

Ian Prosser
Director of Railway Safety
Railway Safety Directorate

15 March 2016

Mark Carne
Network Rail
1 Eversholt Street
London.
NW1 2DN

Dear Mark,

RAILWAY SAFETY REGULATIONS 1999 EXEMPTION DECISION - TRAIN PROTECTION ARRANGEMENTS FOR THE RUNNING OF CROSSRAIL TRAINS BETWEEN PADDINGTON STATION AND HEATHROW TUNNEL JUNCTION

I write to advise you of the Office of Rail and Road's (ORR's) decision to grant an exemption with conditions under the Railway Safety Regulations 1999 (RSR 99) to allow the running of Crossrail trains with alternative train protection arrangements between Paddington and Heathrow Tunnel Junction for a defined period.

On 26 August 2015, Network Rail Infrastructure Ltd in association with Crossrail Limited and MTR Corporation (Crossrail) Limited made an application for an exemption from the requirement under regulation 3 of RSR 99 that both a train and the railway infrastructure should comply with the statutory defined train protection system. The exemption would apply to the running of Class 345 Crossrail passenger trains on the route between Paddington Station and Heathrow Tunnel Junction and would be for a limited period from 20 May 2018 until 31 December 2019 as a fall-back option if the European Train Control System (ETCS) for train protection arrangements cannot be installed and in service within this timeframe. The alternative train protection system, for which this exemption was sought, would provide enhanced deployment of the Train Protection Warning System (TPWS), that is equipment would be fitted in more locations than prescribed by RSR99.

Following a public consultation between 2 September 2015 and 27 October 2015, I wrote to you on 10 December 2015 indicating that this exemption should in principle be granted but would be subject to proportionate and appropriate conditions. This letter explains the

reasoning for ORR's decision to grant this exemption and is accompanied by an exemption certificate with conditions.

Background

Regulation 3(1) of RSR 99 prohibits the operation of a train on a railway unless a train protection system is in service in relation to the train and that railway. This duty to comply is imposed on both the train operators and infrastructure controller. Under the definition in regulation 2(1), "train protection system" has two meanings:

- (a) Where it is reasonably practicable to install it, it means equipment which automatically controls the speed of the train to ensure, so far as possible, that a stop signal is not passed without authority and that the permitted speed is not exceeded at any time throughout the journey (e.g. Automatic Train Protection or ATP); and
- (b) Where it is not reasonably practicable to install equipment as in (a) above, it means equipment installed at specified locations which causes the brakes of the train to apply automatically in specified circumstances (e.g. Train Protection Warning System or TPWS).

The Paddington Station to Heathrow Tunnel Junction section of the Great Western route is currently fitted with a form of automatic train protection (GW-ATP) and it is planned that the eventual train protection arrangements for the Crossrail trains that will run on it will be through the ETCS which includes automatic train protection. The new Crossrail trains cannot be equipped with systems to operate with the current GW-ATP system.

Regulation 6 of RSR 99 provides for exemptions to be granted from any prohibition contained in the Regulations including regulation 3 (use of a train protection system). The exemption must be in the form of a written certificate and may be subject to a time limit and/or conditions. In deciding whether to grant any such exemption, ORR shall have regard to:

- a) the conditions, if any, which we propose to attach to the exemption;
- b) any other requirements imposed by or under any enactment which apply to the case; and
- c) all other circumstances of the case.

Application process

In December 2014 ORR received an initial exemption submission with 58 supporting documents from Network Rail Infrastructure Ltd to allow for an alternative train protection system to be installed, as a temporary fall-back position, in case the target date for the

introduction of ETCS to the Paddington to Heathrow Tunnel Junction section was not achieved by the 20 May 2018 timetable change when the staged introduction of Crossrail stock/passenger services is scheduled to commence. The alternative train protection proposed was not a form of automatic train protection so an exemption from this element of RSR 99's requirements would be necessary in order to allow Crossrail train operations to proceed.

The application was made by Network Rail Infrastructure Ltd (as infrastructure manager) in collaboration with Crossrail Ltd (the future train operator) and MTR Corporation (Crossrail) Ltd – referred to in this letter as “the applicants”. It requested - for a defined limited period – an exemption from the requirement to have automatic train protection on the section/s of railway between Paddington Station and Heathrow Airport Junction, and Heathrow Airport Junction and Heathrow Tunnel Junction.

The application proposed that an alternative train protection system be used on the relevant infrastructure for this limited period through enhanced deployment of TPWS. RSR 99 allows this type of equipment to be installed at specific locations (and which causes the brakes of the train to apply automatically in specified circumstances) only where it is not reasonably practicable to install automatic train protection. As TPWS in its standard deployment is inherently of a lower standard than automatic train protection, the exemption submission set out an enhanced deployment proposal whereby additional TPWS equipment would be installed on the route and claimed that this would deliver a level of overall system safety equivalent to the GW-ATP system.

The exemption request was for the limited period 20 May 2018 to 31 December 2019. Although Crossrail Ltd would need to undertake testing of rolling stock and conduct driver training on the route sufficiently in advance of 20 May 2018, we agree with the applicants that an exemption would be needed only at the point at which the current GW-ATP fitted service was replaced. The use of train paths for testing and/or driver training would be undertaken under the train protection systems already in place for those paths. The exemption request covered the movement of all class 345 trains from when they replace the existing GW-ATP fitted service, including for movement of empty coaching stock.

ORR conducted its assessment of the exemption submission material in accordance with its published Rail Guidance Document RGD 2010-11¹. An ORR cross-discipline case team was established in October 2014 in anticipation of the formal exemption application being made and that team has met regularly with representatives from the applicants throughout the assessment process. Further information was provided at the request of ORR as part of its assessment and Network Rail commissioned a supplementary piece of work to undertake a detailed, independent, risk assessment of the proposed train protection to support further its original submission.

¹ http://orr.gov.uk/data/assets/pdf_file/0013/2254/rgd-2010-11.pdf

The role of the ORR case team was to undertake a full assessment of all the detailed and technical information provided in support of the exemption application in order to consider the arguments put forward as to why such an exemption was considered necessary, whether all appropriate options had been robustly tested, whether the proposed alternative train protection arrangements met any safety concerns and whether any potential risks would be appropriately managed.

RSR 99 requires ORR to consult on an exemption application it receives so, when we were satisfied that the exemption material was presented in an appropriate manner for stakeholder consideration, we placed the main exemption submission (with links to twelve key supporting documents) on the ORR website and invited comments.

The ORR guidance on our internal decision-making process requires the case team, following consideration of the consultation responses and all other relevant information and factors, to make a recommendation to the "Authorising Officer" (in this case myself) whether the exemption should be granted, whether any conditions should be attached and the reasons for their conclusions.

Conclusions of the case team assessment

The case team considered the results of the pre-engagement undertaken by the applicants before submitting their exemption application that had been provided as part of the exemption submission material. They noted that this pre-engagement, whilst fairly limited in scope, had raised no specific concerns with the proposed arrangements.

ORR undertook a formal public consultation with a wider range of stakeholders between 2 September 2015 and 27 October 2015. Eight responses were received. There were two objections including one from an individual. The case team have been informed that the applicants subsequently met with the other objector – ASLEF – to discuss the proposed arrangements and we understand this dialogue is on-going. The only other significant comment raised concerned clarity around transitional arrangements for Heathrow Express services and this matter has now been resolved directly by the applicants. Other stakeholder comments were points of detail, with no bearing on the case team's assessment or recommendation to the Authorising Officer but they have all been addressed by the applicants. A summary of the comments received from stakeholders and responses to them will be placed on ORR's website.

In addition to taking account of stakeholder's views, a review of the detailed information provided in the original exemption submission, the accompanying technical and safety documents, and the outcomes of further work instigated by the applicants to support the exemption request, was undertaken by the case team. The case team concluded that, overall, a sufficiently compelling case to grant an exemption from RSR 99 had been made.

In particular, the case team carefully analysed and considered both the safety and technical implications for allowing this time limited exemption.

(i) Safety considerations

The case team compared the effect in practice of the proposal to deploy additional TPWS equipment (as set out in the exemption application) with the existing GW-ATP protection in order to comparatively assess the level of protection afforded by each approach. The team considered the functionality of TPWS versus GW-ATP and the current risk estimated by the industry Safety Risk Model from Signals Passed At Danger (SPADs), derailments caused by overspeeding, and buffer-stop collisions.

From the evidence provided and following this assessment, the case team concluded that the overall safety impact of the proposed alternative form of train protection for the Paddington to Heathrow Tunnel Junction section of the route would be close to the established reasonably practicable standard for train protection systems.

The case team assessed that additional fitment of train protection equipment on this section of railway line could offer an acceptable level of protection against SPAD events, offer a broadly acceptable level protection for line speed reduction events and although it was weakest in the level of protection for buffer stop events the potential safety risks on this particular line are small.

The case team also considered the safety impacts of the enhanced TPWS installation in terms of the risk to the workforce (especially track side) installing and maintaining it, the risk arising from an increased workload on maintenance teams to maintain the extra equipment, whether such work pressure might cause maintenance errors to this or other signalling equipment, and operational risk from TPWS equipment failure. The case team reviewed the options report submitted by the applicants as part of the exemption application which included risk to workforce, operational risks and maintenance impacts as part of the criteria against which different options were compared. The case team concluded that the risks were appropriately considered in the report and were tolerably low.

The case team also considered whether the proposed additional fitment of TPWS equipment would afford additional protection to all rolling stock fitted with TPWS using this section of line. The case team reviewed the calculations put forward in the exemption submission which quantified the differences in SPAD protection between the current service and proposed future arrangements, signal by signal using a TPWS effectiveness tool. The case team concluded that there would be a small but clear benefit overall in SPAD protection for the other services using this section of line.

(ii) Technical considerations

The case team reviewed the work undertaken by the applicants and their consultants to consider fifteen different options ranging from do nothing, through various fitment, technical or operational possibilities, to delays in running services until ETCS was fitted. Whilst the case team would have liked to have seen greater substantiation of some of the options and the reasons why they were discounted, they agreed with the majority of the ranking of the options made and concluded that the proposed option appeared – on the evidence provided - to be reasonably practicable. The case team noted that the principles of the European Common Safety Method on risk assessment had been applied to the analysis.

The case team also considered the timescales involved and the technical options that could realistically be pursued. They were satisfied that the alternative train protection that would be put in place (were an exemption to be granted) presented a genuine fall-back option and that the parties to the exemption remained committed to the timely introduction of ETCS if this were to prove possible.

Decision

On the basis of the case team's assessment and its recommendations, particularly as regards appropriate and proportionate conditions that should be attached to an exemption, given the scale and nature of this application it was discussed and agreed with all ORR executives in a meeting on 1 December 2015. The decision was supported by a qualitative impact assessment which explained the options. This will be placed on ORR's website.

A decision to grant was made in principle pending the finalisation of specific conditions and communicated to Network Rail on 10 December 2015. The case team has now liaised with technical specialists from the applicants to ensure such conditions properly reflect the route on which they would apply and the technical enhancements that must be put in place for the temporary use of TPWS for Crossrail 345 Class trains.

The exemption and its conditions are also suitably timebound to reflect the fact that these alternative train protection arrangements are not a longer term solution, and allow ORR to monitor both the deployment of the additional TPWS equipment and the continued commitment by the applicants to deliver ETCS to this section of route before the expiry of the exemption.

Please find enclosed the original signed exemption certificate. Copies of the exemption certificate and this decision letter will be placed on ORR's public register and the exemption submission material will remain archived on ORR's website.

A hard copy of this letter and exemption certificate has been sent to Howard Smith (Director, Operations) and Matthew White (Director, Surface) at Crossrail Limited, and to Steve Murphy (Managing Director), Les Bird (Head of Operations) and Mark Eaton (Concessions Director) at MTR Corporation (Crossrail) Ltd.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Ian Prosser', with a horizontal line above the name.

Ian Prosser