NEW EQUIPMENT & SYSTEM APPROVAL PROFORMA

Ref: *11/38834*

Note: the prompts given below are only a guide to the information required for approval. Dependent on the type of equipment or system that requires approval delete any section that is not applicable or include additional information if necessary. Mandatory fields are marked with an asterisk (*).

1 **Equipment or System to be approved** *

CTR 100

2 **Originator** *

Name: Robert Cavallo Company: Imtram Pty Ltd

3 **Introduction** *

CTR 100 is a fast setting concrete repair product. It is used to repair concrete tie rail seat deterioration (RSD)

4 **Determination of Need** *

The surface of concrete ties under the rail will deteriorate over time due to the combined influence of weather and stress due to heavy rail traffic. This results in loosening of the clips, requiring regular replacement of the clip. Ultimately the concrete tie has to be replaced.

CTR 100 is used to rebuild the deteriorated seat and bring the surface of the rail tie back to its original level.

The product cures rapidly so that repairs can be carried out expeditiously.

Repaired seats have shown no deterioration after 12 months in service, thus significantly reducing the need for regular replacement of rail clips.

This is a new technique that can lead to significant cost saving with regard to the problems associated with RSD

5 **Significant Change or Not** *(as determined by the Manager Standards)* *

This change in equipment or system is assessed as minor.

6 **Review Panel** *(as determined by the Manager Standards)* *

- John Furness - Manager Standards
- Tim Calver - Civil Standards & Technical Services Engineer
- Gunaratnam Jayakumar - Senior Delivery Engineer
- Denis Snowden - OHS Co-ordinator NSW

7 **Safety**

Please see technical specifications and MSDS sheets

8 **Performance and Suitability**

CTR 100 has a proven record of use in the USA where it is used extensively for rail seat repair.

Two reports have been issued to ARTC regarding this product. The first was issued in may 2010 to describe a trial application of CTR 100 at Maitland. The second was issued in May 2011 to publish the results of follow up tests after 12 months in service.

After 12 months in service, the repaired seats have shown no deterioration whatsoever.

(i) **Use in other rail networks**

Extensively used in the USA

(ii) **Use in the ARTC network**

12 month trial completed successfully

(iii) **Issues arising from usage of the equipment/system**

To ensure correct mixing of the 2 pack product and proper application the suppliers battery powered applicator is recommended to be used.

The product has a limited shelf-life so performance cannot be guaranteed if it is used past its use by Date.

(iv) **Changes required to infrastructure or systems for use of the equipment**

NA

9 **Reliability**

12 month trial completed successfully.

10 **Maintainability**

The completed repair requires no maintenance.

11	**Approval** *						
	CTR 100 is approved for use on concrete sleepers across the ARTC Network (excluding CRN).						
12	**Conditions of Approval** *						
	• Must be installed in accordance with manufacturer's instruction • Safe handling in accordance with MSDS • Must wear appropriate Safety PPE/clothing (hand protection, eye protection, face mask, long sleeves)						
13	**Does the Originator accept the additional Conditions of Approval as set by the Review Panel:**	Yes	✓	No	☐	N/A	☐

14	**Sign off**		***ARTC office use only***
	Review Panel:		
	John Furness	Date:	28/6/2011
	Tim Calver	Date:	27/6/11
	Gunaratnam Jayakumar	Date:	20/7/11
	Denis Snowden	Date:	24/6/11

Material Safety Data Sheet

SPIKEFAST CTR-100-60 RESIN

1 . Product and company identification

Product name : SPIKEFAST CTR-100-60 RESIN

Supplier : Willamette Valley Company
1075 Arrowsmith
Eugene, OR 97402
541-484-9621

Material uses : Not available.

Manufacturer : Willamette Valley Company
1075 Arrowsmith
Eugene, OR 97402
541-484-9621

Code : 1710560B

Validation date : **2/19/2009.**

Print date : 2/19/2009.

Responsible name : **Regulatory Compliance**

In case of emergency : CALL INFOTRAC
800-535-5053
001-352-323-3500

2 . Hazards identification

Physical state : Liquid.

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Emergency overview : DANGER !

CAUSES RESPIRATORY TRACT, EYE AND SKIN BURNS. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.

Corrosive to the eyes, skin and respiratory system. Causes burns. Harmful in contact with skin and if swallowed. May cause sensitization by skin contact. Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Contains material that can cause target organ damage. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Routes of entry : Dermal contact. Eye contact. Inhalation.

Potential acute health effects

Inhalation : Corrosive to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Ingestion : Harmful if swallowed. May cause burns to mouth, throat and stomach.

Skin : Corrosive to the skin. Causes burns. Harmful in contact with skin. May cause sensitization by skin contact.

Eyes : Corrosive to eyes. Causes burns.

Potential chronic health effects

Chronic effects : Contains material that can cause target organ damage.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Target organs : Contains material which causes damage to the following organs: skin, eye, lens or cornea, nose/sinuses.

2 . Hazards identification

Over-exposure signs/symptoms

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Ingestion : Adverse symptoms may include the following:
stomach pains

Skin : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

Eyes : Adverse symptoms may include the following:
pain
watering
redness

Medical conditions aggravated by over-exposure : Pre-existing skin and digestive disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

3 . Composition/information on ingredients

Name	CAS number	%
2-Ethyl-1,3-Hexanediol	94-96-2	5-10
Butyl Benzyl Phthalate	85-68-7	1-5
Amine.	Proprietary	1-5

There are no ingredients or additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4 . First aid measures

Eye contact : Get medical attention immediately. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Chemical burns must be treated promptly by a physician.

Skin contact : Get medical attention immediately. Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Inhalation : Get medical attention immediately. Move exposed person to fresh air. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Ingestion : Get medical attention immediately. Wash out mouth with water. Remove dentures if any. Move exposed person to fresh air. Keep person warm and at rest. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

4 . First aid measures

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing or wear gloves.

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

5 . Fire-fighting measures

Flammability of the product : In a fire or if heated, a pressure increase will occur and the container may burst.

Extinguishing media

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Hazardous combustion products : Decomposition products may include the following materials:
carbon oxides
nitrogen oxides
metal oxide/oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

7 . Handling and storage

Storage : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Product name	Exposure limits
Amine.	TWA: 0.1 mg/m³ 8 hour(s).

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state : Liquid.

Flash point : Open cup: >204.44°C (>400°F)

Color : Orange.

Odor : Odorless.

Boiling/condensation point : >100°C (>212°F)

Specific gravity : 1.32

Estimated Vapor Density : >1 [Air = 1]

VOC % : 7.66401%

To convert % VOC to lbs/gal use the following equation:
Specific Gravity*8.33*VOC%=VOC lbs/gal

Evaporation rate : <1 (Water = 1)

Solubility : Soluble in the following materials: water.

10 . Stability and reactivity

Stability : The product is stable. Under normal conditions of storage and use, hazardous polymerization will not occur.

Conditions to avoid : No specific data.

Materials to avoid : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Will not occur.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
2-Ethyl-1,3-Hexanediol	LD50 Dermal	Rabbit	2 g/kg	-
	LD50 Dermal	Rabbit	8960 mg/kg	-
	LD50 Dermal	Rabbit	8960 mg/kg	-
	LD50 Dermal	Rabbit	8960 mg/kg	-
	LD50 Intravenous	Rat	131 mg/kg	-
	LD50 Oral	Rat	1400 mg/kg	-
	LD50 Oral	Rat	2710 mg/kg	-
	LD50 Oral	Rat	2710 mg/kg	-
Butyl Benzyl Phthalate	LD50 Dermal	Rat	6700 mg/kg	-
	LD50 Dermal	Rabbit	>10 g/kg	-
	LD50 Oral	Rat	2330 mg/kg	-

Carcinogenicity

IDLH : Not available.

Synergistic products : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
Butyl Benzyl Phthalate	Intoxication	Acute EC50 1 mg/L	Daphnia	48 hours
	Intoxication	Acute EC50 >0.96 mg/L	Daphnia	48 hours
	Population	Acute EC50 0.21 mg/L	Algae	48 hours
	Mortality	Acute LC50 0.82 mg/L	Fish	96 hours
	Mortality	Acute LC50 >0.78 mg/L	Fish	96 hours
	Mortality	Acute LC50 1.5 mg/L	Fish	96 hours
Amine.	Intoxication	Acute EC50 17.4 mg/L	Daphnia	48 hours

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

13 . Disposal considerations

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-

PG* : Packing group

15 . Regulatory information

United States inventory (TSCA 8b): All components are listed or exempted.

SARA 311/312 - Acute, Chronic

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

Ingredient name	Cancer	Reproductive
Butyl Benzyl Phthalate	No.	Yes.
Crystalline Silica	Yes.	No.

Canada

WHMIS (Canada) : Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
Class E: Corrosive material

Canadian lists : **CEPA Toxic substances**: None of the components are listed.
Canadian NPRI: The following components are listed: Butyl benzyl phthalate

Canada inventory : **Canada inventory:** Not determined.

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

Mexico

Classification :

EU regulations

Hazard symbol or symbols :

15 . Regulatory information

Risk phrases : R61- May cause harm to the unborn child.
R43- May cause sensitization by skin contact.
R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety phrases : S53- Avoid exposure - obtain special instructions before use.
S2- Keep out of the reach of children.
S24- Avoid contact with skin.
S29- Do not empty into drains.
S37- Wear suitable gloves.
S46- If swallowed, seek medical advice immediately and show this container or label.
S61- Avoid release to the environment. Refer to special instructions/safety data sheet.

International regulations

International lists : **Australia inventory (AICS):** Not determined.
China inventory (IECSC): Not determined.
Korea inventory (KECI): Not determined.
Philippines inventory (PICCS): Not determined.
Japan inventory (ENCS): Not determined.
Europe inventory: All components are listed or exempted.

16 . Other information

Hazardous Material Information System (U.S.A.) :

Health	*	2
Flammability		1
Physical hazards		0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.) :

Date of printing : **2/19/2009.**

Date of issue : **2/19/2009.**

Date of previous issue : **9/25/2008.**

Version : **1.04**

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

INTRODUCTION

Between 18th and 20th May 2010, repairs were carried to deteriorated concrete tie rail seats at Maitland.

CTR-100 is a 2-pack polyurethane manufactured by The Willamette Valley Company and Imtram Pty Ltd is their Australian representative.

CTR-100 was used to carry out the repairs in May 2010 and the detailed procedure is explained in the report issued by The Willamette Valley Company after the work was completed.

On 20 May 2011 an inspection was carried out of the repairs and this document reports the results of that inspection.

PRESENT

The tests were carried out by:

Robert Cavallo Imtram Pty Ltd

Rick Buckland Imtram Pty Ltd

And were witnessed by:

Paul Heyes ARTC

TEST PROCEDURE

A section of rail was unclipped and jacked up 30cm above the ties. This allowed access to the patched areas for inspection.

The inspection was visual. The patch was cleaned with a brush to remove dirt and dust and then it was carefully inspected for abrasion, cracking, lifting and peeling.

Photographs were taken and these are included in this report.

TEST RESULTS

Five patches were inspected and all exhibited identical conditions:

Abrasion –There was no sign of wear or abrasion.

Cracking – There was no sign of cracking.

Lifting – There was no sign of lifting.

Peeling – There was no sign of peeling. Pushing at the edges of the patch with a small screwdriver showed no signs of loss of adhesion.

The surface of the patch was hard and solid. Striking the surface indicated no hollowness confirming that adhesion was still firm.

The following photographs are included:

Fig 1 - This is a photograph of a deteriorated seat in May 2010. The depression caused by the abrasion is evident.

Fig 2 - This is a photograph of patched seat in May 2011. The surface is clearly still solid and no depression has re occurred.

Fig 3 - This is a close up photograph of an edge of the patched seat.

Fig 4 - This is another close up photograph of an edge of the patched seat.

Fig 5 - This is a photograph of the patch application in May 2010.

Fig 6 - This is a photograph of the completed patch in May 2010.

CONCLUSION

Having shown no signs of deterioration after 12 months, it is likely that the CTR-100 patches installed to repair rail seat abrasion will last significantly longer than 12 months.

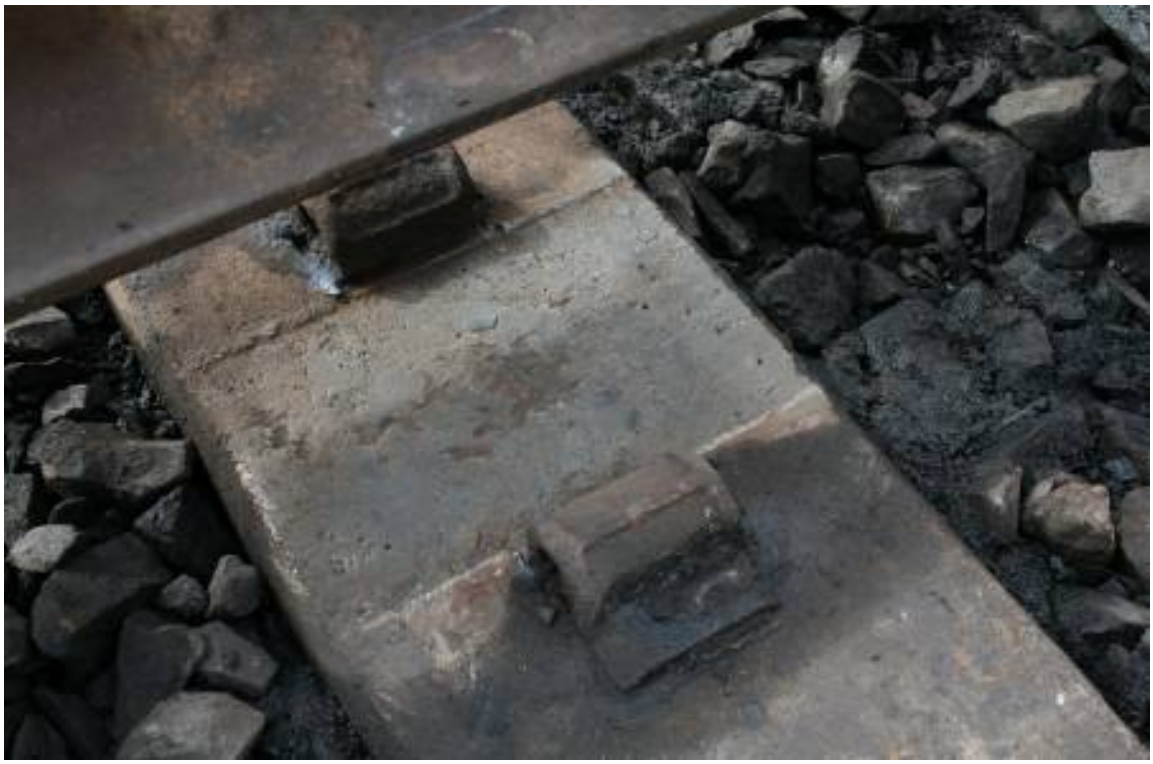

Fig 1

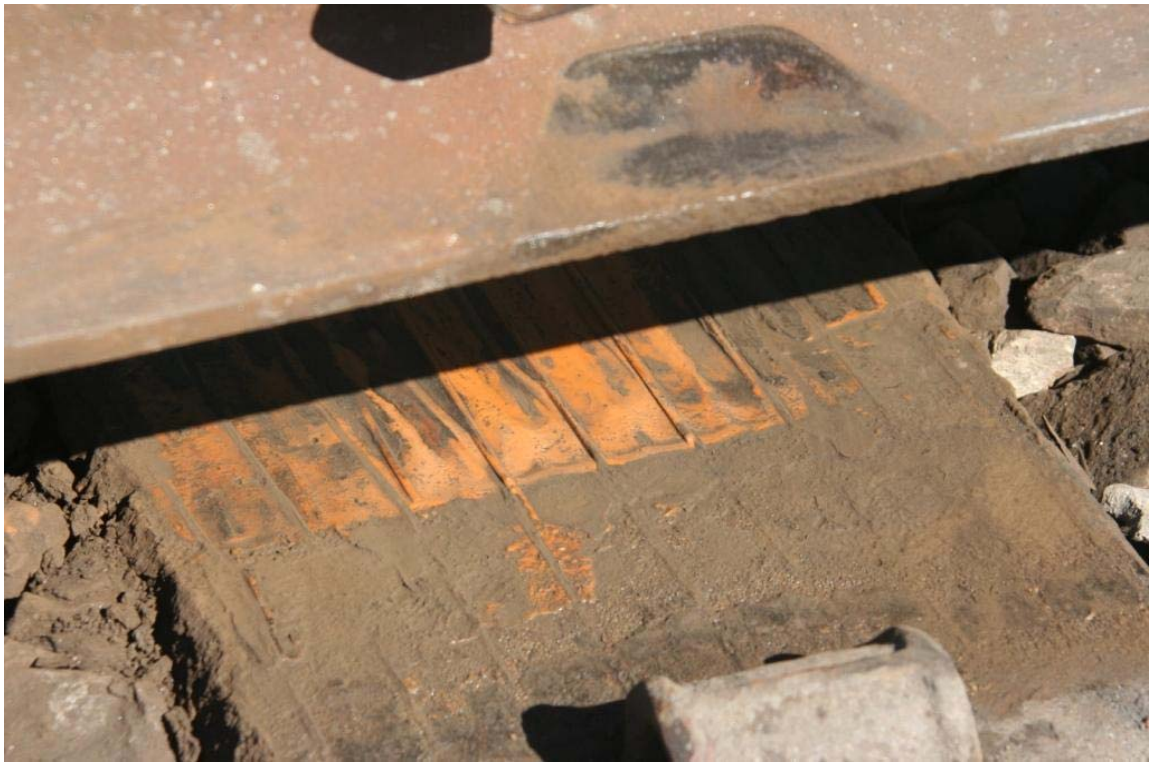

Fig 2

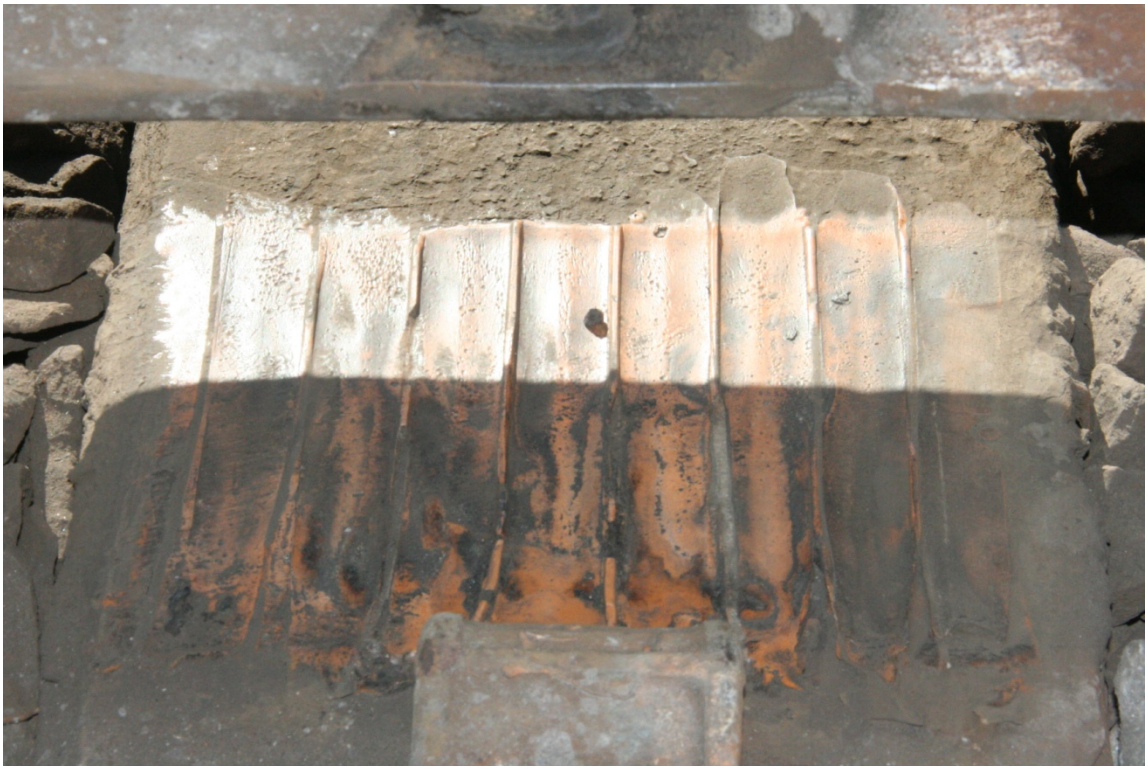

Fig 3

Fig 4

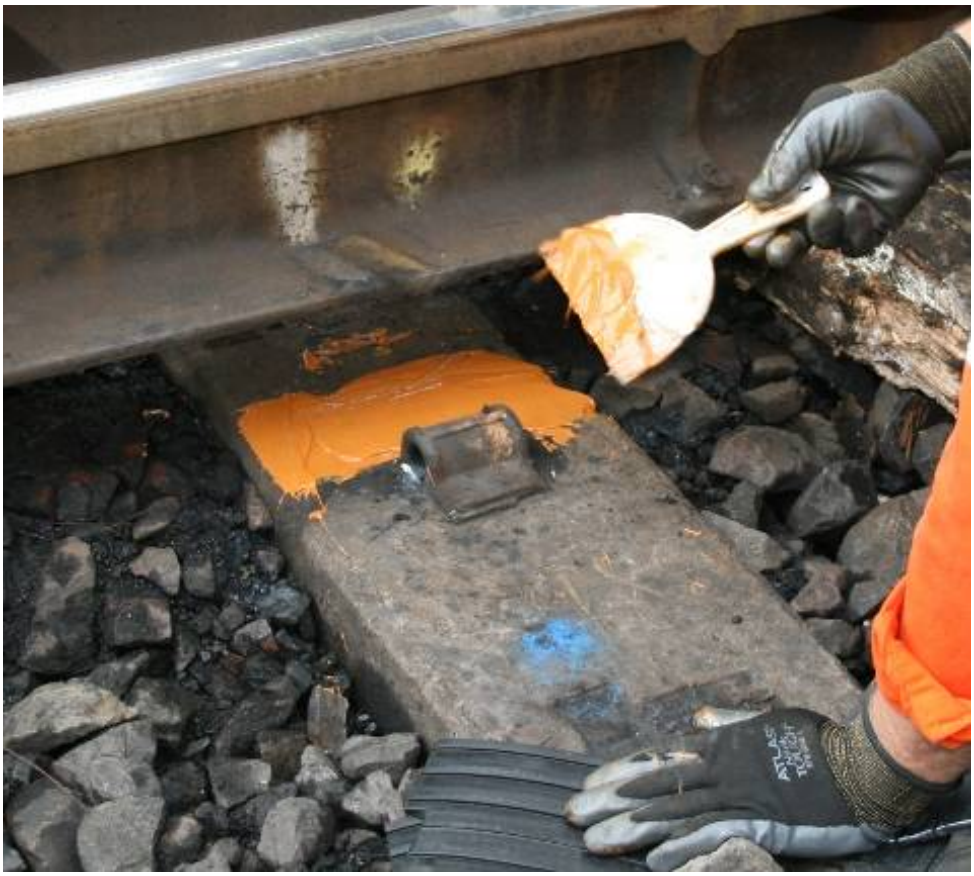

Fig 5

Fig 6