

- Doug Adams - Systems Performance Manager
- Greg Watson - National Rules Managers
- David Ogucha - Track and Civil Standards Engineer

7 **Safety**

The MRWS is a completely autonomous warning system that does not have to rely on interfaces with other existing systems. It is a SIL-4 rated system which has been designed and manufactured in accordance with all applicable CENELEC standards. The MRWS safety case demonstrates that it is safe to operate in the rail environment and all applicable operational and maintenance procedures have been developed to control safe operations.

Prior to the trial a safety risk assessment will be completed for the MRWS trial at UHVA to confirm the controls necessary to manage safety SFAIRP.

The following risks identified by the risk assessment will be controlled:

- Set-up of the train detectors inside the Danger Zone
- Integration of MRWS operations into Work Method Plans, Worksite Protection Plans, Pre-Work Briefs and Notifications for train drivers
- PO-competency to become an Operator/Installer of the MRWS

The system has already trialed successfully by Sydney Trains early this year and is in use at Rio Tinto in WA.

Acceptance certificates of the following major European rail authorities can be provided:

Germany, Deutsche Bahn (DB)

UK, Network Rail

France, SNCF

All components of the MRWS are manufactured in the premises in Germany, which is a ISO 9001 certified site.

The FMECA of MRWS was carried out as part of the SIL 4 certification of the system and verified by TÜV Rail in Munich, Germany.

The MRWS Safety Case is provided.

The MRWS should only be operated by qualified personnel that have successfully completed a 2-day Operator/Installer training course. These courses are provided by the manufacturer Zoellner. The minimum qualification for participation in the course is a PO2-certificate.

Note – this is not a protection device and is in addition to the existing Rules and Procedures.

8 **Performance and Suitability**

The system has been developed according to the highest international safety standards and complies with all applicable CENELEC standards. Certificates provide information on compliance with these standards of railway applications:

EN 50126:1999 Railway applications - The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)

EN 50128:2001 Railway applications – Communication, signalling and processing systems –Software for railway control and protection systems

EN 50129:2003 Railway applications – Communications, signalling and processing systems – Safety related electronic systems for signalling

EN 50159-1:2001 Railway applications - Communication, signalling and processing systems - Part 1: Safety-related communication in closed transmission system

EN 50159-2:2001 Railway applications - Communication, signalling and processing systems - Part 2: Safety related communication in open transmission systems

EN 50121-4:2006 Railway applications - Electromagnetic compatibility - Part 4: Emission and immunity of the signalling and telecommunications apparatus

EN 50124-1:2001 + A1:2003 + A2:2005 + correction 2010 Railway applications - Insulation coordination - Part 1: Basic requirements - Clearances and creepage distances for all electrical and electronic equipment

EN 50125-3:2003 + correction 2010 Railway applications - Environmental conditions for equipment - Part 3: Equipment for signalling and telecommunications

EN 60529:2000 Degrees of protection provided by enclosures (IP code)

The MRWS Safety Case and reference documents provides ARTC with a complete description of the the performance and suitability characteristics of the system.

There are no additional issues identified relating the suitability in the ARTC network.

(i) **Use in other rail networks**

Europe:

Germany- Deutsche Bahn (DB)

United Kingdom - Network Rail

France - SNCF

other certificates available for Austria, Switzerland, Spain, Italy, Poland

Australia:

Use at Rio Tinto Expansion projects during trials since February 2012

Successful trials at Sydney Trains (20. - 24.1.2014)

(ii) **Use in the ARTC network**

The trial of the MRWS will be the first use of the system on the ARTC Network

(iii)	Issues arising from usage of the equipment/system	Additional controls necessary to manage the safe operation of the MWRS will be confirmed as a result of the safety risk assessment. The MWRS trial will also confirm the need for any additions or changes to current requirements			
(iv)	Changes required to infrastructure or systems for use of the equipment	No changes to infrastructure or rail systems are necessary for the use of the equipment under the scope of the trial. The MWRS introduces new competence requirements for the planning, operation and maintenance of the system.			
9	Reliability	Reliability data for the MWRS is provided in the TUV Assessment.			
10	Maintainability	<p><i>The equipment of the MRWS does not require extensive maintenance. All system components are battery operated. The Lithium-Ion batteries use intelligent charging management and an integrated capacity display allows the operator to check the charge at any time. We recommend to charge the used batteries after each shift and to charge each battery at least every 6 weeks.</i></p> <p><i>The whole system has to be re-proofed every 2 years. This will be done by the manufacturer or a by a certified company.</i></p> <p><i>The installation, operation, dismantling and the maintenance of the system is described in detail in the manuals of all components.</i></p> <p><i>Support:</i> <i>Since 1999, Zollner sells Track Warning Systems and provides all customers with after sales support.</i> <i>Due to the periodic reviews, the products are characterized by a great longevity. During the re-proofing a precise functional check and, if necessary, the devices are brought up to date by software updates. For updates will always pay attention to compliance with the backward compatibility.</i></p>			
11	Approval *	<p>The MRWS consists of individual components which are listed in the following with the Name and Item Numbers:</p> <p>ZPW - Zöllner's Personal Warning Device - 01415209 ZRC - Zöllner's Remote Control - 01415210 ZFS - Zöllner's Radio Transmitter - 01415211 F500-SEN - Inductive train detector /incl. clamp) - 01414732 F500-AB - Junction Box for F500-SEN - 01415136 WGH - Additional horn for connection to ZPW - 01415182</p> <p>The listed components are assembled in various configurations to provide the appropriate warning system available for each worksite. The components of the MRWS should be approved for the the worksites in the UHVA project.</p>			
12	Is the supplier accredited to ISO 9001 specifically for this product? *	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
13	Conditions of Approval *	<p>The MRWS can only be operated by trained and qualified Operators/Installers. The knowledge of the operation of the MRWS are taught in a 2-day course, minimum competency: PO2-certificate. All used components must be in perfect condition, have an undamaged seal with valid inspection date.</p> <p><i>This approval is for the purposes of a trial and the following conditions must be adhered to:</i></p> <ol style="list-style-type: none"> <i>1. Installation and operation must be undertaken by fully trained and competent personnel with proof of competence provided to ARTC before start of trial.</i> <i>2. Records of maintenance need to be provided and kept on site at all times.</i> <i>3. Existing ARTC network safe working rules must be applied.</i> <p><i>In exception to the Note within TA20 ARTC Code of Practice for the Victorian Main Line Network, Section 15 Infrastructure Works Rule 15 Actions by Employees on the Approach of a Train, which states 'Where an authorised apparatus is provided for the purpose of giving warning it will not be necessary to employ lookout(s)', a Lookout must be provided where this unit is trialled.</i></p> <p><i>In exception to 3.11.20 Train Running Information (TRI) – Advice and warning of approaching trains item (f) within the Code of Practice for the Defined Interstate Rail Network a Lookout must be provided where this unit is trialled.</i></p> <ol style="list-style-type: none"> <i>4. A test plan including criterion for judging a successful trial must be prepared and accepted by ARTC Standards Manager before the trial. The test plan is to include a shift test log to be completed by the Protection Officer at the end of each shift during the trial period. The shift test logs are to be utilised in compiling the end-of-trial report.</i> <i>5. Site and task specific PPE to be worn at all times.</i> <i>6. A risk assessment is to be conducted prior to the commencement of the trial.</i> <i>7. Appropriate training of Protection Officers and briefings for work groups is to be undertaken in setting up the equipment, recognition of all warnings provided by the system (including audible system failure warnings), pack-up of the system after use, and routine maintenance (including regular battery charging).</i> <i>8. The geographic location of trial sites shall be stated in the test plan, and utilisation of the trial system shall be limited to those sites.</i> <i>9. The trial is for the Hexham Relief Roads project, and as amended February 2015, for the HV Coal Road Ballast Cleaning – Night AMP 2014-2016 at the two coal roads between Maitland and Sandgate.</i> <i>10. A copy of all plans, procedures and SWMS must be provided to ARTC Project Manager and accepted prior to</i> 			

undertaking any physical trials on the infrastructure.

11. Leightons to provide an end of trial report on the utilisation of the system, listing such items as ease of use, issues that arose, set-up and pack-up times, system serviceability, human factors issues (the extent to which teams came to rely on the Zollner system in lieu of existing controls) and other pertinent details to support the Type Approval consideration.

14	Does the Originator accept the additional Conditions of Approval as set by the Review Panel:	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
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15	Sign off Review Panel:	<i>ARTC office use only</i>
	John Furness On File	Date: 7/08/2014
	Doug Adams On File	Date: 5/08/2014
	David Ogucha On File	Date: 6/08/2014
	Greg Watson On File	Date: 5/08/2014

Approval:

Operations Safety & Environment Review Group 11 August 2014

16	Sign off for additional trial during ballast cleaning works on the Coal Roads	<i>ARTC office use only</i>
	Review Panel:	
	John Furness On File	Date: 23/03/2015
	Doug Adams On File	Date: 29/10/2014
	David Ogucha On File	Date: 23/03/2015
	Greg Watson On File	Date: 23/10/2014
	Jamie Graham On File	Date: 23/10/2014