








Safe Work Instruction	Issue date: 24/11/09
Train Brake System (05): Safe Working	Review date: 05/02/11

Document no.	Work description		
SMS-06-SW-1164	This document describes safe work practices in relation to the maintenance of Train Brake Systems		
	Scope This document describes the hazards and controls for work by RSD staff on Rollingstock train brake systems This document does not replace technical 'how to' documents such as Engineering Instructions, Manufacturers' instructions etc		
Review date	References		
05/02/2011	<ul style="list-style-type: none"> • OHS Act 2000 • OHS Regulations 2001 • Rail Safety Act 2008 • SMS-06-PR-0173 Plant and Equipment Lock-out Tag-out • SMS-12-OI-0886 Red Flagging Trains in stabling yards, depots and Maintenance Centres • SMS-06-SW-0836 Isolating 1500V DC OH using an Annett Key • SMS-06-SW-0838 Pantograph Raising and Lowering • SMS-06-SW-1133 Guard's Emergency Cock Lock-Out • SMS-06-SW-0487 Entering Trains from Ballast • SMS-06-SW-0488 Climbing out of Trains onto Ballast • SMS-06-SW-0812 Working in the Pit • SMS-06-SW-1151 Overhead Travelling Crane - Safe Operation • SMS-06-SW-0400 Forklift Trucks • SMS-06-SW-1231 Brake Work - Train Isolation (Diesel Fleet) • SMS-06-SW-1153 Brake Work - Train Isolation (Electric Fleet) • SMS-06-SW-1162 Portable Work Platform • SMS-06-SW-0264 Portable Ladders, Stepladders and Step Platforms 		
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 • Safety Eyewear, as required • Bump Hat • Respiratory Protection, as required • Kneepads, as required 	<ul style="list-style-type: none"> • Rail Industry Safety Induction (RISI) • Site specific induction • Electrical Safety Awareness • Competent in the use of this SWI • Competent in the use of relevant technical documents (eg. EI's) • Competent in brake work • Manual Handling Training 	<ul style="list-style-type: none"> • Forklift Certificate of Competency, as required
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 • Hand tools • Lifting aids/trolley 			
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.			
	Warning The following warnings apply throughout this SWI: <ul style="list-style-type: none"> • Work within the brake system may expose you to hand injuries from sharp edges and pinch points. Wear gloves to protect you from lacerations. Ensure you have correctly isolated and, where possible, bleed the air out of the system • Isolation of air can cause a blast of air. Always wear eye protection when undertaking this step. Failure to do so could result in eye injury from compressed air and/or dust. Failure to correctly isolate could result in subsequent blast of air or air/dust hazard when disconnecting hoses • Brake system components can be heavy and / or awkward to manipulate. Where possible use manual handling aids and/or seek assistance. Whenever manually handling, use a firm grip, keep back straight, bend knees and avoid twisting, bending or overreaching, in accordance with manual handling training • 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 • Working in the pit carries a range of hazards including, slips trips & falls, head strikes and potential exposure to train radio radiation on Electric Sets. Always conduct work in the pit, in accordance with SMS-06-SW-0812 Working in the Pit 		

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Competency	<p>Staff are to be trained and supervised to ensure they:</p> <ul style="list-style-type: none"> • Transport required parts, tools and equipment to and from the work area using manual aids (such as trolleys) so as to minimise the risk of manual handling injuries • Carry out the tasks in accordance with technical documents (eg. EI's) • Implement necessary controls, in accordance with this document • Work with Line Manager to identify any additional hazards and implement controls in accordance with relevant SWI's and other SMS components
Place Red Flag	To notify persons that brake work is being carried out on the train you must place a Red Flag in accordance with <u>SMS-12-OI-0886 Red Flagging Trains in stabling yards, depots and Maintenance Centres</u>
Isolate: Electric Fleet	<p>Before carrying out any work on brake systems, isolation is required to protect from injury or death. The isolation required may vary, depending upon the work, and should be determined in conjunction with line management, however the following is mandatory</p> <p>To protect from the movement of Electric Trains always:</p> <ul style="list-style-type: none"> • Lower the pantograph(s), in accordance with <u>SMS-06-SW-0838 Pantograph Raising and Lowering</u>, upon completion of this task always undertake a visual inspection to verify this has been achieved and / or • Isolate the road, in accordance with <u>SMS-06-SW-0836 Isolating 1500V DC OH Using an Annett Key</u>, and / or • Isolate the guard's emergency cock, in accordance with <u>SMS-06-SW-1133 Guard's Emergency Cock Lock-Out /or</u> • Isolate in accordance with <u>SMS-06-SW-1153 Brake Work – Train Isolation (Electric Fleet)</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>Warning</p> <ul style="list-style-type: none"> • Isolating using <u>SMS-06-SW-1153 Brake Work – Train Isolation (Electric Fleet)</u> provides less protection than the other referenced SWIs and should only be used with authorisation by the Service Manager or the Fleet Manager, in circumstances where greater protection is not practicable • Failure to correctly isolate all energy sources could result in serious injury or death. Always verify that isolation has been achieved and, if in doubt, seek assistance from your Line Manager
Isolate: Diesel Fleet	<p>Before carrying out any work on brake systems, isolation is required to protect from injury or death. The isolation required may vary, depending upon the work, and should be determined in conjunction with line management, however the following is mandatory</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 • Apply local road isolation (e.g. lock the boom gate, position the stop board and position chocks) • Isolate in accordance with <u>SMS-06-SW-1231 Brake Work – Train Isolation (Diesel Fleet)</u>
	<p>Warning</p> <ul style="list-style-type: none"> • Failure to correctly isolate all energy sources could result in serious injury or death. Always verify that isolation has been achieved and, if in doubt, seek assistance from your Line Manager
Carry Out Brake System Work	<p>Once isolation has been put in place, inspect the brake component(s) and determine work required</p> <p>Identify the relevant tools, equipment and parts that will be required</p> <p>Identify any other relevant SWI's (eg. SWI's 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. trolleys, or electrical maintenance vehicles)</p> <p>Where possible, climb in and out of the cars from platforms. If it is necessary to access from floor level or ballast always do so in accordance with <u>SMS-06-SW-1162 Portable Work Platform</u>, <u>SMS-06-SW-0264 Portable Ladders, Stepladders and Step Platforms</u>, or <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>Warning</p> <p>Some brake work has unique hazards and controls. These include...</p>
Brake and Park Brake	<ul style="list-style-type: none"> • Forklift hazards when lifting and moving parts. Forklifts present a serious crush hazard. Ensure the operator has a clear path to travel and work at all times. Hydraulics can creep so never allow anyone to work beneath lifted equipment. Only trained/competent forklift operators are to drive or otherwise use

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<i>Cylinder Removal & Replacement</i>	<p>forklifts in accordance with <u>SMS-06-SW-0400 Forklift Trucks</u></p> <ul style="list-style-type: none"> Exposure to compressed air or overhead dust. Always isolate and bleed air before disconnecting hoses to prevent blasts of compressed air and, potentially dust. To further protection, wear eye and respiratory protection during these steps Manual handling injury when removing/replacing components. Where possible use manual handling aids and/or seek assistance. Use a firm grip, keep back straight, bend knees and avoid twisting, bending or overreaching in accordance with your training Potential finger or hand crush injuries. To prevent injury ensure isolation has been put in place (see page 2). To further protection wear protective gloves
<i>Brake Controller Removal & Replacement</i>	<ul style="list-style-type: none"> Air blast injury. Always isolate the Safety Apparatus Isolation (SAI) cock and apply a personal lock and/or tag, in accordance with <u>SMS-06-PR-0173 Plant and Equipment Lock-out Tag-out</u>. Then, bleed all downstream air before disconnecting hoses. To further protection, wear eye protection Electric shock hazard. Test to verify all electrical connections to the controller are dead before disconnecting
<i>Brake Pad / Shoe Removal & Replacement</i>	<ul style="list-style-type: none"> Exposure to dust. When examining or working on brake pad / shoes, wear eye and respiratory protection Head strike injury. Always wear a bump hat when carrying out this task Potential finger or hand crush injuries. To prevent injury ensure isolation has been put in place (see page 2). To further protection wear protective gloves
<i>Brake Rigging Removal and Replacement</i>	<ul style="list-style-type: none"> Exposure to dust. When examining or working on brake rigging, wear eye and respiratory protection during these steps Cuts from sharp edges on brake rigging, wear protective gloves Head strike injury. Always wear a bump hat when carrying out this task
<i>Headstock Height Adjustment</i>	<ul style="list-style-type: none"> Overhead crane hazards. This task is carried out in the lift shop at some maintenance centres and involves the use of an overhead Crane to lift the carriage. Always work in accordance with <u>SMS-06-SW-1151 Overhead Travelling Crane - Safe Operation</u> Potential finger or hand crush injuries. To prevent injury ensure isolation has been put in place (see page 2). To further protection wear protective gloves Exposure to dust. When examining or working on brake pad / shoes, wear eye and respiratory protection Cuts from sharp edges on brake rigging, wear protective gloves
<i>Trip and Trip Plate Removal & Replacement</i>	<ul style="list-style-type: none"> Air blast and potential dust hazards. Always isolate the Safety Apparatus Isolation (SAI) cock and apply a personal lock and/or tag, in accordance with <u>SMS-06-PR-0173 Plant and Equipment Lock-out Tag-out</u>. Then, bleed all downstream air before disconnecting hoses to prevent injury. To further protection, wear eye and respiratory protection Cuts from sharp edges, wear protective gloves Manual handling injury when removing/replacing components. Where possible use manual handling aids and/or seek assistance. Use a firm grip, keep back straight, bend knees and avoid twisting, bending or overreaching in accordance with manual handling training Hearing damage. When cutting back in the SAI cock, wear hearing protection
	<p>Note</p> <ul style="list-style-type: none"> Always carry out work in accordance with relevant technical documents (eg. EIs)
Clean Up	<p>Once work is complete, clean up any spills and remove tools, equipment and parts from work area</p> <p>Dispose of rubbish in waste disposal containers / bins</p>
Remove Isolation	<p>Once the area is safe, remove all previously applied isolations, in accordance with the referenced SWI</p>
	<p>Warning</p> <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
Remove Red Flag	<p>Remove your Red Flag, in accordance with <u>SMS-12-OI-0886 Red Flagging Trains in Stabling Yards, Depots and Maintenance Centres</u></p>
Notify	<p>Notify Line Manager (supervisor or foreman) of completion, as required</p>

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Additional controls
<ul style="list-style-type: none"> • <i>Other controls may be necessary, depending upon the work being carried out. Refer to relevant SWIs</i> • <i>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</i>