

SWMS – Civil Rail Welding and adjusting

Issue date: 04/10/07
Review date: 04/10/10

SWMS number: SMS-06-SW-0767	SWMS Name: Rail welding and adjusting.			SWMS Team: Livio Radman Tony Karakolevski Dragan Sukara John Jobson Mick Meehan
Custodian (Position): Business Systems Officer, Illawarra Region. Peter Sharpe.	Assumptions: Fine weather, daylight hours, rail tracks operational with OHW power live. Staff have had Regional Induction. Staff briefed in SWMS: Civil inspections and maintenance in the danger zone of the railway track.			
Approving Authority (Position): General Manager, Infrastructure Maintenance.	Plant/Equipment/Tools: <ul style="list-style-type: none">• Oxy/LPG equipment.• Weld shears.• Hot sets.• Rail bonds.• Welding equipment.• Welding portions.• Flint gun.• Profile grinder.• Tensors.• Electric generator.• Cobras.• Fire fighting equipment.• Hand tools.• Hand grinders.• Hot materials basket.	Records/Reporting: <ul style="list-style-type: none">• Scope of work.• Weld identification label.• Welding return (Form WR1, TMC 222) Smartweld.	Permits/licences required: <ul style="list-style-type: none">• Hot work permit when applicable.• Oxy gas cutting.• Plant operator competency as required.• Minor Plant operator competency as required.• Electrical permit holder QEL as required.	Content reviewed by Technical expert (SME) and RailCorp safety professional (position including Div/Group) <ul style="list-style-type: none">• Rail welding and lubrication advisor. Engineering Division, Knowledge Group.• Safety Officer - Asset Management, Metropolitan Infrastructure, Illawarra.
Applicable Standards, Codes of Practice and guidance: <ul style="list-style-type: none">• AS4839 (2001).	Inspection requirements <ul style="list-style-type: none">• Electrical equipment has current test tag.• Rail bonds have current tag.• Daily plant check list.• Pre work check of tools and equipment.• Inspection of oxy-fuel gas equipment, see TMC 222, chapter 6.	Service schedule: Nil.	Training/Qualifications required: <ul style="list-style-type: none">• TDTW4 – Weld using aluminothermic technique.• TDTB61- Establish and maintain correct rail stress.• TDTD3397B. Operate vehicle mounted loading crane.• Railcorp Infrastructure Engineering - Track Installation and Maintenance Manual TMC 222 chapter 4, and TMC223.	

Number	Step	Hazard or human error (Safety/Environmental hazards identified, including physical environment, human errors, plant and equipment)	Risk ranking before controls	Control (to be Implemented to eliminate or reduce the risk to the lowest practicable level)	Risk ranking after controls	Responsibility	Job step to be completed in accordance with (name associated documentation)
1.	Unloading/loading tools and equipment from vehicle, and positioning at worksite.	Manual handling.	C+	Correct manual handling techniques. Team lifts. Use mechanical lifting device where possible.	C-	Team Member	SMS-06-GD-0001. Guide to Manual Handling.
		Explosion from oxy/LPG bottles.	B+	Ensure oxy/LPG bottles are secured in upright position at all times.	C-	Team Member	
		Burns from ignition of Ignition tapes.	C+	Ignition tapes to be stored in sealed containers away from welding portions.	D	Team Member	
		Struck by object when loading truck with vehicle mounted crane.	B+	Staff to keep safe distance from vehicle loading. Hard hat PPE. Operator to hold vehicle crane loading competency TDTD3397B SWI vehicle mounted crane.	C-	Team Member	SWI: Vehicle mounted crane. SMS-06-SW-0532. Protective helmets. TDTD3397B
		Incorrect loading of truck resulting in roll over, equipment/plant/tools coming of vehicle.	B+	All equipment/plant and tools to be secured. Balanced loading of truck.	B-	Worksite supervisor Truck driver.	
		Contact with sharp objects.	C+	Remove or blunt if possible. Wear gloves.	C-	Team Member.	SMS-06-SW-0530. Protective gloves.
		Crush injury.	B-	Correct manual handling techniques. Team lifts. Orderly loading of truck. Use mechanical lifting device where possible. Stay clear of moving equipment such as tail gate loaders and lifting devices.	C+	Team Member	SMS-06-GD-0001. Guide to Manual Handling.
		Electric shock from overhead power lines or wiring.	B+	Staff to have been trained in Electrical Awareness or RISI. Maintain Electrical clearances. Obtain Electrical Isolation permit prior to commencing work if required.	B-	Team Manager. Team Member. Worksite Supervisor.	SMS-06-GD-0268. Working around electrical infrastructure.

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		Slips, trips, falls and fall from heights.	B+	Correct manual handling techniques. Team lifts. Orderly loading of truck. Get on and off truck using steps provided.	B-	Worksite supervisor Team member	SMS-06-GD-0001. Guide to Manual Handling.
2.	Inspect worksite.	See SWMS – Civil inspections and maintenance in the danger zone.		See SWMS – Civil inspections and maintenance in the danger zone.			SWMS – Civil inspections and maintenance in the danger zone.
3.	Correct track geometry, and preparing welding bays.	Manual handling.	C+	Correct manual handling techniques.	C-	Team Member	SMS-06-GD-0001. Guide to Manual Handling.
		Cuts and abrasions from tools.	C-	Staff instructed before work, or previously deemed competent in safe use of hand tool. Work in accordance with applicable SWI. Wear appropriate PPE according to SWI.	C-	Worksite supervisor. Team Member	SWI: Applicable to tool/plant being used.
		Crush injury from hand tools.	C+	Staff instructed before work, or previously deemed competent in safe use of hand tool. Work in accordance with applicable SWI. Wear appropriate PPE according to SWI. Swing hammers away from body parts.	C+	Worksite supervisor. Team Member	SWI: Applicable to tool being used.
		Muscular strain	C+	Stretch before commencing activity. Rest periods as required. Staff instructed before work, or previously deemed competent in safe use of hand tool.		Team Member.	SWI: Applicable to tool being used.
		Repetitive strain injury.	B-	Rest periods as required. Staff instructed before work, or previously deemed competent in safe use of hand tool.	C+	Worksite supervisor. Team Member.	SWI: Applicable to tool/plant being used.

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		Struck by flying object eg broken tool, ballast, lockspikes etc.	C+	Eye protection PPE. Hard hat PPE. Keep safe distance between workers. Periodic check of tools. Clean ballast from tool impact area. Staff instructed before work, or previously deemed competent in safe use of hand tool.	C-	Team Member. Worksite supervisor.	SMS-06-SW-0529. Eye protection. SMS-06-SW-0532. Protective helmets.
		Struck by tool.	C+	Eye protection PPE. Hard hat PPE as required. Keep safe distance between workers. Staff instructed before work, or previously deemed competent in safe use of hand tool.	C-	Team Member. Worksite supervisor.	SMS-06-SW-0529. Eye protection. SMS-06-SW-0532. Protective helmets.
		Sudden release of tool.	C+	Eye protection PPE. Hard hat PPE as required. Keep safe distance between workers. Staff instructed before work, or previously deemed competent in safe use of hand tool.	C-	Team Member. Worksite supervisor.	SMS-06-SW-0529. Eye protection. SMS-06-SW-0532. Protective helmets.
		Electric shock from digging in the track ballast.	C-	Identify existing signal and electrical track connections. No digging below formation level without service searches.	C-	Worksite supervisor.	
		Hearing damage.	B-	Hearing protection PPE.	C-	Team Member.	SMS-06-GD-0531. Hearing protection.

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		Struck by runaway rail mounted plant or equipment.	C-	Staff instructed before work, or previously deemed competent in safe use of equipment. Use of appropriate SWI or instruction manual. Do not leave rail mounted, un-braked equipment, unattended.	D	Worksite supervisor. Team Member.	SWI: Applicable to tool/plant being used.
4.	Cut, prepare and align rail ends.	Electrocution from rail traction current.	B+	Correct installation of rail bonds as instructed by Signal Electrician.	C-	Worksite Supervisor. Signal Electrician.	
		Manual handling.	C+	Correct manual handling techniques.	C-	Team Member	SMS-06-GD-0001. Guide to Manual Handling.
		Cuts abrasions, burns from rail saw or Oxy equipment.	C-	Staff instructed before work, or previously deemed competent in safe use of hand tool. Work in accordance with applicable SWI. PPE Long leather welding gloves, long cotton drill pants and shirt, spats, Flip type Welding goggles, shade 5 lense. Staff not involved in task instructed to stay clear.	C-	Worksite supervisor. Team Member	SWI: Applicable to tool/plant being used. Railcorp Infrastructure Engineering - Track Installation and Maintenance Manual TMC 222 chapter 4.
		Hearing damage.	B-	Hearing protection PPE.	C-	Team Member.	SMS-06-GD-0531. Hearing protection.
5.	Remove old, and insert new rail closure, crossing, or stockrail and switch.	Manual handling.	C+	Correct manual handling techniques. Use lifting equipment where possible.	C-	Team Member	SMS-06-GD-0001. Guide to Manual Handling.
		Struck by moving plant, and injuries from pinch points on plant.	B-	Movement beepers on plant. Flashing light on plant. Do not approach plant without gaining operator's attention. Use plant pilot when required. Keep safe distance from working plant.	B-	Worksite supervisor. Team Member.	SMS-06-SW-0225. Plant.

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		Struck by flying object eg Broken tool, ballast, lockspikes, vegetation, etc.	C+	Eye protection PPE. Hard hat PPE. Keep safe distance between workers. Periodic check of tools. Clean ballast from tool impact area. Staff instructed before work, or previously deemed competent in safe use of tool.	C-	Team Member. Worksite supervisor.	SMS-06-SW-0529. Eye protection. SMS-06-SW-0532. Protective helmets.
		Hearing damage.	B-	Hearing protection PPE.	C-	Team Member.	SMS-06-GD-0531. Hearing protection.
		Electric shock from overhead power lines or wiring.	B+	Staff to have been trained in Electrical Awareness. Maintain Electrical clearances. Obtain Electrical Isolation permit prior to commencing work if required.	B-	Team Manager. Team Member. Worksite Supervisor.	SMS-06-GD-0268. Working around electrical infrastructure.
6.	Carrying out a weld.	Manual handling.	C+	Correct manual handling techniques.	C-	Team Member	SMS-06-GD-0001. Guide to Manual Handling.
		Burns to staff.	C-	Assign designated hot work areas. Place used hot items in Hot Crate Basket. PPE Long leather welding gloves, long cotton drill pants and shirt, spats, Flip type Welding goggles with shade 5 lens, for oxy/lpg cutting, and face shield for pre-heating of weld. Staff not involved in task instructed to stay clear.	D	Team Member	
		Skin irritation from luting process.	C-	Wash hands after activity. Review MSDS luting sands.	D	Team Member	MSDS: Luting sand.
		Injury to persons below when working on underbridges.	C+	Deck out bridge if required. Use slag tray as required.	C-	Worksite Supervisor.	

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		Explosion.	C+	Follow correct welding process. Applicable SWI for welding equipment being used.	C-	Rail Welder	Railcorp Infrastructure Engineering - Track Installation and Maintenance Manual TMC 222 chapter 4. SWI: Welding equipment.
		Damage to eyes by welding process, and removal of slag from weld.	C-	Flip type Welding goggles, shade 5 lens, or face shield as required for the activity.	D	Team Member	
		Damage to eyes of the public by welding process, and removal of slag from weld.	B-	Place welding screens around area if required. Clear area of public.	C-	Worksite supervisor	
		Damage to lungs or airways from chemical fumes.	C=	Wear P2 fume particle mask. Staff not involved task instructed to stay up wind. Filters on crucible to be used in tunnels. Review MSDS for welding portions. Review MSDS for welding moulds. Review MSDS for ignition tapes. Review MSDS for self tapping thimble.		Team Member	SMS-06-SW-0535. Respiratory protection. MSDS: Welding portions. MSDS: Welding moulds. MSDS: Ignition tapes. MSDS: Self tapping thimble.
		Burns to staff from a fire.	C-	Clean site of combustible material. Have appropriate fire fighting equipment on site. PPE Long leather welding gloves, long cotton drill pants and shirt, spats, Designated look out.	D	Worksite supervisor.	SWI: Appropriate SWI for fire fighting equipment to be used.
7.	Finish grinding of weld.	Manual handling.	C+	Correct manual handling techniques. Team lift to lift grinder.	C-	Team Member	SMS-06-GD-0001. Guide to Manual Handling.
		Muscular strain.	C+	Rotate task. SWI grinder	C-	Worksite supervisor Team member	SWI: Grinder

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		Struck by flying object, eg disintegrating disc, metal fragments.	B+	Safety goggles, or flip type welding goggles. Other workers to keep safe distance. Clean ballast from grinder impact area. SWI – Profile Grinder.	C-	Team Member. Worksite supervisor.	SWI – Profile Grinder.
		Burns to body.	B+	Wear long pants, spats and long sleeved shirt. PPE. Safety goggles PPE. Do not touch hot rail.	C-	Team Member.	Long pants, spats and long sleeved shirt. PPE. Safety goggles PPE.
		Setting fire to surrounding vegetation.	B+	Keep area clear of combustible materials. Appropriate fire fighting equipment on site. Fire watch person where applicable. Provide protective screen when required.	C-	Worksite supervisor.	
		Hearing damage.	B-	Hearing protection PPE.	C-	Team Member.	SMS-06-GD-0531. Hearing protection.
8.	Rail adjusting.	Manual handling.	C+	Correct manual handling techniques.	C-	Team Member	SMS-06-GD-0001. Guide to Manual Handling.
		Contact with sharp edges.	C+	PPE - Wear gloves. Periodic check of tools and equipment.	C-	Team Member.	SMS-06-SW-0530. Protective gloves.
		Repetitive strain injury.	B-	Rest periods as required. Staff instructed before work, or previously deemed competent in safe use of hand tool.	C+	Worksite supervisor. Team Member.	SWI: Applicable to tool/plant being used.
		Muscular strain	C+	Staff instructed before work, or previously deemed competent in safe use of hand tool.	C-	Team Member.	SWI: Applicable to tool/plant being used.

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		Struck by tool.	C+	Eye protection PPE. Hard hat PPE as required. Keep safe distance between workers. Staff instructed before work, or previously deemed competent in safe use of hand tool.	C-	Team Member. Worksite supervisor.	SMS-06-SW-0529. Eye protection. SMS-06-SW-0532. Protective helmets.
		Sudden release of tool.	C+	Eye protection PPE. Hard hat PPE as required. Keep safe distance between workers. Staff instructed before work, or previously deemed competent in safe use of hand tool.	C-	Team Member. Worksite supervisor.	SMS-06-SW-0529. Eye protection. SMS-06-SW-0532. Protective helmets.
		Struck by moving plant, and injuries from pinch points on plant.	B-	Movement beepers on plant. Flashing light on plant. Do not approach plant without gaining operator's attention. Use plant pilot when required. Keep safe distance from working plant.	B-	Worksite supervisor. Team Member.	SMS-06-SW-0225. Plant.
		Struck by flying object eg Broken tool, ballast, lockspikes, vegetation, etc.	C+	Eye protection PPE. Hard hat PPE as required. Keep safe distance between workers. Periodic check of tools. Clean ballast from tool impact area. Staff instructed before work, or previously deemed competent in safe use of hand tool.	C-	Team Member. Worksite supervisor.	SMS-06-SW-0529. Eye protection. SMS-06-SW-0532. Protective helmets.
9.	Pack up worksite	Work incomplete, material left on site.	C+	Carry post work inspection.	D	Worksite supervisor.	

MIMS STANDARD JOBS LISTING.

Std Job Code	Activity Description
P00007	CHECK ADJUSTMENT OF RAIL
P00C10	INSTALL RAIL CLOSURE (SHORT)
P03014	CWR & LWR RAIL ADJUSTMENT
P03809	WELD WITH DESTRESSING (CWR)
P03810	WELD WITHOUT DESTRESSING
P03814	CHANGE JWR TO CWR
P03816	REMOVE RAIL FLAW
P03818	CHANGE SHORT RAIL TO JWR
P03C01	ADJUST RAIL (INCLUDES CWR, LWR & JWR)
P03C05	RECTIFY DEFECTIVE WELD
P03C06	REPAIR/REMOVE RAIL FLAW
P03E02	EMERGENCY RECTIFY DEFECTIVE WELD
P03E03	EMERGENCY REPAIR/REMOVE RAIL FLAW
P05003	SUPPLY/INSTALL INSULATED JOINT
P05800	REPLACE INSULATED JOINT WITH GIJ
P08806	REPLACE CHECK RAIL
P08807	REPLACE STOCK RAIL
P08810	REPLACE TURNOUT XING
P08815	REPLACE SWITCH RAIL
P08817	REPLACE HOUSED POINTS SECTION
P08826	REPLACE EXPANSION SWITCH
P08828	REPLACE CATCHPOINT ON CONCRETE BEARER
P08829	REMOVE AND RESTORE GUARD RAILS
P08C06	REPLACE TURNOUT XING
P08C07	REPLACE TURNOUT SWITCH & OR STOCK RAI
P09800	INSTALL DIAMOND
P09802	REPLACE DIAMOND

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NOTE: Each work group or team member must sign off on the SWMS to acknowledge they have been briefed about or instructed in the SWMS

Team member name (Please print)	Team Member signature	Instructor/ Briefer name	Date	Team member name (Please print)	Team Member signature	Instructor/ Briefer name	Date

RailCorp Level 2 Risk Matrix - Regional & Local (Workplace)			Likelihood/Frequency							Definition for Use - Regional & Local level (Workplace) Used for workplace hazards and safety risks that do not consider the whole of the network. Indicatively this matrix is appropriate for use where the hazards under consideration are up to 10% of the total network exposure. This includes regional and local workplace risk assessments. As an example, the Level 2 scale would be used when examining the risk of slips, trips and falls on specific RailCorp platforms within a region or at a particular station, or the risk of fire within a depot. There are 3 options for descriptors which can be used to determine the frequency category. One set of descriptors is provided for frequency, one for historical likelihood, and one for predictive likelihood in the workplace. Choose the most appropriate. To score the risk, follow the steps: 1. Identify the magnitude of the credible consequence if the risk were to occur. If applicable, risks should be considered in terms of the safety (this matrix), commercial and environmental impact (using other matrices). 2. Identify the likelihood of this level of consequence occurring. (This is done after considering the effectiveness of the current controls in place) 3. Score the risk using the combination of likelihood and consequence ranking. Note: Where there are a range of credible consequences which may lead to a different level or risks and/or where the controls may be different. It may be useful to score the risk more than once.
			Event Frequency	Less than once every 1000 years	Once every 100 to 1,000 years	Once every 10 to 100 years	Once every 1 to 10 years	More than once per year up to and including 10 times per year	More than 10 times per year	
			Historical (Likelihood)	Unheard of in the rail industry	Has occurred once or twice in the rail industry	Has occurred many times in the rail industry, but not in NSW	Has occurred once or twice in NSW	Has occurred frequently in NSW	Has occurred frequently at specific locations	
			Workplace Predictive (Likelihood)	Not expected to occur	May occur only in exceptional circumstances	Could occur at some time but not likely	You would expect it to occur at least once in the next 10 years performing similar activities	You would expect it to occur at least once this year performing similar activities	You would expect it to occur at least once this month performing similar activities	
				F1	F2	F3	F4	F5	F6	
Consequence			Incredible	Improbable	Remote	Occasional	Probable	Frequent		
>10 Fatalities	C6	Disastrous	B-	B+	A	A	A	A		
2-10 Fatalities	C5	Catastrophic	C+	B-	B+	A	A	A		
1 Fatality (2-10 Major Injuries)	C4	Critical	C-	C+	B-	B+	A	A		
1 Major Injury	C3	Major	D	C-	C+	B-	B+	A		
1 or more Minor Injuries	C2	Minor	D	D	C-	C+	B-	B+		
First aid treatment, or illness/injury not requiring treatment	C1	Negligible	D	D	D	C-	C+	B-		