

SWMS number: SMS-06-SW-1298	SWMS Name: Diesel Fleet Maintenance			SWMS Team: Created with reference to input provided by: Jay Fleming (E08II Electrical & OHS Rep.), Paul Parkinson (E08II Electrical & OHS Rep.), Lee Morris(E09 Electrical), Steve Attrill (E08 Presentation Tech.), Robert Duffield (E09 Mechanical)
Custodian (Position): Manager, Services & Support, RSD	Assumptions: All work is to be performed at an RSD Diesel Maintenance Centre in a controlled work environment with access to referenced controls and carried out by competent persons applying approved engineering Instructions (EIs), etc.			
Approving Authority (Position): GM Safety Support Services	Plant/Equipment/Tools: <ul style="list-style-type: none"> • Red Flag • Appropriate trade tools • Wheel Chocks • Lock and lockout device 	Records/Reporting: <ul style="list-style-type: none"> • Relevant checklist(s) 	Permits/licences required:	Content reviewed by Technical expert (SME) and RailCorp safety professional (position including Div/Group) Initial assessment by: Peter Gaul (RSD Contract Safety Team Leader) Vijay Singh (SMS Auditor / OHS Consultant) Reviewed Suresh Singh (RSD Safety Manager) Darren Stuart (RSD Safety Officer) Geoff Went (Safety Facilitator) Rob Jackson (SSS) Peter Hynes (SSSD Team Leader)
Applicable Standards, Codes of Practice and guidance: <ul style="list-style-type: none"> • OHS Act 2000 • OHS Regulations 2001, Chapter 4,5 • Rail Safety Act 2008 • ASCC – National Standard for Manual Tasks 2007 • AS 3760 In-service Inspection and Testing of Electrical Equipment • SMS-06-SR-1479 OHS Risk Management 	Inspection requirements <ul style="list-style-type: none"> • Power leads tested 6 monthly • Visual inspection of leads for damage before use • Visual inspection of power and pneumatic tools for damage and operability 	Service schedule: METRE Reports	Training/Qualifications required: <ul style="list-style-type: none"> • Site specific induction • Manual Handling training • Rails Industry Safety Induction (RISI) • Trade qualification, as required 	PPE required: <ul style="list-style-type: none"> • High visibility orange vest or clothing • Lace up Safety Footwear • Safety eyewear for power tool use • Hearing protection, as required • Appropriate respirator , as required • Bump hat, as required • Protective Gloves, as required

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Review date: 25/11/13

Number	Step	Hazard or human error (Safety/Environmental hazards identified, including physical environment, human errors, plant and equipment)	Risk ranking before controls	Risk ranking after controls	Responsibility	Job step to be completed in accordance with (name associated documentation)
General Hazards These Hazards and controls apply throughout this SWMS	Struck by or contact with moving trains	C4, F3 =B-	<ul style="list-style-type: none"> • Rail Industry Safety Induction (RISI) • Site induction • High visibility vest or clothing • Trained drivers • Sounding horns • Route knowledge • Shed alarms • Traffic management plan (including designated pathways) • Road isolation, as applicable • Medical standards and health assessments • Site speed restrictions • Red flag and Plid on train being worked on • Road isolation of train being worked on 	C4, F1 =C-	Supervisor and authorised employee	SMS-06-GD-0323 Personal Protective Equipment SMS-06-GD-0333 Worksite Traffic Management SMS-12-OI-0886 Red Flagging Trains in stabling yards, depots and Maintenance Centres
	Slip, trip, fall on rail, ballast, other uneven walking surfaces, or spilt oil, grease, water and on entry/exit to carriage, poor lighting, fall from doorway.	C3, F3 =C+	<ul style="list-style-type: none"> • Designated walkways • Use of referenced entering / climbing out of trains SWI's • Lace-up safety footwear • Housekeeping • Workplace inspections • Isolation of doors • 3 points of contact • Use platform to access carriage 	C2, F2 =D		SMS-06-SW-0488 Climbing out of Trains onto Ballast SMS-06-SW-0487 Entering Trains from Ballast SMS-16-SR-0057 Inspection and testing

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<u>General Hazards</u> These Hazards and Controls apply throughout this SWMS	Electric shock from power sources within carriage, cabling, control jumpers, earthing and power to auxiliary equipment	C3, F4 =B-	<ul style="list-style-type: none"> Road isolation of train being worked on Pre work inspection & briefing Site specific induction Electrical Trade Certificate Do not use metal objects around exposed terminals Insulated foot wear and protective clothing Always carry out a test to verify isolation has been achieved Covered terminals Warning signs 	C3, F2 =C-	Supervisor and authorised employee	SMS-06-GD-0268 Working Around Electrical Equipment SMS-06-SW-0777 GI Inspection
	Head Strikes	C3, F2 =C-	<ul style="list-style-type: none"> Keep area clear Bump hat Lighting Additional portable lighting, as required Non slip surfaces 	C2, F2 =D		SMS-06-SW-0812 Working in the Pit
	Needle Stick Injuries	C3, F3 =C+	<ul style="list-style-type: none"> Inspecting area before touching Lighting, as required Full length clothing Safety footwear Protective gloves Handling sharps SWI Sharps tongs and sharps container Pre -work briefing 	C2, F3 =C -		SMS-06-SW-0405 Handling Sharps

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	<u>General Hazards</u> These Hazards and Controls apply throughout this SWMS	Contact with sharp edges	C3, F3 =C+	<ul style="list-style-type: none"> • Protective gloves • Lace up Safety Boots • Appropriate clothing 	C2, F2 =D		
		Contact with hot components	C3, F3 = C+	<ul style="list-style-type: none"> • Protective Gloves, as required • Allow equipment to cool down • Pre-work brief • Supervision 	C2, F2 = D		
		Strains and sprains from manual handling, repetitive movements and accessing difficult locations	C2, F4 =C+	<ul style="list-style-type: none"> • Use a firm grip, keep back straight, bend knees and avoid twisting, bending or overreaching • Use manual handling aids such as trolleys • Forklifts or Lifting gear (Overhead crane, pendulum crane, jacks), as required • 2 person or more, team lifts for heavy or awkward items • Assess the risk before accessing difficult places • Lighting • Additional portable lighting, as required • Knee pads, as required • Step ups, ladders as required • Take rest breaks as required 	C2, F2 =D		SMS-06-GD-0001 Guide to Manual Handling SMS-06-SW-0400 Forklift Trucks SMS-06-SW-1151 Overhead Travelling Crane - Safe Operation SMS-06-SW-0777 GI Inspection
		Dust	C2, F4 =C+	<ul style="list-style-type: none"> • Appropriate PPE • Induction, Supervisor, pre-work brief 	C2, F2 =D		

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	Working from the Maintenance Pit	Head Strikes	C3, F2 =C-	• See above "General Hazards"	C2, F2 =D	Supervisor and authorised employee	SMS-06-SW-0812 Working in the Pit
		Slips, Trips & Falls	C3, F3 =C+	• See above "General Hazards"	C2, F2 =D		SMS-06-SW-0812 Working in the Pit
 Warning • Ensure a pre work brief is undertaken with all team members involved in the activity • Ensure a detailed Workplace Risk Assessment is undertaken and documented							
	1. Electric Tools	Electric shock from power leads and associated tools and equipment	C3, F4 =B-	• Testing and Tagging • Pre-use inspection • RISI • Always carry out a test to verify isolation has been achieved • Residual Current/earth leakage device (ELD) or otherwise known as Residual Current Device (RCD) • Keep Leads off ground and away from water • Use battery drills, when possible	C2, F2 =D	Supervisor and authorised employee	SMS-06-SW-0274 Electrical Equipment Selection Inspection Testing
		Noise	C2, F4 =C+	• Appropriate PPE • Warning sign awareness • Induction, • Supervisor, • Pre-work brief	C2, F2 =D		SMS-06-EN-0553 Electrical Hazards Warnings
		Dust	C2, F4 =C+	• See above "General Hazards"	C2, F2 =D		SMS-06-GD-0273 Noise Management

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1. Electric Tools		“Kick Back” – sudden movement of tool	C3, F4 =B-	<ul style="list-style-type: none"> • Competent Operator working in accordance with referenced SWI • Tool guards are in place and operational • Keep body away from “kick back” path of tool • Safety guards have retracted before placing tool on ground or bench (e.g. power saw) 	C2, F2 =D		SMS-06-SW-0474 Angle Grinders SMS-06-SW-0479 Power Drills SMS-06-SW-0483 Power Saws
		Projectiles	C3, F4 = B-	<ul style="list-style-type: none"> • Safety Eyewear (including face shield) as appropriate • Pre-use checks, as per relevant SWI (See above “kick back”) • Competent operator working in accordance with relevant SWI (See above “kick back”) • Protective gloves • Relevant training in the operation of tools and equipment being used • Equipment guard • Pre-work assessment and briefing • Keep clear of path of moving tool • Check that guard returns correctly • Workable guard and continuous inspection • Supervision 	C2, F2 = D		SMS-06-SW-0474 Angle Grinders

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		Cuts and abrasions from contact with moving tool	C2, F2 =D	<ul style="list-style-type: none"> • Competent operator working in accordance with relevant tool SWI • Appropriate protective gloves • Keep clear of cutting tools • Supervision • Pre-work brief • Keep hands clear • Relevant training in the operation of tools and equipment being used • Equipment guard 	C2, F2 =D		SMS-06-SW-0474 Angle Grinders
		Sparks and hot metal generated by tool use	C2, F 3 = C-	<ul style="list-style-type: none"> • Competent operator working in accordance with relevant SWI (See above "kick back") • Long sleeved shirts or overalls • Additional controls as dictated by outcome of hot work risk assessment • Appropriate protective gloves • Appropriate eye protection • Use correct cutting wheels (soft wheels for hard metal, hard wheels for soft metal) • Remove flammable materials within the vicinity of the work being undertaken • Pre-work brief • Supervision • Extinguishers readily available 	C2, F 1 = D		SMS-06-PR-0329 Hot Work SMS-06-SW-0948 Arc Welders – Safe Operation SMS-06-SW-0951 Oxy-Acetylene Welding Equipment – Safe Operation

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2. Pneumatic Tools	Pneumatic discharge	C2, F3 = C-	<ul style="list-style-type: none"> Pre-use checks, as per referenced SWI Avoid compresses air contact with skin Competent Operator working in accordance with referenced SWI 	C2, F2 =D	Supervisor and authorised employee	SMS-06-SW-0809 <u>Pneumatic Tools</u>
	Struck by pneumatic hose	C3, F3 =C+	<ul style="list-style-type: none"> Pre-use checks, as per referenced SWI All fittings securely connected Competent Operator working in accordance with referenced SWI Isolation and release of air pressure before removing hoses Safety eyewear as required/face shields 	C2, F2 =D		SMS-06-SW-0809 <u>Pneumatic Tools</u>
	Noise	C2, F4 =C+	<ul style="list-style-type: none"> Appropriate PPE Induction, Supervisor, pre-work brief 	C2, F2 =D		SMS-06-GD-0273 <u>Noise Management</u>
	Dust	C2, F4 =C+	<ul style="list-style-type: none"> Appropriate PPE Safety eyewear Induction, Supervisor, pre-work brief 	C2, F2 =D		

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		Body contact and noise from compressed air	C3, F2 =C-	<ul style="list-style-type: none"> Pre-use checks, as per referenced SWI Avoid compresses air contact with skin Competent Operator working in accordance with referenced SWI Safety Eyewear 	C2, F2 =D		SMS-06-SW-0809 Pneumatic Tools
		Cuts and abrasions from contact with moving tool	C2, F2 =D	<ul style="list-style-type: none"> Competent Operator working in accordance with referenced SWI 	C2, F2 =D		
	3. Forklift	Struck by forklift	C4, F3 = B-	<ul style="list-style-type: none"> Traffic management plan Awareness whilst working around forklifts both drivers and pedestrians Hands and body parts clear of moving parts Trained Operator working in accordance with referenced SWI High Visibility Vest or Clothing Designated Walkways Signage Maintain safe distance Daily Inspections Reversing Beeper 	C3, F2 =C-	Supervisor and authorised employee	SMS-06-SW-0400 Forklift Trucks SMS-16-FM-0401 Forklift Daily Inspection

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	3. Forklift	Struck by falling load	C4, F3 = B-	<ul style="list-style-type: none"> • Flashing light while forklift is in use • Trained Operator working in accordance with referenced SWI • High Visibility Vest or Clothing • Daily inspection • Always have a planned escape route away from falling loads. 	C3, F2 = C-		SMS-06-SW-0400 Forklift Trucks SMS-06-GD-0323 Personal Protective Equipment SMS-16-FM-0401 Forklift Daily Inspection
	4. Overhead Crane	Struck by moving/lowering crane load	C3, F3 = C +	<ul style="list-style-type: none"> • Use designated lifting equipment, slings, tackle and frames; • Use guide rope to assist in handling loads; • Use designated lifting points; • Trained Operator working in accordance with referenced SWI • High Visibility Vest or Clothing • Periodic inspections • Pre-start inspections • Keep clear of suspended or moving load • Appropriate PPE • Vigilance 	C2, F2 = D	Supervisor and authorised employee	SMS-06-SW-1151 Overhead Travelling Crane - Safe Operation SMS-06-GD-0323 Personal Protective Equipment SMS-16-FM-0717 Overhead Travelling Crane Daily Pre-start-Daily Checklist

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		Struck by falling load	C4, F3 = B-	<ul style="list-style-type: none"> • Trained Operator working in accordance with referenced SWI • High Visibility Vest or Clothing • Periodic Inspections • Pre-start inspection • Restrained load • Use of appropriate slings, chain, techniques and lifting tackle 	C3, F2 =C-		SMS-06-SW-1151 Overhead Travelling Crane - Safe Operation SMS-06-GD-0323 Personal Protective Equipment SMS-16-FM-0717 Overhead Travelling Crane Daily Pre-start-Daily Checklist
	Commence work in accord with referenced SWI, EI's, etc.						
1.	Place Red Flag in accordance with referenced SOI	Slip, trip, fall on rail, ballast or other uneven walking surfaces and on entry/exit to carriage	C3, F3 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C2, F3 =C-	Supervisor and authorised employee	SMS-12-OI-0886 Red Flagging Trains in stabling yards, depots and Maintenance Centres
2.	Apply local road isolation (eg. lock boom gate, place Stop boards, position chocks, etc)	Slip, trip, fall on rail, ballast or other uneven walking surfaces and on entry/exit to carriage Struck by or contact with moving trains	C3, F3 =C+ C4, F3 =B-	<ul style="list-style-type: none"> • See above "General Hazards" 	C2, F3 =C- C4, F1 =C-	Supervisor and authorised employee Supervisor and authorised employee	

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3.	Isolate car or set in accordance with referenced SWI	Electric shock	C3, F4 =B-	<ul style="list-style-type: none"> • Isolations carried out in accordance with system SWI • Always carry out a test to verify isolation has been achieved • Do not use metal objects around exposed terminals • Pre-work Inspection • Warning signs • RISI • Electrician working in accordance with referenced SWI 	C2, F2 =D	Supervisor and authorised employee	SMS-06-SW-1130 <u>Electrical Isolation Diesel Fleet</u>
		Note <i>The following pages document hazards and controls that apply when working on the noted system</i>					
4.	Repair / replace Body components in accordance with Engineering Instructions, etc	Strains and sprains from manual handling, repetitive movements and accessing difficult locations	C2, F4 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C4, F1 =C-	Supervisor and authorised employee	SMS-06-SW-1284 <u>Train Body System (01) Safe Working.</u>
		Needle Stick Injuries	C3, F3 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C2, F3 =C -		
		Slip, trip, fall on rail, ballast, other uneven walking surfaces, or spilt oil, grease, water and on entry/exit to carriage	C3, F3 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C2, F3 =C -		
		Head Strikes	C3, F2 =C-	<ul style="list-style-type: none"> • See above "General Hazards" 	C2, F2 =D		
		Contact with sharp edges	C3, F3 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C2, F2 =D		

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	Fall from heights during roof inspection	C3, F3 =C+	<ul style="list-style-type: none"> • Diesel Maintenance Centres use of guarded high roads in conjunction with harnesses worn by trained users • Harness, D rings anchor points etc are in good working condition • Inspect and maintain harness • Non slip footwear • Use of handrails 	C2, F2 =D		SMS-06-SW-1160 <u>Working on High Roads</u>
	Electric shock from power sources within carriage	C3, F4 =B-	<ul style="list-style-type: none"> • See above "General Hazards" 	C2, F2 =D		SMS-06-SW-1130 <u>Electrical Isolation Diesel Fleet</u>
	Struck by forklift	C4, F3 = B-	<ul style="list-style-type: none"> • See above "Forklift" above 	C3, F2 =C-		
	Struck by or contact with moving trains	C4, F3 =B-	<ul style="list-style-type: none"> • See above "General Hazards" 	C4, F1 =C-		

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		Biological hazards from interaction with toilet / plumbing	C3, F2 =C-	<ul style="list-style-type: none"> • Lighting • Appropriate PPE • Personal hygiene • Protective gloves • Additional portable lighting, as required • Drivers' Incident reporting • Inspections before work commences • Contract Cleaning, as required • Work in Accordance with SWI • Vaccinations 	C2, F2 =D		SMS-06-SW-0506 <u>Cleaning up Bodily Fluids on Trains</u>
		Biological Hazards / Blood Borne Pathogens	C3, F2 =C-	<ul style="list-style-type: none"> • Appropriate PPE • Personal hygiene • Protective gloves • Drivers' Incident reporting • Inspections before work commences • Lighting • Additional portable lighting, as required • Contract Cleaning, as required • Cleaning in accordance with referenced SWIs 	C2, F2 =D		

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		Hidden Dangerous fauna (e.g. spiders and snakes)	C3, F3 =C +	<ul style="list-style-type: none"> Additional portable lighting Vigilance Appropriate protective gloves Long sleeve shirt Trousers Lace up safety footwear 	C2, F3 =C -		
		Cuts from broken glass	C3, F2 =C	<ul style="list-style-type: none"> Protective gloves Glass handling tools (suction cup handles) Apron Safety eyewear as required 	C2, F2 =D		
5.	Repair / Replace Bogie components in accordance with Engineering Instructions, etc	Strains and sprains from manual handling, repetitive movements and accessing difficult locations	C2, F4 =C+	<ul style="list-style-type: none"> See above "General Hazards" 	C4, F1 =C-	Supervisor and authorised employee	SMS-06-SW-1248 Bogie System (02) Safe Working
		Slip, trip, fall on rail, ballast, uneven walking surfaces oil etc	C3, F3 =C+	<ul style="list-style-type: none"> See above "General Hazards" 	C2, F3 =C-		
		Head strike	C3, F2 =C-	<ul style="list-style-type: none"> See above "General Hazards" 	C2, F2 =D		
		Contact with sharp edges	C3, F3 =C+	<ul style="list-style-type: none"> See above "General Hazards" 	C2, F2 =D		
		Struck by forklift	C4, F3 =B-	<ul style="list-style-type: none"> See above "Forklift" 	C3, F2 =C-		
		Struck by or contact with moving trains	C4, F3 =B-	<ul style="list-style-type: none"> See above "General Hazards" 	C4, F1 =C-		

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		Biological Hazards / Blood Borne Pathogens	C3, F2 =C-	<ul style="list-style-type: none"> See above "Repair / Replace Body components in accordance with SWI" 	C2, F2 =D	Supervisor and authorised employee	SMS-06-SW-0506 Cleaning up Bodily Fluids on Trains
		Contact with hot components	C3, F3 = C+	<ul style="list-style-type: none"> See above "General Hazards" 	C2, F2 = D		
		Hidden Dangerous fauna (eg. spiders and snakes)	C3, F3 =C +	<ul style="list-style-type: none"> Additional portable lighting Vigilance Appropriate protective gloves Long sleeve shirt Trousers Lace up safety footwear 	C2, F3 =C -		
		Various hazards associated with use of tools and equipment	C2, F4 =C+	<ul style="list-style-type: none"> See above "Tools & Equipment Hazards" 	C2, F2 =D		
		Electric shock from cabling	C3, F4 =B-	<ul style="list-style-type: none"> See above "General Hazards" 	C2, F2 =D		SMS-06-SW-1130 Electrical Isolation Diesel Fleet
6.	Repair / replace inter-car connection components in accordance with Engineering Instructions, etc	Strains and sprains from manual handling, repetitive movements and accessing difficult locations	C2, F4 =C+	<ul style="list-style-type: none"> See above "General Hazards" 	C4, F1 =C-	Supervisor and authorised employee	SMS-06-SW-1249 Intercar Connectors System (03) Safe Working
		Struck by or contact with moving trains	C4, F3 =B-	<ul style="list-style-type: none"> See above "General Hazards" 	C4, F1 =C-		
		Electric shock from jumpers	C3, F4 =B-	<ul style="list-style-type: none"> See above "General Hazards" 	C2, F2 =D		SMS-06-SW-1130 Electrical Isolation Diesel Fleet
		Various hazards associated with use of tools and equipment	C2, F4 =C+	<ul style="list-style-type: none"> See above "Tools & Equipment Hazards" 	C2, F2 =D		

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		Dust from pneumatics	C2, F4 =C+	<ul style="list-style-type: none"> See above "Tools & Equipment Hazards" 	C2, F2 =D		
		Struck by pneumatic Hose	C3, F3 =C+	<ul style="list-style-type: none"> See above "Tools & Equipment Hazards" 	C2, F2 =D		
		Body contact and noise from compressed air	C3, F2 =C-	<ul style="list-style-type: none"> See above "Tools & Equipment Hazards" 	C2, F2 =D		
		Limb entrapment by moving parts	C3, F2 = C-	<ul style="list-style-type: none"> Keep clear of moving parts No loose fitting clothing Pre work brief Supervision Use correct tools 	C2, F2 = D		
7.	Repair / Replace Door system components in accordance with Engineering Instructions, etc	Fall from doorway	C3, F3 =C+	<ul style="list-style-type: none"> See above "General Hazards" 	C2, F2 =D	Supervisor and authorised employee	SMS-15-TP-0246 Site Incident Management Plan for (Location) SMS-06-SW-1165 Train Door Systems (04) Safe Working
		Needle Stick Injuries	C3, F3 =C+	<ul style="list-style-type: none"> See above "General Hazards" 	C2, F3 =C-		
		Contact with sharp edges	C3, F3 =C+	<ul style="list-style-type: none"> See above "General Hazards" 	C2, F2 =D		
		Strains and sprains from manual handling, repetitive movements and accessing difficult locations	C2, F4 =C+	<ul style="list-style-type: none"> See above "General Hazards" 	C4, F1 =C-		
		Various hazards associated with use of tools and equipment	C3, F4 = B-	<ul style="list-style-type: none"> See above "Tools & Equipment Hazards" 	C2, F2 =D		

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8.	Repair / Replace Brake system components in accordance with Engineering Instructions, etc	Electric shock from power sources within carriage	C3, F4 =B-	• See above "General Hazards"	C2, F2 =D	Supervisor and authorised employee	SMS-06-SW-1130 Electrical Isolation Diesel Fleet
		Dust from pneumatics	C2, F4 =C+	• See above "Tools & Equipment Hazards"	C2, F2 =D		SMS-06-GD-0273 Noise Management
		Body contact and noise from compressed air	C3, F2 =C-	• See above "Tools & Equipment Hazards"	C2, F2 =D		
		Caught by moving doors	C3, F3 = C+	• Isolations of door • Door closing warnings • Keep clear of moving doors • Pre-work briefing • Supervision	C2, F2 = D		
		Caught by moving door components	C3, F3 = C+	• Isolations of door • Pre-work briefing • Supervision	C2, F2 = D		
8.	Repair / Replace Brake system components in accordance with Engineering Instructions, etc	Body contact and noise from compressed air	C3, F2 =C-	• See above "Tools & Equipment Hazards"	C2, F2 =D	Supervisor and authorised employee	SMS-06-SW-1164 Train Brake System (05) Safe Working
		Dust from brakes	C3, F2 =C-	• Isolations carried out, in accordance with SWI • P1 Dust Mask, as required • Safety Eyewear, as required • Protective gloves	C2, F2 =D		SMS-06-GD-0273 Noise Management
		Body contact and noise from compressed air	C3, F2 =C-	• See above "Tools & Equipment Hazards"	C2, F2 =D		
		Contact with hot components	C3, F3 = C+	• See above "General Hazards"	C2, F2 = D		

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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)
		Strains and sprains from manual handling, repetitive movements and accessing difficult locations	C2, F4 =C+	<ul style="list-style-type: none"> See above "General Hazards" 	C4, F1 =C-		
		Biological Hazards / Blood Borne Pathogens	C3, F2 =C-	<ul style="list-style-type: none"> Appropriate PPE Personal hygiene Lighting Additional portable lighting, as required Drivers' Incident reporting Inspections before work commences Contract Cleaning, as required Work in Accordance with SWI 	C2, F2 =D		
		Contact with sharp edges	C3, F3 =C+	<ul style="list-style-type: none"> See above "General Hazards" 	C2, F2 =D		
		Head strike	C3, F2 =C-	<ul style="list-style-type: none"> See above "General Hazards" 	C2, F2 =D		
		Slip, trip, fall on rail, ballast, other uneven walking surfaces, or spilt oil, grease, water	C3, F3 =C+	<ul style="list-style-type: none"> See above "General Hazards" 	C2, F3 =C-		
		Struck by forklift	C4, F3 =B-	<ul style="list-style-type: none"> See above "Forklift" 	C3, F2 =C-		
		Struck by or contact with moving trains	C4, F3 =B-	<ul style="list-style-type: none"> See above "General Hazards" 	C4, F1 =C-		

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Number	Step	Hazard or human error (Safety/Environmental hazards identified, including physical environment, human errors, plant and equipment)	Risk ranking before controls	Risk ranking after controls	Responsibility	Job step to be completed In accordance with (name associated documentation)	
		Hidden Dangerous fauna (e.g. spiders and snakes)	C3, F3 =C +	<ul style="list-style-type: none"> Additional portable lighting Vigilance Appropriate protective gloves Long sleeve shirt Trousers Lace up safety footwear 	C2, F3 =C -		
		Various hazards associated with use of tools and equipment	C3, F4 = B-	<ul style="list-style-type: none"> See above "Tools & Equipment Hazards" 	C2, F2 =D		
		Pinched by moving components	C3, F2 = C-	<ul style="list-style-type: none"> Isolations carried out, in accordance with SWI Maintain safe distance No loose clothing Pre-work brief 	C2, F2 =D		
		Electric shock from earthing	C3, F4 =B-	<ul style="list-style-type: none"> See above "General Hazards" 	C2, F2 =D		SMS-06-SW-1130 Electrical Isolation Diesel Fleet
9.	Repair / replace Pneumatic system components (other than braking) in accordance with Engineering Instructions, etc	Body contact and noise from compressed air	C3, F2 =C-	<ul style="list-style-type: none"> See above "Tools & Equipment Hazards" 	C2, F2 =D	Supervisor and authorised employee	SMS-06-SW-1260 Pneumatics (other than Braking) System (06) - Safe Working SMS-06-GD-0273 Noise Management
		Dust from pneumatics or brakes	C2, F4 =C+	<ul style="list-style-type: none"> See above "Tools & Equipment Hazards" 	C2, F2 =D		
		Struck by pneumatic Hose	C3, F3 =C+	<ul style="list-style-type: none"> See above "Tools & Equipment Hazards" 	C2, F2 =D		
		Strains and sprains from manual handling, repetitive movements and accessing difficult locations	C2, F4 =C+	<ul style="list-style-type: none"> See above "General Hazards" 	C4, F1 =C-		

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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)
		Biological Hazards / Blood Borne Pathogens	C3, F2 =C-	<ul style="list-style-type: none"> • Appropriate PPE • Personal hygiene • Lighting • Additional portable lighting, as required • Drivers' Incident reporting • Inspections before work commences • Contract Cleaning, as required • Work in Accordance with SWI 	C2, F2 =D		
		Head strike	C3, F2 =C-	<ul style="list-style-type: none"> • See above "General Hazards" 	C2, F2 =D		
		Contact with sharp edges	C3, F3 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C2, F2 =D		
		Struck by forklift	C4, F3 = B-	<ul style="list-style-type: none"> • See above "Forklift" above 	C3, F2 =C-		
		Struck by or contact with moving trains	C4, F3 =B-	<ul style="list-style-type: none"> • See above "General Hazards" 	C4, F1 =C-		
		Slip, trip, fall on rail, ballast, other uneven walking surfaces, or spilt oil, grease, water	C3, F3 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C2, F3 =C-		
		Hidden Dangerous fauna (e.g. spiders and snakes)	C3, F3 =C +	<ul style="list-style-type: none"> • Additional portable lighting • Vigilance • Appropriate protective gloves • Long sleeve shirt • Trousers • Lace up safety footwear 	C2, F3 =C -		

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Number	Step	Hazard or human error (Safety/Environmental hazards identified, including physical environment, human errors, plant and equipment)	Risk ranking before controls	Risk ranking after controls	Responsibility	Job step to be completed In accordance with (name associated documentation)	
		Biological hazards from interaction with toilet / plumbing	C3, F2 =C-	<ul style="list-style-type: none"> • Appropriate PPE • Personal hygiene • Immunisation against Hepatitis A & B • Cleaning by presentation services • Protective gloves • Safety eyewear as required • Work in Accordance with SWI 	C2, F2 =D		
		Various hazards associated with use of tools and equipment	C3, F4 = B-	<ul style="list-style-type: none"> • See above "Tools & Equipment Hazards" 	C2, F2 =D		
11	Repair / replace Auxiliary Equipment system components in accordance with Engineering Instructions, etc	Fall from heights during work on windscreen wipers, horns and strobe lights	C3, F4 = B-	<ul style="list-style-type: none"> • Work Platform 	C2, F2 =D	Supervisor and authorised employee	SMS-06-SW-1250 Auxiliary Equipment Systems (07) Safe Working
		Noise from horn	C2, F4 =C+	<ul style="list-style-type: none"> • Isolation of the horn air supply or circuit breaker • Hearing protection, as required 	C2, F2 =D		SMS-06-GD-0273 Noise Management
		Dust	C2, F4 =C+	<ul style="list-style-type: none"> • P1 Dust Mask, as required • Safety Eyewear, as required • Protective gloves 	C2, F4 =D		
		Noise from compressed air	C2, F4 =C+	<ul style="list-style-type: none"> • Hearing protection as required 	C2, F2 =D		
		Body contact and noise from compressed air	C3, F2 =C-	<ul style="list-style-type: none"> • See above "Tools & Equipment Hazards" 	C2, F2 =D		
		Various hazards associated with use of tools and equipment	C3, F4 = B-	<ul style="list-style-type: none"> • See above "Tools & Equipment Hazards" 	C2, F2 =D		
		Struck by or contact with moving trains	C4, F3 =B-	<ul style="list-style-type: none"> • See above "General Hazards" 	C4, F1 =C-		

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Number	Step	Hazard or human error (Safety/Environmental hazards identified, including physical environment, human errors, plant and equipment)	Risk ranking before controls	Risk ranking after controls	Responsibility	Job step to be completed In accordance with (name associated documentation)	
		Slip, trip, fall on rail, ballast, other uneven walking surfaces, or spilt oil, grease, water	C3, F3 =C+	• See above "General Hazards"	C2, F3 =C-		
		Electric shock from power to auxiliary equipment	C3, F4 =B-	• See above "General Hazards"	C2, F2 =D		SMS-06-SW-1130 Electrical Isolation Diesel Fleet
12	Repair / replace Climate Control system components in accordance with Engineering Instructions, etc	Dust from filters	C2, F4 =C+	• Appropriate PPE	C2, F4 =D	Supervisor and authorised employee	SMS-06-SW-1244 Train Climate Control (HVAC) System (08) Safe Working
		Strains and sprains from manual handling, repetitive movements and accessing difficult locations	C2, F4 =C+	• See above "General Hazards"	C4, F1 =C-		
		Head strike	C3, F2 =C-	• See above "General Hazards"	C2, F2 =D		
		Contact with sharp edges	C3, F3 =C+	• See above "General Hazards"	C2, F2 =D		
		Slip, trip, fall on rail, ballast, other uneven walking surfaces, or spilt oil, grease, water	C3, F3 =C+	• See above "General Hazards"	C2, F3 =C-		
		Hidden Dangerous fauna (e.g. spiders and snakes)	C3, F3 =C +	<ul style="list-style-type: none"> • Additional portable lighting • Vigilance • Appropriate protective gloves • Long sleeve shirt • Trousers • Lace up safety footwear 	C2, F3 =C -		

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Number	Step	Hazard or human error (Safety/Environmental hazards identified, including physical environment, human errors, plant and equipment)	Risk ranking before controls	Risk ranking after controls	Responsibility	Job step to be completed In accordance with (name associated documentation)	
		Fall from heights	C3, F4 = B -	<ul style="list-style-type: none"> • Use of high roads in accordance with referenced SWI • Working at heights training 	C2, F2 = D		SMS-06-SW-1160 <u>Working on High Roads</u>
		Burns from refrigerants	C2, F2 = D	<ul style="list-style-type: none"> • Protective gloves • Protective eyewear as appropriate 	C2, F2 = D		
13	Repair / replace Traction system components in accordance with Engineering Instructions, etc	Strains and sprains from manual handling, repetitive movements and accessing difficult locations	C2, F4 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C4, F1 =C-	Supervisor and authorised employee	SMS-06-SW-1273 <u>Train Traction System (09) Safe Working</u>
		Contact with hot components	C3, f3 = C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C2, F2 = D		SMS-06-GD-0273 <u>Noise Management</u>
		Contact with sharp edges	C3, F3 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C2, F2 =D		
		Noise from motors	C2, F4 =C+	<ul style="list-style-type: none"> • Isolate engine in accordance with system SWI • Hearing protection, as required 	C2, F2 =D		
		Diesel fumes	C3, F3 = C+	<ul style="list-style-type: none"> • Natural ventilation • Appropriate PPE • Restrict engine starts until work is complete • Stand away from the wind / fume direction 	C2, F2 = D		

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Number	Step	Hazard or human error (Safety/Environmental hazards identified, including physical environment, human errors, plant and equipment)	Risk ranking before controls	Risk ranking after controls	Responsibility	Job step to be completed In accordance with (name associated documentation)	
		Entrapment by moving parts	C4, F4 = B+	<ul style="list-style-type: none"> • Isolated engine • Keep clear of moving parts • Machine guards in place and adequate • Do not wear loose apparel • Stop machine before doing any adjustments • Apply engineering instruction / manual requirements. 	C2, F2 = D		
		Slip, trip, fall on spilt oil or grease	C3, F3 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C2, F3 =C-		
		Various hazards associated with use of tools and equipment	C3, F4 = B-	<ul style="list-style-type: none"> • See above "Tools & Equipment Hazards" 	C2, F2 =D		
14	Repair / replace Auxiliary Power Supply system components in accordance with Engineering Instructions, etc	Strains and sprains from manual handling, repetitive movements and accessing difficult locations	C2, F4 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C4, F1 =C-	Supervisor and authorised employee	SMS-06-SW-1285 Train Auxiliary Power Supply System (10) Safe Working
		Slip, trip, fall on spilt oil or grease	C3, F3 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C2, F3 =C-		

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Number	Step	Hazard or human error (Safety/Environmental hazards identified, including physical environment, human errors, plant and equipment)	Risk ranking before controls	Risk ranking after controls	Responsibility	Job step to be completed In accordance with (name associated documentation)	
		Electric shock	C4, F4 = B+	<ul style="list-style-type: none"> • Staff trained in Electrical Safety Awareness • Electrical Isolation in accordance with system SWI • Warning signs • Isolation of battery fuse if work is required • Vigilance; • Use approved PPE • Supervision • Lock-out/Tag-out devices applied • Pre-work briefs • Use of appropriately insulated tools 	C2, F2 = D		SMS-06-SW-1130 <u>Electrical Isolation</u> <u>Diesel Fleet</u>
		Various hazards associated with use of tools and equipment	C3, F4 = B-	<ul style="list-style-type: none"> • See above "Tools & Equipment Hazards" 	C2, F2 =D		

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Number	Step	Hazard or human error (Safety/Environmental hazards identified, including physical environment, human errors, plant and equipment)	Risk ranking before controls	Risk ranking after controls	Responsibility	Job step to be completed In accordance with (name associated documentation)	
15	Repair / replace Lighting system components in accordance with Engineering Instructions, etc	Fall from heights during roof work	C3, F4 = B -	<ul style="list-style-type: none"> • Use of high roads in accordance with referenced SWI • Training in the fitting of harness • Use designated PPE • Use proper anchor points • Inspect anchor points and PPE for fitness to use 	C2, F2 = D		SMS-06-SW-1251 Train Lighting Systems (12) - Safe Working
		Diesel fumes	C3, F4 = C+	<ul style="list-style-type: none"> • Natural ventilation • Appropriate PPE • Restrict engine starts until work is complete • Stand away from the wind / fume direction 	C2, F2 = D		SMS-06-SW-1160 Working on High Roads
		Slip, trip, fall on rail, ballast, other uneven walking surfaces, or spilt oil, grease, water	C3, F3 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C2, F3 =C-		

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Number	Step	Hazard or human error (Safety/Environmental hazards identified, including physical environment, human errors, plant and equipment)	Risk ranking before controls	Risk ranking after controls	Responsibility	Job step to be completed In accordance with (name associated documentation)	
		Electric shock	C4, F4 = B+	<ul style="list-style-type: none"> • Staff trained in Electrical Safety Awareness • Electrical Isolation in accordance with system SWI • Warning signs • Isolation of battery fuse if work is required • Vigilance; • Use approved PPE • Supervision • Lock-out/Tag-out devices applied • Pre-work briefs • Use of appropriately insulated tools 	C2, F2 = D		SMS-06-SW-1130 Electrical Isolation Diesel Fleet
		Strains and sprains from manual handling, repetitive movements and accessing difficult locations	C2, F4 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C4, F1 =C-		
16	Repair / replace Indicators, Control & Monitoring System components in accordance with Engineering Instructions, etc	Strains and sprains from manual handling, repetitive movements and accessing difficult locations	C2, F4 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C4, F1 =C-	Supervisor and authorised employee	SMS-06-SW-1269 Train Indicators Control and Monitoring Systems (13) Safe Working
		Various hazards associated with use of tools and equipment	C3, F4 = B-	<ul style="list-style-type: none"> • See above "Tools & Equipment Hazards" 	C2, F2 =D		
		Radiation from train radio antennae	C3, F3 = C+	<ul style="list-style-type: none"> • Isolation, in accordance with referenced SWI 	C4, F1 =C-		SMS-06-SW-0891 Train Radio Isolation

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		Electric shock	C4, F4 = B+	<ul style="list-style-type: none"> • Staff trained in Electrical Safety Awareness • Electrical Isolation in accordance with system SWI • Warning signs • Isolation of battery fuse if work is required • Vigilance; • Use approved PPE • Supervision • Lock-out/Tag-out devices applied • Pre-work briefs • Use of appropriately insulated tools 	C2, F2 = D		SMS-06-SW-1130 Electrical Isolation Diesel Fleet

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Number	Step	Hazard or human error (Safety/Environmental hazards identified, including physical environment, human errors, plant and equipment)	Risk ranking before controls	Risk ranking after controls	Responsibility	Job step to be completed In accordance with (name associated documentation)	
17.	Repair / replace Communication system components in accordance with Engineering Instructions, etc	Radiation from train radio antennae	C3, F3 = C+	<ul style="list-style-type: none"> Isolation, in accordance with referenced SWI Keep safe distances Isolate radio or turn off when not in use / being tested 	C2, F2 = D	Supervisor and authorised employee	SMS-06-SW-1281 Train Communication System (14) Safe Working SMS-06-SW-0891 Train Radio Isolation
		Electric shock	C4, F4 = B+	<ul style="list-style-type: none"> Staff trained in Electrical Safety Awareness Electrical Isolation in accordance with system SWI Warning signs Isolation of battery fuse if work is required Vigilance; Use approved PPE Supervision Lock-out/Tag-out devices applied Pre-work briefs Use of appropriately insulated tools 	C2, F2 = D		SMS-06-SW-1130 Electrical Isolation Diesel Fleet
		Various hazards associated with use of tools and equipment	C3, F4 = B-	<ul style="list-style-type: none"> See above "Tools & Equipment Hazards" 	C2, F2 = D		

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		Fall from heights during roof work	C3, F4 = B -	<ul style="list-style-type: none"> • Use of high roads in accordance with referenced SWI • Training in the fitting of harness 	C2, F2 = D		SMS-06-SW-1251 Train Lighting Systems (12) - Safe Working SMS-06-SW-1160 Working on High Roads
18	Repair / replace Water Systems components in accordance with Engineering Instructions, etc	Strains and sprains from manual handling, repetitive movements and accessing difficult locations	C2, F4 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C4, F1 =C-	Supervisor and authorised employee	SMS-06-SW-1257 Train Water System (15) Safe Working
		Biological hazards from interaction with soiled water / plumbing	C3, F2 =C-	<ul style="list-style-type: none"> • Appropriate PPE • Personal hygiene • Immunisation against Hepatitis A & B • Cleaning by presentation services • Protective gloves • Safety eyewear as required • Work in Accordance with SWI 	C2, F2 =D		
		Various hazards associated with use of tools and equipment	C3, F4 = B-	<ul style="list-style-type: none"> • See above "Tools & Equipment Hazards" 	C2, F2 =D		
		Contact with sharp edges	C3, F3 =C+	<ul style="list-style-type: none"> • See above "General Hazards" 	C2, F2 =D		

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19	Repair / replace Catering Equipment system components in accordance with Engineering Instructions, etc	Strains and sprains from manual handling, repetitive movements and accessing difficult locations (e.g. fridges and ovens)	C2, F4 =C+	• See above "General Hazards"	C4, F1 =C-	Supervisor and authorised employee	SMS-06-SW-1252 Catering Equipment System (16) - Safe Working
		Electric shock from power leads or electrical appliances	C4, F4 = B +	<ul style="list-style-type: none"> • Testing and Tagging • Inspection before work commences • Unplugging appliances before work commences • Warning signs • Staff trained in Electrical Safety Awareness • Qualified Electricians carrying out electrical work • Vigilance • Use lock-out / tag-out devices • Use appropriate PPE • Use appropriately insulated tools • Supervision • Pre-work briefing 	C2, D2 = D		SMS-06-SW-0274 Electrical Equipment Selection Inspection Testing SMS-06-SW-1130 Electrical Isolation Diesel Fleet
		Various hazards associated with use of tools and equipment	C3, F4 = B-	• See above "Tools & Equipment Hazards"	C2, F2 =D		
		Burns or scalds	C3, F3 = C+	<ul style="list-style-type: none"> • Inspection before work commences • Protective gloves • Safety Clothing • Allow cooling period 	C2, F2 = D		
		Contact with sharp edges	C3, F3 =C+	• See above "General Hazards"	C2, F2 =D		

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20	Repair / replace Crew & Passenger Amenities system components in accordance with Engineering Instructions, etc	Needle Stick Injuries	C3, F3 =C+	• See above "General Hazards"	C2, F3 =C-	Supervisor and authorised employee	SMS-06-SW-1256 Crew and Passenger Amenities System (17) Safe Working
		Various hazards associated with use of tools and equipment	C3, F4 = B-	• See above "Tools & Equipment Hazards"	C2, F2 =D		SMS-06-SW-0274 Electrical Equipment Selection Inspection Testing
		Strains and sprains from manual handling, repetitive movements and accessing difficult locations (e.g. tables and beds)	C2, F4 =C+	• See above "General Hazards"	C4, F1 =C-		SMS-06-SW-1130 Electrical Isolation Diesel Fleet
		Electric shock from electrical (eg crew CD player) or outlets (eg shaver outlet / GPOs)	C4, F4 = B +	<ul style="list-style-type: none"> • Electrical Isolation in accordance with system SWI • Staff trained in Electrical Safety Awareness • Warning signs • Inspection before work commences • Qualified Electricians carrying out electrical work • Vigilance 	C2, D2 = D		
21	Repair / replace Diesel Engine Systems components in accordance with Engineering Instructions, etc	Strains and sprains from manual handling, repetitive movements and accessing difficult locations	C2, F4 =C+	• See above "General Hazards"	C4, F1 =C-	Supervisor and authorised employee	SMS-06-SW-1261 Diesel Engine System (18) Safe Working
		Contact with hot components	C3, F3 = C+	• See above "General Hazards"	C2, F2 = D		SMS-06-GD-0273 Noise Management
		Contact with sharp edges	C3, F3 =C+	• See above "General Hazards"	C2, F2 =D		
		Noise from motors	C2, F4 =C+	<ul style="list-style-type: none"> • Isolated engine • Hearing protection, as required 	C2, F2 =D		

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		Diesel fumes	C3, F4 = C+	<ul style="list-style-type: none"> Natural ventilation Appropriate PPE Isolate Engine 	C2, F2 = D		
		Contact with diesel fuel	C2, F3 = C-	<ul style="list-style-type: none"> Protective gloves 	C2, F2 = D		
		Entrapment by moving parts	C4, F4 =B+	<ul style="list-style-type: none"> Isolated engine Keep clear of moving parts Machine guards in place and adequate Do not wear loose apparel Stop machine before doing any adjustments Apply engineering instruction / manual requirements. 	C2, F2 = D		
		Slip, trip, fall on spilt oil or grease	C3, F3 =C+	<ul style="list-style-type: none"> See above "General Hazards" 	C2, F3 =C-		
		Exposure to Fire Suppression agents	C4, F4 = B+	<ul style="list-style-type: none"> Isolation of fire suppression system before work commences Safe design Scheduled maintenance, repair, testing and inspection Use appropriate PPE Pre-work briefing Supervision 	C2, F2 = D		
		Various hazards associated with use of tools and equipment	C3, F4 = B-	<ul style="list-style-type: none"> See above "Tools & Equipment Hazards" 	C2, F2 =D		
		 Note Once the relevant work is complete, the following steps apply					

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Number	Step	Hazard or human error (Safety/Environmental hazards identified, including physical environment, human errors, plant and equipment)	Risk ranking before controls	Risk ranking after controls	Responsibility	Job step to be completed In accordance with (name associated documentation)	
22	Remove any personal isolation on the relevant car(s) or set in accordance with referenced SWI	Electric shock	C4, F4 = B +	<ul style="list-style-type: none"> • Staff trained in Electrical Safety Awareness • Electrical Isolation in accordance with system SWI • Warning signs • Isolation of battery fuse if work is required • Vigilance; • Use approved PPE • Supervision • Lock-out/Tag-out devices applied • Pre-work briefs • Use of appropriately insulated tools 	C2, F2 = D	Owner Only	SMS-06-SW-1130 Electrical Isolation Diesel Fleet
23	Remove Red Flag in accordance with referenced SOI	Nil	-		-	Owner Only	SMS-12-OI-0886 Red Flagging Trains in stabling yards, depots and Maintenance Centres
24	Notify of completion	Nil	-		-		

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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