









Safe Work Instruction	Issue date: 23/11/09
Train Indicators, Control & Monitoring Systems (13): Safe Working	Review date: 01/03/11

Document no. SMS-06-SW-1269	Work description This SWI describes safe work practices related to the maintenance of components within the Train Indicator, Control & Monitoring system Scope This SWI describes the hazards and controls for work by RSD staff on Rollingstock Train Indicator, Control & Monitoring systems This document does not replace technical 'how to' documents such as Engineering Instructions, Manufacturers' instructions etc In addition to the inclusions of this document, all Indicator, Control & Monitoring system work is to be carried out in accordance with SMS-06-GD-0268 Working Around Electrical Equipment .		
Review date 01/03/11	References <ul style="list-style-type: none"> • OHS Act 2000 • OHS Regulations 2001(Clause 64, 80, 81, 207 & 208) • Rail Safety Act 2008 • COP Low Voltage Electrical Work • AS 61010.1-2003 Safety requirements for electrical equipment for measurement, control & laboratory use • HB 187-2006 Guide to Selecting a Safe Multimeter • SMS-12-OI-0886 Red Flagging Trains in stabling yards, depots and Maintenance Centres • SMS-06-GD-0268 Working Around Electrical Equipment • SMS-06-SW-1160 Working on High Roads • SMS-06-SW-0264 Portable Ladders, Stepladders and Step Platforms • SMS-06-SW-0839 Compressed Air - Safe Use • SMS-06-PR-0173 Plant and Equipment Lock-out Tag-out • SMS-06-SW-0836 Isolating 1500V DC OH using an Annett Key • SMS-06-SW-0837 Isolating 1500v DC OH using a Supplementary Lock • SMS-06-SW-0838 Pantograph Raising and Lowering • SMS-06-SW-1133 Guard's Emergency Cock Lock-Out • SMS-06-SW-0538 PPE for Electrical Work • SMS-06-SW-0269 Electric Shock Protocol • SMS-06-SW-0812 Working in the Pit • SMS-06-SW-0487 Entering Trains from Ballast • SMS-06-SW-0488 Climbing out of Trains onto Ballast 		
Responsible supervisor	PPE and precautions	Competencies or qualifications	Licences or permits required
Line Manager	<ul style="list-style-type: none"> • High visibility vest or clothing • Safety Footwear • Gloves, as required • Knee pads, as required • Bump hats, as required • Eye protection, as required 	<ul style="list-style-type: none"> • Rail Industry Safety Induction (RISI) • Site specific induction • Electrical Safety Awareness • Electrical Trade Certificate, as required • Manual Handling Training 	
Tools and equipment required			
<ul style="list-style-type: none"> • Red Flag • Personal Locks, Multi-locks (Hasps) and/or Danger tags, as required • Power tools, as required • Hand tools 			
IF CONTROL MEASURES ARE NOT SUITABLE AND MAJOR CHANGES ARE NEEDED, CONDUCT A RISK ASSESSMENT AND DEVELOP NEW CONTROLS ACCORDING TO SMS-06-PR-0104 WORKPLACE RISK MANAGEMENT.			


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	<p>Warning</p> <p>The following warnings apply throughout this SWI:</p> <ul style="list-style-type: none"> To prevent falls when working at height ensure you work in accordance with <u>SMS-06-SW-0264 Portable Ladders, Step Ladders, and Step Platform</u>, additionally, ensure any ladders are non-conductive, to reduce the risk of electric shock Always remove all metal wrist, hand and neck jewellery and chains to prevent them becoming conductors should they come in contact with a live piece of equipment Working with power tools can be hazardous. Where possible use non-powered or battery operated tools. If power tools are required, always work in accordance with the relevant SWI or manufacturers instructions if no SWI is available
Place Red Flag	To notify persons that work on Indicator, Control & Monitoring systems is being carried out on the train you must place a Red Flag accordance with <u>SMS-12-OI-0886 Red Flagging Trains in stabling yards, depots and Maintenance Centres</u>
Job/Site Planning	<p>Once the red flag is in place, determine the work required</p> <p>Identify the relevant tools, equipment and parts that will be required</p> <p>Identify any other relevant SWIs (eg. SWIs for relevant tools) that will document hazards and their controls</p> <p>Collect identified items from the store and transport to the location using manual handling aids (eg. bags, trolleys, or electric maintenance vehicles)</p> <p>Where possible, climb in and out of the cars from platforms. If it is necessary to access from ballast always do so in accordance with <u>SMS-06-SW-0487 Entering Trains from Ballast</u> and <u>SMS-06-SW-0488 Climbing out of Trains onto Ballast</u></p>
	<p>Note</p> <ul style="list-style-type: none"> Should testing / fault finding on live electrical equipment and / or wiring be required, this is only to be carried out by qualified electricians or apprentices under their direct supervision, when: <ul style="list-style-type: none"> Competent in the requirements of electrical shock protocol in accordance with <u>SMS-06-SW-0269 Electric Shock Protocol</u> Wearing all the PPE for electrical work in accordance with <u>SMS-06-SW-0538 PPE for Electrical Work</u> Using approved electrical test equipment (e.g. a multimeter that complies with AS 61010.1-2003)
Isolation – Electrical Energy	<p>Before commencing work on Indicator, Control & Monitoring systems, isolation is required to protect you from electric shock, injury or death. The isolation required may vary, depending upon the work, and should be determined in conjunction with relevant technical documents and, if in doubt, in conjunction with the Line Manager</p> <p>However, to protect from electrical energy within the Indicator, Control & Monitoring system always</p> <ul style="list-style-type: none"> Isolate electrically by switching the electrical switch and circuit breaker and Apply personal locks, multi-locks and/or tags to all isolations, in accordance with <u>SMS-06-PR-0173 Plant and Equipment Lock-out Tag-out</u>
	<p>Note</p> <p>If due to its design, it is currently not possible to apply a lock or tag to a switch or circuit breaker:</p> <ul style="list-style-type: none"> Isolate the circuit Lock or seal (using tape) the Control Panel Attach a Danger Tag to the Control Panel door
	<p>Warning</p> <ul style="list-style-type: none"> Indicators, Control & Monitoring systems may have multiple power sources. Failure to correctly isolate all energy sources could result in serious injury or death. Always verify that isolation has been achieved if in doubt, seek assistance from your Line Manager
Isolation – Pneumatic Energy	Control systems have pneumatic connections (eg. Master Controllers). Depending upon the work being carried out, it may be necessary to isolate pneumatic energy. Always isolate in conjunction with relevant technical documents. If in doubt contact your Line Manager before commencing work

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Isolation – Train Movement	<p>To protect from the movement of Electric Trains when ever possible</p> <ul style="list-style-type: none"> Lower the pantograph(s), in accordance with <u>SMS-06-SW-0838 Pantograph Raising and Lowering</u>, <u>SMS-06-SW-0837 Isolating 1500v DC OH using a Supplementary Lock</u> and Isolate the road, in accordance with <u>SMS-06-SW-0836 Isolating 1500V DC OH Using an Annett Key</u>, and Isolate the guard's emergency cock, in accordance with <u>SMS-06-SW-1133 Guard's Emergency Cock Lock-Out</u>
Check	Visually inspect that the pantograph(s) has been lowered from the overhead power supply
	<p>Warning</p> <p>Ensure all pantographs are lowered in accordance with <u>SMS-06-SW-0838 Pantograph Raising and Lowering</u>. Visually check that the pantographs are lowered. Do not simply rely on the pantograph air pressure gauge, this will not guarantee that the pantographs are lowered. Failure to confirm that pantographs are lowered correctly may lead to serious INJURY or DEATH.</p>
	<p>To protect from the movement of Diesel Trains always</p> <ul style="list-style-type: none"> Shut down the engine and apply the park brake fully Place Red Flag in accordance with <u>SMS-12-OI-0886 Red Flagging Trains in stabling yards, depots and Maintenance Centres</u> Apply local road isolation (e.g. lock the boom gate, position the stop board and position chocks)
Carry Out Communication System Work	Once isolation and other relevant controls have been put in place, carry out the Indicator, Control or Monitoring system work
	<p>Warning</p> <p>The Train Indicator, Control & Monitoring System work has a number of general hazards. These include...</p>
	<ul style="list-style-type: none"> Manual handling injury when handling large components. Where possible make use of manual handling aids such as gantry cranes, trolleys etc. Ensure any lifting / transport carried out with powered equipment (such as gantry cranes or electric powered maintenance vehicles) is carried out in accordance with relevant SWIs. Where manual handling aids are not practicable, seek assistance and use manual handling techniques consistent with your training Manual handling injury when accessing components mounted at height or in awkward positions. Only work with an approved, appropriate height step ladder. Seek assistance, as required, make use of manual handling techniques consistent with your training Strike injuries when accessing components located in awkward positions. Seek assistance, as required, and wear bump hats, knee pads and / or protective gloves, as required
	<p>Warning</p> <p>Some Indicator, Control & Monitoring system work has unique hazards. These include...</p>
<i>Master Controller Removal & Replacement</i>	<ul style="list-style-type: none"> Contact with blasts of air or dust can cause serious eye injuries. Always wear eye protection when working with master controllers. Failure to correctly isolate air before commencing work could result in subsequent blast of air or air / dust hazard when disconnecting hoses. Always work in accordance <u>SMS-06-SW-0839 Compressed Air - Safe Use</u>
<i>Speed Sensor Probe Removal & Replacement</i>	<ul style="list-style-type: none"> Various hazards associated with working in the pit. Always work in accordance with <u>SMS-06-SW-0812 Working in the Pit</u> Contact with hot and dusty/dirty components can cause burn and eye injuries. Always wear eye protection and protective gloves when carrying out this work
<i>Destination Indicator Removal & Replacement</i>	<ul style="list-style-type: none"> Various hazards associated with working from high roads. Always work in accordance with <u>SMS-06-SW-1160 Working on High Roads</u> Injury or death resulting from unexpected train movement therefore ensure train movement isolation (as per page 2) is in place Falls from height therefore ensure all work is carried out from the protection of a fixed or portable work platform Electric shock from contact with Over Head Power therefore ensure the road is isolated (see page 2)
	<p>Note</p> <ul style="list-style-type: none"> Ensure all work is carried out in accordance with relevant Engineering and Operational Instructions
Reinstate the electrical &	Before reinstating electrical & pneumatic power always check for Red Flag(s) and that equipment is safe to reinstate

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pneumatic circuits	Look for and inform other personnel that may be affected by reinstating the circuit or pneumatic energy
	Warning <ul style="list-style-type: none"> Only remove your own isolation. The removal of another persons lock and / or tag may result in their injury or death. Offenders will be subject to strict disciplinary action and may be subject to prosecution by the regulator
Function Test	Ensure correct installation of replaced components by function testing
Clean and Exit	Remove replaced components and any rubbish from the train dispose of in a designated bin Remove any unused components, tools and equipment from the train Remove your Red Flag, in accordance with <u>SMS-12-OI-0886 Red Flagging Trains in Stabling Yards, Depots and Maintenance Centres</u> Notify the Line Manager (supervisor or foreman) of completion, as required

Additional controls	
<ul style="list-style-type: none"> Other controls may be necessary, depending upon the work being carried out. Refer to relevant SWIs If you identify additional hazards and / or controls relevant to this SWI, notify your Safety Facilitator or Line Manager as soon as practicable, so they can be noted and used to continuously improve this document 	