NEW EQUIPMENT & SYSTEM APPROVAL PROFORMA

Ref: *14/28332*

Note: the prompts given below are only a guide to the information required for approval. Dependent on the type of equipment or system that requires approval delete any section that is not applicable or include additional information if necessary. Mandatory fields are marked with an asterisk (*).

1 **Equipment or System to be approved** *

ZOLLNER's Mobile Radio Warning System (MRWS) as a semi-automatic track warning system for trial in protecting work.

2 **Originator** *

Name: Richard Gardener / Christian Jung Company: Leighton Contractors National Rail/ Zoellner Australia

3 **Introduction** *

The Zollner Mobile Radio Warning System (MWRS) is a failsafe SIL4-rated warning system designed to reduce the human errors in the announcement of approaching trains on track worksites.
It is a further development of the Autoprowa, Automatic Track Warning System (Z-ATWS) that was designed to give a collective warning to all personnel working near the Danger Zone through a series of horns and lights within a worksite in the event of an approaching train.
In contrast to ZATWS the MRWS is characterized by a very short assembly time and quick start-up of the system, so it is especially well suited for short-term worksites or small worksites.
By using reliable train detectors and latest safe bi-directional radio transmission the SIL4-rated system takes out the human factor in the train detection.
Designed to be a fail-safe system and as the single source of protection it is already in use in most European countries.
The UHVA understands the risk of human error when conducting Lookout duties and so has sought a more reliable alternative with a proven track record in similar operational environments. The advantages of the MRWS are that it provides an increased and consistent warning time, clearly defined to protection staff in pre-work planning by the zone safe working co-ordinator. It reduces the dependency on Lookouts in close proximity to track and therefore reduces the Opportunity of human error. It provides an extra level of protection to suspend work activities (such as plant operations) outside the Danger Zone during the passage of a train. This reduces the potential for driver distraction and associated reliability issues. It is proposed that UHVA undertake a reduced form of trial on the ARTC network as a step towards achieving approval for its use as to protect workers in the Danger Zone.

The intended use of the MRWS at the UHVA during the trial is to:
• Warn personnel and operators of plant working outside the danger zone only
• Operate at times and locations approved by UHVA/ARTC
• Be installed and recovered from the track using current Network rules
• Provide a visual and audible warning to UHVA personnel to suspend work activities such as plant operations during the passage of a train.
• Integrate the MRWS into all current UHVA systems and perform the MRWS Trial in addition to all current WH&S and rail safety plans procedures and tools

The MRWS equipment will be used to provide a warning in addition to current safe working network rules and procedures, where personnel are working outside the danger zone. The MRWS system will only be used during the daytime working hours of the project.
Prior to its use a pre start checklist will be completed by a trained MRWS operator. This will include the verification of safe warning times. Thanks to the rapid assembly and dismantling times of the MRWS it can be trialed easily at various locations. At the completion of each shift the MRWS will be removed from site.

4 **Determination of Need** *

The MWRS provides a safer working environment to workers working on or around the track by providing more reliable train detection with reduced human factors.
The use of the MRWS in its full capacity will
- reduce the human error in train detection
- improve safe working performance
- provide Safety with highest availability (SIL4)
- enables work on live rail or near the adjacent open line
- reduces the necessity to work under possession of the track
- improve the rail reliability
- increases the productivity
- give more flexibility in planning of worksites (use of MRWS as LOWS or as a warning device on machinery).

5 **Significant Change or Not**

The first step will be the use of the MRWS as a secondary means of protection during the trials to get confidence to this kind of technology.
A later use of the system as a primary source of protection is being considered and should be carried out in a further step
*

This change in equipment or system is assessed as SIGNIFICANT

6 **Review Panel** *(as determined by the Manager Standards)* *

- John Furness - Manager Standards

- 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 as been designed and manufactured in accordance with all applicable CENLEC standards. The MWRS safety case demonstrates that it is safe to operate in the rail environment and all applicable operational and miantenance procedures have been developed to contol safe operations.

Prior to the trail 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 pro-cessing systems –Software for railway control and protec-tion 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 pro-cessing systems - Part 1: Safety-related communication in closed transmission system
EN 50159-2:2001 Railway applications - Communication, signalling and pro-cessing 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 equip-ment - 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 desription of the the performance and suitbability 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 MWRS 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 chnages to current requirements

(iv) **Changes required to infrastructure or systems for use of the equipment**

No chnages to infrastrcuture or rail systems are necessary for the use of the equipment under the scope of the trial. The MWRS inroduces new competence requirements for the planning, operation and maintenance of the system.

9 **Reliability**

Reliability data for the MWRS is provide in the TUV Assessment.

10 **Maintainability**

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.

The whole system has to be re-proofed every 2 years. This will be done by the manufacturer or a by a certified company.
The installation, operation, dismantling and the maintenance of the system is described in detail in the manuals of all components.

Support:
Since 1999, Zollner sells Track Warning Systems and provides all customers with after sales support.
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.

11 **Approval** *

The MRWS consists of individual components which are listed in the following with the Name and Item Numbers:
ZPW - Zöllner's Personal Warning Device - 01415209
ZRC - Zöllner's Remote Control - 01415210
ZFS - Zöllner's Radio Transmitter - 01415211
F500-SEN - Inductive train dennsor /incl. clamp) - 01414732
F500-AB - Junction Box for F500-SEN - 01415136
WGH - Additional horn for connection to ZPW - 01415182

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.

12	**Is the supplier accredited to ISO 9001 specifically for this product?** * Bureau Veritas Certification certifies the conformity of the company Zöllner Holding GmbH according to the requirements of DIN EN ISO 9001:2008. (Certificate no. DE002310-1).	Yes	☒	No	☐

13 **Conditions of Approval** *

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.

This approval is for the purposes of a trial and the following conditions must be adhered to:
1. Installation and operation must be undertaken by fully trained and competent personnel with proof of competence provided to ARTC before start of trial.
2. Records of maintenance need to be provided and kept on site at all times.
3. Existing ARTC network safe working rules must be applied.
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 proved where this unit is trialled.
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.
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.
5. Site and task specific PPE to be worn at all times.
6. A risk assessment is to be conducted prior to the commencement of the trial.
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).
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.
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.
10. A copy of all plans, procedures and SWMS must be provided to ARTC Project Manager and accepted prior to

	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	☒	No	☐	N/A	☐

15	**Sign off** **Review Panel:**			***ARTC office use only***
	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**			***ARTC office use only***
	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**