



Gloucestershire Warwickshire Steam Railway Plc
Risk Assessment for Fusible Plug Manufacture Process - Global

Risk Assessment - Fusible Plug Manufacture Process

Assessing the risks and use of lead in the manufacturing process of fusible plugs

Reference No: GLO-45367-48

Version No: 1

Assessment Approver: Kevin Jarvis

Department: Global

Date Of Assessment: 16 March 2024

Review Due Before: 21 July 2031

Lead Assessor: Geoff Goring

Team:

Using the flamefast brazing station fusible plugs; lead

Type	Hazard Cause	Persons Affected	Control Measures	L Overall	S	T	Additional Control Measures	L Overall	S	T	Owner/Action
Health and Safety	Lead poisoning, neurological effects, kidney damage Lead fume generation during melting	Volunteers & Staff	1) CRITICAL - Engineering: Local exhaust ventilation (LEV), temperature controls - Effective 2) CRITICAL - Engineering: 14 monthly LEV certification by third party - Effective 3) CRITICAL - Administrative: Good housekeeping, wet cleaning methods, no dry sweeping, hand washing facilities - Effective 4) CRITICAL - Administrative: Health surveillance - operators enrolled in at least 12-monthly blood testing - Effective 5) CRITICAL - Administrative: Inspect all extraction equipment before commencing process - Effective 6) CRITICAL - Administrative: provide adequate welfare facilities, and ensure washing of hands, no eating or drinking whilst operating - Effective 7) CRITICAL - PPE: PPE to use AT ALL TIMES: Heat resistant Gloves, Fire Retardant protective clothing, eye protection [glasses or face shield], Safety footwear with metatarsal metal or composite end caps - boots preferred. Face masks - Effective	1 x Low - Risk to be monitored to ensure it remains adequately controlled to an acceptable level.	4 = 4	4	1) PPE: Blood and urine testing. Face masks and / or hoods - Effective	1 x Low - Risk to be monitored to ensure it remains adequately controlled to an acceptable level.	1 = 1	1	n/a
Health and Safety	Serious burns, eye injuries Burns from molten lead and solder	Volunteers & Staff	1) CRITICAL - Engineering: Guarded work area, controlled pouring procedures - Effective 2) CRITICAL - Engineering: Dry moulds, preheat moulds, inspect materials - Effective 3) CRITICAL - Administrative: Hearth inspection, fire extinguishers, combustible material exclusion zone - Effective 4) CRITICAL - Administrative: signage, insulated tools and training - Effective 5) CRITICAL - PPE: PPE to use AT ALL TIMES: Heat resistant Gloves, Fire Retardant protective clothing, eye protection [glasses or face shield], Safety footwear with metatarsal metal or composite end caps - boots preferred. Face masks - Effective	1 x Low - Risk to be monitored to ensure it remains adequately controlled to an acceptable level.	1 = 1	1	None	1 x Low - Risk to be monitored to ensure it remains adequately controlled to an acceptable level.	1 = 1	1	n/a
Health and Safety	Musculoskeletal injuries Manual handling of moulds and materials	Volunteers & Staff	1) CRITICAL - Engineering: Mechanical aids, lifting training, weight limits - Effective	1 x Low - Risk to be monitored to ensure it remains adequately controlled to an acceptable level.	1 = 1	1	None	1 x Low - Risk to be monitored to ensure it remains adequately controlled to an acceptable level.	1 = 1	1	n/a



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Type	Hazard Cause	Persons Affected	Control Measures	L Overall	S	T	Additional Control Measures	L Overall	S	T	Owner/Action
Health and Safety	Minor to major injuries Slips and trips	Volunteers & Staff	1) CRITICAL - Administrative: Good housekeeping and clear walkways - Effective	1 x Low - Risk to be monitored to ensure it remains adequately controlled to an acceptable level.	1 =	1	None	1 x Low - Risk to be monitored to ensure it remains adequately controlled to an acceptable level.	1 =	1	n/a
Health and Safety	Delayed emergency response Lone working	Volunteers & Staff	1) CRITICAL - Administrative: Apply GWSR lone working policy - Effective 2) Administrative: Ensure a colleague is made aware of process occurrence and is not impacted - safe exclusion zone 2m - Effective	1 x Low - Risk to be monitored to ensure it remains adequately controlled to an acceptable level.	1 =	1	None	1 x Low - Risk to be monitored to ensure it remains adequately controlled to an acceptable level.	1 =	1	n/a

COSHH Assessments

There are no COSHH assessments associated with this risk assessment.

Reference Documents

- ORR Full Guide to Fusible Washout Plugs: HGR B9008 revision 03 - FULL document of HGR B9008
- Solder Paste MSDS - The solder paste details on an international MSDS
- The GWSR process / training sheet for Fusible Plugs Process - The sheet used to train operatives in the Fusible Wash out plug process - backs as a comprehensive process step sheet
- Flux MSDS - Bakers No. 3 - The FULL MSDS of Bakers No. 3 flux that is used in the fusible plug process
- Fryolux T1333 Leaded Solder Paint MSDS - MSDS for solder paint used in the fusible plug process

Ends



Appendix



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GWSR Toddington Machines and Kit Skills & Competency Matrix					
	Tracy Hallet	Rod Minchin	David		
Turning	1	4	5	5	5
Milling - vertical and horizontal	0	2	5	5	3
Milling - Universal; specific machining centre Huron #06	0	2	5	5	3
Boring - jig; horizontal and vertical	0	2	5	5	3
Shaping / Slotting	0	2	4	4	5
Brazing, heat treatment and white metalling	2	4	5	5	5
Fusible Plugs	2	4	5	5	0
Grinding - Tool, cutter, surface and cylindrical	0	2	3	3	5
Abrasive wheels, cutting disc use & Hand held grinding tools	0	3	3	3	5
Off-hand grinding, pedestal wheel grinding, wire wheel	0	2	4	4	5
Drilling [Radial]	0	2	4	4	3
Band sawing and power sawing	0	2	4	4	5
Welding [TIG, MIG, oxy acetylene]	2	4	4	4	0
Drilling [Pillar]	0	2	5	5	5
Heavy duty pressing	0	2	2	2	0
Plasma Cutting	0	2	1	1	
	7	41	63	63	52
	17%		100%		87%
KEY (Dreyfuss Model)					
0 = Not done					
1 = Novice					
2 = Advanced Beginner					
3 = Competent					
4 = Proficient					
5 = Expert					

Reference: UI-46218-745

Competency Matrix - Extracted Dreyfuss modelled competency matrix. REFER specifically to Fusible Plugs

THIS DRAWING APPLIES TO THE FOLLOWING CLASSES

CLASS	TYPE	CLASS	TYPE
		ALL	

NOTES:
MACHINED SURFACE ∇ GROUND SURFACE ∇
WELDING SYMBOLS TO B.S. 499/1933.
ALL SCREW THREADS TO BE TO B.S. 84 (WED)
UNLESS OTHERWISE STATED
DIMENSIONS OVER, TO OR BETWEEN MACHINED SURFACES
FOR WHICH NO LIMITS ARE GIVEN TO BE $\pm .010$ INS.

SCALES: FULL SIZE.

WASHOUT PLUG.

BRITISH RAILWAYS
LOCOMOTIVE DRAWING OFFICE
SWINDON

DRAWING No. A
SL/SW/20

DRAWN J.D. TRACED J.D. CHECKED R.J.L. DATE 22-11-83.

15" x 20"

15000
LETTER OR NUMBER
DATE
REF
ALTERATIONS

A 19237 ALM MATERIAL SPECIFICATIONS ADDED
LETTERS IN END OF PLUG ALTERED
FROM STAMPED TO RAISED AND
REPOSITIONED. ITEMS 1 TO 11 SL/SW/20
MADE AMO.I

RECESS TO CHAIN DOTTED LINE.
ONLY REQUIRED IF PLUG IS
HOT PRESSED.

MARK NO. 1 TO BE
STAMPED IN END OF PLUG.
IN TYPE.

TAPER LINE B

4 RAISED LETTERS

12 THREADS PER INCH

NOTE: THREAD IS TO BE CUT AT RIGHT ANGLES
TO THE CENTRE LINE OF PLUG.

MARK

DIMENSION	1	2	3	4	5	6	7	8	9	10	11
SL/SW	20	20	20	20	20	20	20	20	20	20	20
AMOI	1	1	1	1	1	1	1	1	1	1	1

NOMINAL SIZE

FULL DIA.	LOW	HIGH
1.3750	1.3663	1.3837
1.5000	1.4913	1.5087
1.5625	1.5538	1.5712
1.6250	1.6163	1.6337
1.6875	1.6788	1.6962
1.7500	1.7413	1.7587
1.8125	1.8038	1.8212
1.8750	1.8663	1.8837
1.9375	1.9298	1.9462
2.0000	1.9913	2.0087

AT A

DIMENSION B

D