Chilternrailways by arriva

Fleet Engineering

SELCAB ATP Removal
Assessment of Verification Route

Report No: R351

ISSUE	DATE	AUTHOR	DETAILS
D1	July 19	S. Jarrett	First draft
D2	September 19	S. Jarrett	Second draft following discussion at NR-Chiltern ATP Steering group on 03/09/19.
1	January 20	S. Jarrett	First Issue

1 Executive Summary

This report has been written to determine and recommend the applicable verification and approvals route for the removal of SELCAB-ATP from the Chiltern Railways fleet through the roll out of Enhanced TPWS in its place in consideration of the RIR 2006 & 2010, ROGS 2006 and the Common Safety Method on Risk Evaluation & Assessment. It considers the legislation from the perspective of Chiltern Railways as a Railway Undertaking.

The report is written to record the verification route.

It is concluded that the upgrade does not meet the “New” or “Major” criteria to trigger Railway Interoperability processes, as the project utilises conventional, well established technology within a limited scope.

It is concluded that the project meets the ‘significance’ threshold within the requirements of the Common Safety Method on Risk Assessment but is only ‘Significant’ at the point that ATP is turned off on either the trains or infrastructure (whichever is first). Chiltern Railways will therefore need to put in place a scheme to assess the hazards, controls and an independent review of this process by an Assessment Body.

2 Definitions

ATP	Automatic Train Protection
CSM	Common Safety Method
CRCL	Chiltern Railways
DfT	Department for Transport
GWR	Great Western Railway
NNSR	Nationally Notified Safety Rules
NNTR	Nationally Notified Technical Rules
NoBo	Notified Body
RIR	Railway Interoperability Regulations 2011
ROGS	Railway & Other Guided Transport Systems (Safety) Regulations 2006
RSSB	Railway Safety & Standards Board
SMS	Safety Management System
TSI	Technical Standard for Interoperability

3 Reference Documents

1. The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS): A guide to ROGS, May 2013, Office of Rail Regulation.
2. ORR Guidance on the application of the Common Safety Method (CSM) on Risk Assessment and Evaluation, ORR, March 2015.
3. GE/GN8640 Guidance on Planning an application of the Common Safety Method on Risk Assessment and Evaluation, Issue 01, June 2014.
4. GE/GN8641 Guidance on System Definition, Issue 01, June 2014
5. GE/GN8642 Guidance on Hazard Identification and Classification, Issue 02, June 2014
6. GE/GN8643 Guidance on Risk Evaluation and Assessment, Issue 02, June 2014
7. GE/GN8644 Guidance on Safety Requirements and Hazard Management, Issue 01, June 2014
8. GE/GN8645 Guidance on Independent Assessment, Issue 01, June 2014.
9. DfT Interoperability Helpnote “Is my project in scope?”, Version 2, October 2012.
10. DfT Interoperability Helpnote “Renewals & Upgrading?”, Version 2, October 2012.
11. ATOC ACOP 1006, Approved Code of Practise – Management of Rail Vehicle Engineering Change, Issue 3.5, August 2015.

4 Introduction

Chiltern Railways and Network Rail are working together to enable the removal of the SELCAB ATP system from the infrastructure and fleet though the installation of enhanced TPWS.

4.1 Background Information

This section has been written to explain the background to the proposed project and aid understanding of the terminology used in the rest of the report.

4.2 SELCAB ATP

SELCAB ATP is an ATP system unique in the world to the Chiltern route. The system was developed in the early 1990s as a BR trial and has been kept operational since trial completion. The system provides full supervision of driver compliance with signal aspects and the PSR. It will intervene, if the driver makes an error, to bring the train to a stand before a point of conflict.

The system was declared obsolete by its supplier, Thales, in 2012 and the supply of spare parts is declining requiring a major change to address the risks this introduces for Chiltern Railways and Network Rail.

SELCAB ATP is installed to Network Rail infrastructure on the following routes:

- London Marylebone – Aynho Junction via High Wycombe & Bicester North
- London Marylebone – Harrow on the Hill
- Mantles Wood (Amersham) – Aylesbury Vale Parkway
- Aylesbury – Princes Risborough

The infrastructure is also fitted with AWS/TPWS in accordance with Network Rail practice.

The following Chiltern Railways fleets are fitted with the on-board ATP equipment:

- 165/0 – 39 units
- 168/0 – 5 units
- 1681/ - 8 units
- 168/2 – 6 unit
- 172/1 – 4 units

The following Chiltern Railways fleets are not fitted with the on-board ATP equipment:

- 168/3 – 9 units
- Mk3 DVT – 6 vehicles
- Class 68 – 6 vehicles

All the fleets listed above are also fitted with AWS/TPWS.

4.3 Enhanced TPWS

Conventional TPWS installation principles does not necessitate the installation of TPWS at all signals. It is only fitted at:

1. Junctions
2. Buffer Stops
3. Major changes of PSR

The “Enhanced TPWS” installation will fit TPWS stop loops to all mainline signals on the ATP infrastructure. The scope of upgrade may also include upgrading the on-train TPWS equipment to the current compliant equipment since some sub fleets have earlier TPWS equipment that is not fully compliant with the current version of GE/RT8075 and RIS-0755-CCS. This will produce a net safety benefit justifying ATP removal since all trains operating over the route will benefit from the enhanced protection rather than just those fitted with SELCAB ATP. This will be modelled as part of the project and used to justify an Exemption required by the Railway Safety Regulations 1999.

4.4 Purpose of Report

This report has been written to determine and recommend the applicable verification and approvals route to allow the removal of ATP for Chiltern Railways trains and infrastructure following completion of the Enhanced TPWS scheme in consideration of the RIR 2011 and the Common Safety Method on Risk Evaluation & Assessment. It considers the legislation from the perspective of Chiltern Railways as a Railway Undertaking.

The report is written to record the verification route.

5 Interoperability Assessment

5.1 Legal Requirements and Guidance

The DfT has published guidance on the applicability of the Railway Interoperability Regulations 2011 to new and upgraded rolling stock.

The DfT Helpnotes and ATOC Guide to Vehicle Change provides guidance on whether the RIR may be applicable to a project or not. The key questions for a train are:

1. Will the project introduce a new structural subsystem or a new part of a structural subsystem on UK Mainline Railways infrastructure?
2. Is it an upgrade or renewal work on a structural subsystem?

The structural subsystems are defined in Annex II of Directive 2008/57/EC (as amended by Directive 2011/18/EU). Structural subsystems are those which deal with rolling stock, infrastructure, energy or control and command and signalling.

If the answer to both questions is ‘yes’ then the RIR apply and NoBo verification is required.

The definition of 'Major' work is covered by help note 209. Unfortunately there is no established definition of 'Major Work' in the regulations or directives. It is necessary to consider the common English interpretation as would be applied by courts in the United Kingdom. Help note "Renewals & Upgrading" states that it is useful to consider the following points in assessing this:

- *The scale of your project in terms of geographic size, cost and change to the subsystem you are working on. National programmes, Route programmes, Projects of strategic importance are likely to be major as are projects of a significant financial scale.*
- *The significance of the work. Could the work aid or hinder the development of an interoperable network and given the location or nature of the work what would be the likely impact?*
- *How does your project relate to any published National Implementation plans such as the plans for GSM-R or ERTMS?*
- *Does the work allow for an economically efficient opportunity to apply a standardised design? In particular would it reduce the level and cost of future re-engineering if the subsystem is to be migrated to an interoperable design at a future date*

If the Project entity believes that the works are 'Major' then they should apply to the Competent Authority (the DfT) for a Regulation 5 decision to endorse this.

5.2 Application of the Interoperability Tests to the Project

Q1. Will the project introduce a new structural subsystem or a new part of a structural subsystem on UK Mainline Railways infrastructure?
Answer: No. The project will introduce more installations of TPWS equipment and possibly a minor upgrade to the on-train equipment. However this equipment is already well established and in use on both the trains and infrastructure.

Q2. If so, is it a new or Major work?
Answer: No. The equipment being installed is not new in application on either the rolling stock or infrastructure. However this project does enable the later roll out of ETCS on the route, as there is an established means of migration from TPWS/AWS to ETCS but not from SELCAB ATP to ETCS.

It is concluded that Chiltern Railways will not need to apply Railway Interoperability Regulations.

6 Common Safety Method on Risk Evaluation and Assessment

6.1 Legal & Regulatory Guidance

The CSM applies to 'significant' changes based on criteria in the regulation and is up to the Proposer to determine. The 'significance' criteria are:

(a) failure consequence: credible worst-case scenario in the event of failure of the system;

(b) novelty used in implementing the change;

(c) complexity of the change;

(d) monitoring: the inability to monitor the implemented change and take appropriate interventions;

(e) reversibility: the inability to revert to the system before the change;

(f) additionality: assessment of the significance of the change taking into account all recent safety-related modifications to the system under assessment and which were not judged as significant.

If a project is assessed as significant then the proposer should select a safety verification route and appoint an Assessment Body to overview safety verification. There are 3 principle safety verification routes available:

1. Codes of Practice / Compliance with Standards

2. Comparison with similar reference systems (e.g. comparison of one WSP system with another).

3. Explicit Risk Estimation (quantified risk assessment) to demonstrate that the risks of the new system are ALARP.

The Assessment Body may be internal to the business or external (e.g. a NoBo). An internal Assessment Body must demonstrate that they are independent & competent.

At the conclusion a safety assessment report is produced to support the proposer in taking the decision on the safety of the system. If the project also requires an authorisation to place into service (e.g. new train, GSM-R) the safety assessment report should also be submitted to the ORR with the technical file and other documentation. The ORR will take this into account in granting the authorisation.

6.2 Initial System Definition for 'Significance' test

The System being changed is that the main train protection system for SELCAB fitted trains operating over the exiting SELCAB fitted infrastructure will change to from SELCAB to TPWS and that the TPWS coverage will be enhanced across the SELCAB ATP area. This will allow SELCAB ATP to be removed from use on both the infrastructure and trains.

This project affects:

- Means of train protection.
- Scope of TPWS installation across the SELCAB area.
- Effectiveness of TPWS equipment installed across the fleet.
- Loss of continuous speed supervision
- Replacement of rollback protection through installation of a stand-alone rollback system

The key interfaces are:

- Track subsystem
- Train protection subsystems (SELCAB ATP)
- Train Driver

The existing safety measures that apply to it are:

- Compliance with NNTRs and TSIs.
- Compatibility assessment of Chiltern fleet with Network Rail infrastructure.
- Driving in compliance with Rule Book (GE/RT8000).
- Company instructions including DOTE.
- Driver competency management.
- Train Maintenance Plan

6.3 Application of the Significance Test to the Project

Criteria	**Is the Project significant against this criteria?**
Failure consequence: credible worst-case scenario in the event of failure of the system	The worst case scenario is that when the ATP equipment is turned off there is a major event such as a collision or high speed derailment. This is as direct or indirect result of loss of functionality or protection that ATP provided such as continuous speed supervision or continuous fault monitoring of the on-train and fixed infrastructure.
Novelty used in implementing the change	The TPWS equipment utilised in this project is well established and widely in use in the UK and so is not novel.
Complexity of the change	The equipment installation required by this project and the design principles are well established and not considered complex.
Monitoring: the inability to monitor the implemented change and take appropriate interventions	The new equipment installed on the train or infrastructure can be monitored through conventional, well established maintenance and safety monitoring processes (e.g. fault reporting, SPAD reporting, overspeed monitoring).
Reversibility: the inability to revert to the system before the change	If the enhanced TPWS installations on train or on the infrastructure do not work, then this is likely to be detected as part of post installation testing. The ATP equipment will remain in use for as long as it can be serviced or until a decision is taken by Chiltern Railways and/or Network Rail to turn it off.
Additionality: assessment of the significance of the change taking into account all recent safety-	There has been no major enhancement of the TPWS equipment on-train or on the infrastructure in the last 2 years. There have been no material changes to the scope or functionality of ATP or TPWS in recent years.

related modifications to the system under assessment and which were not judged as significant	

It is concluded that the scheme to install enhanced TPWS to enable ATP removal is likely to meet the threshold for 'significance' through the failure consequence criteria. The project is only 'Significant' at the point that ATP is turned off on either the trains or infrastructure (whichever is first). Therefore CRCL together with Network Rail will need to follow the CSM REA process and appoint an Assessment Body to check the process has been followed.

7 Conclusions

This report documents the decision making for the correct authorisation route of:

- Chiltern Railways – as a Railway Undertaking

for the installation of enhanced TPWS to enable ATP removal.

It is concluded that the project is not 'New' or 'Major' within the requirements of the Railway Interoperability Regulations 2011 because the TPWS equipment being fitted on the infrastructure is additional to the existing compliant TPWS installations.

It is concluded that the project meets the 'significance' threshold within the requirements of the Common Safety Method on Risk Assessment but is only 'Significant' at the point that ATP is turned off on either the trains or infrastructure (whichever is first). Chiltern Railways will therefore need to put in place a scheme to assess the hazards, controls and an independent review of this process by an Assessment Body.