenching and Ground Support
- ✓ For a main with a broken back –
 - Excavate the minimum size trench required to fit a stainless-steel band around the break. Clean the area immediately around the split with water and place a stainless steel band around the pipe and tighten as per manufacturers specifications
- ✓ For a main with a longitudinal split –
 - For AC pipe excavate the entire length (including collars), of the section of pipe requiring repair unless the situation prohibits otherwise. For all other type of pipe, a section extending a minimum of 1.0 m either side of the damaged area should be removed and replaced

ASBESTOS CEMENT PIPES

- ✓ Refer to Asbestos Management Procedure P19
- ✓ Fence of the area using para-webbing and “Hazardous Materials – Do Not Enter” tape to restrict access of all non-approved persons to the worksite
- ✓ Arrange all necessary equipment to be utilised during the procedure to be situated inside the designated work area i.e. all tools, fittings and clean up materials
- ✓ Manually excavate around the collars and use one of the following preferred techniques to remove the damaged length of pipe –
 - For smaller diameter AC pipes, it is preferable to wrap the collars and wet rags before smashing the collars using a sledgehammer, crowbar or cut using a handsaw. If this procedure is used, the pipe should be kept wet with water to eliminate dust
 - When a full length cannot be removed, snap cutters may be used to achieve a smooth square- cut end. Again, if this method is used, the pipe and fittings should be kept wet with water to eliminate dust
 - In extreme circumstances such as where manual tools are ineffective (on larger couplings), or the repair access is limited, the use of a quick cut saw **with a continuous water flow** is permissible. However, other safety considerations such as location and wind direction etc. may need to be assessed and taken into account prior to adopting this method

- ✓ Broken Asbestos Concrete pipe & collars shall be secured in plastic bags in accordance with the NSW EPA requirements, identified and disposed of at an approved site. Proprietary tape and bags already identified for asbestos are available for this purpose. Full length asbestos concrete pipes shall be wrapped and secured in heavy duty plastic, identified and disposed of at an appropriate site

OTHER HAZARDOUS PIPE COATINGS PROCEDURES

- ✓ Hazardous pipe coatings such as coal tar or bituminous wrapped pipe may contain asbestos, Polycyclic aromatic hydrocarbons (PAHs) and/or Polychlorinated Biphenyls (PCBs).
- ✓ Refer to “Guideline for Identifying Hazardous Pipe Coatings” extracts attached.
- ✓ Refer to Trim Ref. D24/7605 for the full version.
- ✓ Repairs should be carried out as per the (asbestos Cement Pipes” section.
- ✓ The only exception to this is that manual hand tools such as a hammer and chisel/brick buster is the preferred removal method, however, only enough force is used to remove the coating without damaging the internal concrete lining.
- ✓ Alternatively, a cordless renovator tool could be considered.

ENDING OPERATIONS

- ✓ Fill in excavations and compact as required
- ✓ Install covers, markers etc. as required. Refer to relevant Standard, Code of Practice or SWI
- ✓ Restore the excavation as near as possible to the original condition (topsoil, seed and/or turf if required)
- ✓ Remove all fencing and warning tape
- ✓ All PPE and equipment used during the process should then be meticulously cleaned down with water or “wet wipes”. The used wipes, disposal gloves, respirator cartridges and disposal coveralls should then be discarded immediately into AC waste bags prior to sealing ready for disposal
- ✓ Clothing worn in asbestos removal procedure should be regarded as being potentially contaminated with asbestos. Contaminated clothing may be safely laundered in a conventional washing machine separate from other laundry, provided the clothing is thoroughly wetted when discarded by the worker and not allowed to dry out until washed
- ✓ The Asbestos Concrete waste bags can be stowed in designated AC waste bins to be delivered to the West Nowra Waste Depot for immediate burial
- ✓ Ensure hands and faces are cleaned immediately after completing any work involving Asbestos Cement pipes
- ✓ Complete appropriate paperwork and supply to coordinator (Water Service Application, Cams, WAE and Repairs List etc.)

DO NOT

- ✘ Do not use if plant is faulty. Attach a DO NOT OPERATE tag and report fault to your supervisor
- ✘ Do not leave the work site with unwrapped asbestos cement material
- ✘ Do not unnecessarily break up asbestos cement material
- ✘ Do not leave plant running unattended
- ✘ Do not wear loose jewellery

- ✘ Do not use mobile phone while operating plant

***Plant in this SWI refers to any machinery, equipment, appliance, container, implement and tool.**

Guideline for Identifying Hazardous Pipe Coatings (extracts)

1. Purpose

The purpose of this document is to enable a non-expert to gain sufficient knowledge to be able to confidently identify the hazardous factory-applied pipe coatings that are commonly encountered by personnel working with Water Corporation assets. Images of a range of pipe examples are presented to illustrate the various ways a pipe coating can appear after many years of service, storage, or neglect.

Note that this guideline focuses on common factory-applied pipe coatings and excludes tape wrap and heat-shrink coating systems commonly applied to pipe joints, fabricated specials and valves. Further investigation is required for coatings that differ to those presented in this document.

2. Background

Many buried pipeline assets are coated with materials that are now known to be hazardous to human and environmental health. Generally, this is not a problem if the pipes remain undisturbed but there is a risk that personnel will be exposed to potentially dangerous materials when the asset is uncovered for maintenance, inspection, or replacement. Although there are dozens of different pipe coatings in use, only the health and safety aspects of the coating material is considered here. In this limited context, all steel pipe coatings fall into one of the following 4 categories:

- Category 1** - Coatings that do not contain hazardous substances
- Category 2** - Coatings that contain inert hazardous substances (e.g. asbestos).
- Category 3** - Coatings that contain intractable hazardous substances (e.g. PAH, PCB).
- Category 4** - Coatings that contain both inert and intractable hazardous substances.

3. Definitions

- CTE - Coal Tar Enamel - a polymer-based coating produced from the plasticization of coal tar.
- MDPE - Medium Density Polyethylene – Modern polymer pipe coating material such as Sintakote™
- MSCL - Mild Steel Cement Lined
- Denso - Trade name for various types of corrosion protection wrapping systems for pipes and fittings.
- PAH - Polycyclic aromatic hydrocarbons – carcinogen found in coal tar.
- PCB - Polychlorinated biphenyls banned chemicals known to harm human and environmental health.
- Petrolatum - Non-toxic petroleum-based substance also referred to as petroleum jelly.
- RRJ - Rubber Ring Joint – Pipe connecting system
- Sintakote - Trade name for MDPE coating which is fusion bonded to the steel pipe surface.

4. Guideline

Generally, nearly all mild steel pipes manufactured prior to 1990 incorporate hazardous substances in the coating material. The use of Rubber Ring Joint (RRJ) pipe, which first became available in 1989, would suggest that the asset was manufactured after this date.

Pipe coatings containing hazardous substances:

- Factory applied and field-applied bitumen coating – typically found on pipes installed during the period 1900 – 1930 (**Category 3** material containing intractable hazardous substances).
- Asbestos-cement wrap and field-applied asbestos-cement mortar coating – found on some pipes installed in the 1930s (**Category 2** material containing inert hazardous substances).

- Coal tar enamel wrap coating – typically found on pipes installed during the period 1930 – 1990 (**Category 4** material containing both inert and intractable hazardous substances).
- Non-hazardous pipe coatings:
- Fusion-bonded polyethylene (e.g. Sintakote™) and field-applied vinyl tapes – became available after about 1985 (**Category 1** material free from hazardous substances).
 - Note: In addition to the handling precautions that must be exercised, coating material containing PAHs and/or PCBs can only be disposed of at a licenced intractable landfill site.

Note: Shoalhaven Water’s pipe coatings fall into **Category 4 in general.**

Coal Tar Enamel Wrap Identification (**Hazardous**)

Coal tar enamel coated pipe (or simply coal tar pipe) was produced from the 1930s until the 1990s. The coating process varied considerably but usually involved the application of a primer followed by spirally wrapping the pipe with chrysotile asbestos and fibreglass bandage soaked in a hot mixture of coal tar-asphalt. The finished pipe was whitewashed to reduce temperature rise during transport and storage.

Hazardous coating category 4 – contains asbestos and PAHs.
Some samples may also contain a plasticizing agent containing PCBs.

Identification Procedure for Coal Tar Enamel Wrap Coating

Most CTE-coated pipe can be identified with a high degree of confidence by looking for the 5 clues listed below. Normally, laboratory testing is only required to classify the waste for disposal purposes.

Look for clues:

- Distinctive spiral wrap - Coating is formed by winding a woven asbestos bandage soaked in Coal Tar Enamel (CTE).
- Smell – CTE has a distinctive smell, however, pipes installed above ground lose this smell after a few years.
- Whitewash coating - new pipe was often whitewashed to reduce softening of the coating by sun exposure during transport and storage. Remnants of this whitewash can often be found, even on pipes stored in the open for decades.
- Pliant coating – The coating of exhumed pipes often shows signs of deformation caused by ground stress or tree root pressure – however, the coating on above-ground pipe will harden and embrittle as the volatiles evaporate.
- Weathered coating fades from black to a grey colour (in a similar way that a bitumen road fades from black to grey over time).

Consult as-built information and installation records (e.g., SAP and GIS layers):

- Date of manufacture - CTE coating predominated on pipes made during the 1930s until at least the mid-1980s
- Beware - the recorded installation date is not always the same as the date of manufacture because old, stockpiled pipe may have been used or exhumed pipe may have been re-used.

Review Asset Condition Assessment (ACA) Reports:

- Pipe coating material is usually noted when pipeline asset inspection work is undertaken.
- For assistance - consult APDG, Engineering, Inspection and Condition Assessment.

Laboratory testing:

- Test for Polycyclic Aromatic Hydrocarbons (PAH) - All CTE contains these known carcinogens.
- Test for Polychlorinated Biphenyls (PCB) – Some CTE contains this carcinogen. PCB was sometimes added as a plasticizer to the hot CTE during manufacture to prevent coking.
- Test for asbestos – Most CTE pipe coatings contains this carcinogen. It is usually in the form of woven chrysotile bandage but can also be present as a compressed felt-like material. The asbestos fibres are stabilised by the coal tar and hazardous quantities of fibres are rarely released by stripping of the coating.

Coal Tar Enamel Wrap examples



Figure 20 – Damaged asbestos coal tar coating at an unknown location. Note the remnant whitewash, spiral bandage wrap, black substrate.



Figure 21 - Weathered asbestos coal tar coated pipe at Bold Park reservoir site. Note the spiral wrap and fading of the coating to a light grey.



Figure 22 - Weathered asbestos coal tar coated pipe at Boondi Pump Station. Note the spiral wrap and the remnant whitewash, especially on the underside of the pipe.



Figure 28 - Weathered asbestos coal tar coated pipe at Fleay Road, Harvey. Note the spiral wrap, remnant whitewash and coating colour weathered to light grey.