













Safe Work Instruction	Issue date: 23/06/10
<b>Pantograph: Raising and Lowering</b>	Review date: 07/06/13

Document No. SMS-06-SW-0838	<b>Work description</b> This SWI describes the safe practices for raising and lowering the electrical fleet pantographs.		
	<b>Scope</b> This SWI applies to work being conducted in Rollingstock Division (RSD) Maintenance Centres or other locations as part of "in running" repairs and all RSD activates.		
Review date 07/06/2013	<b>References</b> <ul style="list-style-type: none"> <li>• OHS Act 2000</li> <li>• OHS Regulations 2001</li> <li>• Rail Safety Act 2008</li> <li>• <a href="#">SMS-06-GD-0323 Personal Protective Equipment</a></li> <li>• <a href="#">SMS-06-GD-0268 Working Around Electrical Equipment</a></li> <li>• <a href="#">SMS-12-OI-0886 Red Flagging Trains in stabling yards, depots and Maintenance Centres</a></li> <li>• <a href="#">SMS-06-PR-0173 Plant and Equipment Lock-out Tag-out</a></li> <li>• <a href="#">SMS-06-EN-0553 Electrical Hazards Warnings</a></li> <li>• <a href="#">SMS-06-SW-0487 Entering Trains from Ballast</a></li> <li>• <a href="#">SMS-06-SW-0488 Climbing out of Trains onto Ballast</a></li> <li>• <a href="#">SMS-06-PR-0104 Workplace Risk Management.</a></li> </ul>		
<b>Responsible supervisor</b>	<b>PPE and precautions</b>	<b>Competencies or qualifications</b>	<b>Licences or permits required</b>
Line Manager	<ul style="list-style-type: none"> <li>• High visibility clothing or vest</li> <li>• Safety Footwear</li> </ul>	<ul style="list-style-type: none"> <li>• Site specific induction</li> <li>• Rail Industry Safety Induction (RISI)</li> <li>• Electrical Safety Awareness</li> <li>• Competent in the use of this SWI</li> </ul>	
<b>Tools and equipment required</b> <ul style="list-style-type: none"> <li>• Driver and Train Keys</li> <li>• Red flag</li> <li>• Danger tag(s)</li> <li>• Lock out device(s)</li> </ul>			
<b>IF CONTROL MEASURES ARE NOT SUITABLE AND MAJOR CHANGES ARE NEEDED, CONDUCT A RISK ASSESSMENT AND DEVELOP NEW CONTROLS ACCORDING TO <a href="#">SMS-06-PR-0104 Workplace Risk Management.</a></b>			
	<b>Note</b>  Pre work brief and task risk assessment Ensure a pre-work brief and task risk assessment is undertaken with all team members involved in the work activity. If any new/additional team members arrive any time later they must be briefed before they commence work.		
	<b>Warning:</b> <i>The following warnings apply to all steps throughout this SWI:</i> <ul style="list-style-type: none"> <li>• Failure to correctly lower the pantograph could lead to injury or death from electric shock. Always visually verify that pantograph has lowered correctly and an air gap of at least 0.5m has been achieved. If in doubt, seek assistance from a Line Manager.</li> <li>• To prevent an incident never rely on the pantograph raise/lower gauges to determine the position of any pantograph(s), always do a visual check to confirm the position of a pantograph.</li> <li>• Failure to ensure all persons are safe before raising or lowering the pantographs could lead to finger crush injuries from the movement of the pantograph or injury or death from electric shock, if interacting with electrical equipment.</li> <li>• When working around electrical equipment always assess your environment and look out for hidden electrical hazards. For general guidance refer to: <a href="#">SMS-06-GD-0268 Working Around Electrical Equipment.</a></li> </ul>		

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<b>Check Others are Safe</b>	<ul style="list-style-type: none"> <li>Never raise or lower a pantograph if others may be injured as a result.</li> <li>To ensure no one will be harmed by raising or lowering the pantograph(s); <ul style="list-style-type: none"> <li>Always check that there are no red flags or danger tags in place.</li> <li>Visually check for anyone who is working but has failed to place a red flag or danger tag.</li> <li>Make a public announcement (PA) warning that you are about to raise the pantograph, using the train PA system.</li> </ul> </li> </ul>	
<b>Lowering the pantograph</b>	The following outlines the steps required to lower the pantograph(s).	
<b>Place a red flag</b>	Place a red flag, in accordance with <u>SMS-12-OI-0886 Red Flagging Trains in stabling yards, depots and Maintenance Centres</u> .	
<b>Check Compressors are stopped</b>	Before lowering the pantograph, check that no compressors are running. This can be done by checking the main reservoir gauge and/or listening for the compressors to stop.	
	<b>Warning</b> <i>Failure to ensure that the compressors have ceased running before lowering the pantograph could prevent the pantographs from lowering causing an arc from the overhead power resulting in damage.</i>	
<b>Lower</b>	Before lowering the pantograph follow the steps in "Check Others are Safe" see page 2 of 3 Lower the pantograph using the 'pan down' push button.	
	<b>Note</b> <ul style="list-style-type: none"> <li>Using the Train Management System (TMS) Shutdown button on a Tangara will lower the pantographs and shut down all the train electrical and communication systems. A waiting period of three minutes is recommended before raising the pantographs again, to prevent operational problems with the Tangara's electrical systems when they restart, as per manufactures recommendations.</li> <li>Always wear the appropriate PPE for the task at hand especially if working on electrical equipment, for general guidance refer to: <u>SMS-06-GD-0323 Personal Protective Equipment</u>.</li> </ul>	
	<b>Warning</b> <ul style="list-style-type: none"> <li>Failure to ensure all persons are safe before lowering the pantographs could lead to finger crush injuries from the movement of the pantograph or injury or death from electric shock, if interacting with electrical equipment.</li> <li>On Tangara, Millennium or Oscar fleet type vehicles there is a possibility that the two pantographs of the 4 car set may be electrically connected and one pantograph may live the other cars in of the set. Therefore all pantographs must be lowered and isolated. Refer to: <u>SMS-06-EN-0553 Electrical Hazards Warnings</u>, section 13.1 Pantographs.</li> </ul>	
	<b>Note</b> Personnel <b>MUST NOT</b> lower the pantograph using the cock. The pan down button <b>MUST</b> always be used. Equipment can be damaged if the pantograph cock is used instead of the pan down button. Using the 'pan down' button disengages the auxiliary power supply and protects against this damage and electrical injury.	
<b>Isolate</b>	<ul style="list-style-type: none"> <li>Isolate pantograph isolation cock(s).</li> <li>Place a Danger Tag on the cock(s), in accordance <u>SMS-06-PR-0173 Plant and Equipment Lock-out Tag-out</u>.</li> </ul>	

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	<p><b>Warning</b></p> <ul style="list-style-type: none"> <li>On the Tangara, lower and isolate all pantograph cocks on other driver cabs to ensure no pantographs can be raised. Failure to do so could result in exposure to injury or death from electric shock in the event of a remote pantograph being raised.</li> <li>The pantograph(s) must have an air gap of at least 0.5m from the overhead supply. If this cannot be achieved in the current location, the train is to be moved to where this gap can be achieved.</li> <li>When checking that the pantograph(s) has lowered correctly, beware of being struck by moving trains and maintain a secure grip to (three points of contact) when exiting the train. <i>Ensure you do not fall from train whilst exiting, refer to: SMS-06-SW-0487 Entering Trains from Ballast and SMS-06-SW-0488 Climbing out of Trains onto Ballast.</i></li> </ul>
<b>Check</b>	Visually inspect that the pantograph(s) has been lowered from the overhead power supply.
	<p><b>Warning</b></p> <p>Ensure all pantographs are lowered in accordance with this SWI. <b>Visually check</b> 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 <b>INJURY</b> or <b>DEATH</b>.</p>
<b>Raising the Pantograph</b>	The following outlines the steps required to raise the pantograph(s).
<b>Remove isolation</b>	<ul style="list-style-type: none"> <li>Remove your Danger Tag from the pantograph isolation cock(s), in accordance with <u>SMS-06-PR-0173 Plant and Equipment Lock-out Tag-out</u></li> <li>Open pantograph isolation cock(s).</li> </ul>
	<p><b>Warning</b></p> <ul style="list-style-type: none"> <li>Only remove your own protection. The removal of another person's 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.</li> </ul>
	<p><b>Note</b></p> <p>If another Danger Tag is in place you will have to locate the owner and have them remove it before you can raise the pantograph(s).</p>
<b>Raise</b>	Before raising the pantographs follow the steps in "Check Others are Safe" see page 2 of 3 Press the 'pan up' button.
	<p><b>Warning</b></p> <ul style="list-style-type: none"> <li>Failure to ensure all persons are safe before raising the pantograph(s) could lead to finger crush injuries from the movement of the pantograph or injury or death from electric shock, if interacting with electrical equipment.</li> </ul>
<b>Check</b>	Visually inspect that the pantograph(s) have been <b>raised</b> and are in the correct position.
	<p><b>Warning</b></p> <ul style="list-style-type: none"> <li>When checking that the pantograph(s) has been raised correctly, beware of being struck by moving trains and maintain a secure grip (three points of contact) to ensure you do not fall from the train whilst exiting, refer to: <u>SMS-06-SW-0487 Entering Trains from Ballast</u> and <u>SMS-06-SW-0488 Climbing out of Trains onto Ballast</u>.</li> </ul>
<b>Remove Red Flag</b>	If you no longer need to work on or about 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> before leaving the train.
<b>Additional controls</b>	
Additional isolation or other controls may be required as part of the work being undertaken. Refer to the relevant SWI.	