

Safety Impacts arising in the case of a delay to Implementation of Crossrail Stage Two Opening

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1 Purpose

This document examines the impacts that may arise from any delay to the commencement of the operation of Stage 2 of the Crossrail Staged Opening Plan planned for the May Timetable Change Date in 2018.

2 Scope

The document will examine both the direct safety benefits that will not be delivered if the Stage 2 commencement date is postponed and also the wider implications on the opening of the later stages of the Crossrail Programme, in particular the commencement of full Crossrail services at Stage 5 in December 2019.

3 Definitions

ATO	Automatic Train Operation
ATP	Automatic Train Protection
CBTC	Communications Based Train Control
DOO CCTV	Driver Only Operation Closed Circuit TV
ETCS	European Train Control System
GW-ATP	The legacy British Rail Automatic Train Protection system installed on the Great Western Main Line
TSI	Technical Standards for Interoperability

4 Background

Crossrail has adopted a Staged Opening Plan in order to minimise overall risk to both the programme and the safety of operation of the railway that would occur if a 'big bang' approach to opening were to be adopted.

At Stage 1 in May 2017, the new Crossrail rolling stock will commence introduction into passenger service along with the new Crossrail DOO CCTV system installed on these trains and at the stations served. This will enable a programme of driver training to be progressive and allow drivers recruited for the later stages of Crossrail opening to gain practical handling experience of the trains in surface operation between Liverpool Street and Shenfield.

Stage 2 is scheduled for May 2018 and introduces the trains into operation on the western route between Paddington and Heathrow. Crucially this stage will see the commencement of operation using ETCS Level 2 and enable drivers to gain experience of this system and consolidate route knowledge in the period before commencement of operation through the Crossrail Central Operating Section. This would still apply in the event that Network Rail is unable to place the ETCS signalling into use between Paddington and Airport Junction but exemption is granted to use an enhanced TPWS installation on the route to provide additional Train Protection. The section of route between Airport Junction and Heathrow would remain as

the priority fitment for ETCS and therefore this service would still provide operational experience of the use of ETCS prior to its extension to cover the rest of the western route between Paddington and Reading.

Stage 3 in December 2018 will be the opening date of the Crossrail Central Operating Section which will operate under a CBTC signalling system with Crossrail trains operating between Paddington (Low Level) and Abbey Wood. The spur from Stepney Green Junction to Pudding Mill Lane Junction will also be brought into use at this stage albeit with no planned passenger service until Stage 4. The route will though be used by driver training trips to build experience and reliability in the overlay of the CBTC system to Stratford and the transition there to and from TPWS.

Stage 4 in May 2019 will see the Great Eastern route to Shenfield incorporated into the Central Operation Section.

Stage 5 in December 2019 is the final stage to complete the Crossrail introduction by extending services from Paddington (Low Level) to both Reading and Heathrow Airport, replacing the 'standalone' service introduced to Heathrow at Stage 2.

5 Direct Safety Benefits arising from the introduction of Crossrail services

The introduction of Crossrail services utilising the new Class 345 rolling stock will replace the both existing Class 360 rolling stock (built 2005) and Class 165 rolling stock (built 1992) with new stock built to current crash worthiness requirements.

The new service will provide significant additional passenger carrying capacity between Hayes & Harlington/Southall and Paddington – currently this section of route has 3 of the 10 most crowded trains in the UK (Autumn 2013 figures). Crossrail trains comprising 9 x 22m long vehicles will have capacity for 1500 passengers per train replacing much lower capacity rolling stock on both the Connect services and the existing two car Greenford services which operate on the route from West Ealing into Paddington.

The introduction of the Crossrail service will also help to alleviate overcrowding on the London Underground Central and District Lines through the provision of additional capacity from Ealing Broadway.

The Crossrail DOO CCTV system being installed for the dispatch of Crossrail trains conforms fully with the recommendations of recent RAIB reports (Brentwood, Charing Cross, St James, Liverpool and Holborn incidents) in providing the driver with a means of stopping trains when leaving the platforms, unlike existing National Rail DOO train despatch methods in use on the route. The cameras will be positioned to give a clear view along the platform-train interface rather than relying on an angled view towards the platform edge.

6 Indirect Safety Benefits arising from the introduction of Crossrail services

The provision of Crossrail services to Heathrow at Stage 2 of the Crossrail Staged Opening programme are an essential element of the overall opening strategy allowing for driver training and familiarisation with the route and new signalling technology (in use on the Heathrow branch even if introduction is delayed between Paddington and Airport Junction). A delay to implementing Stage 2, while it would not impact the commencement of Stages 3 (Crossrail Central Operating Section; Paddington to Abbey Wood) or 4 (integration of Great Eastern services into the Central Operating Section) would impact the commencement of full Crossrail operation at Stage 5 (Integration of Heathrow, Maidenhead and Reading services into the Central Operating Section). This would perpetuate the need for large numbers of passengers to change trains at Paddington to continue their journey via Crossrail with a consequent increase in Slips, Trips and falls incidents.

Any inability to operate trains to Heathrow prior to Stage 5 would result in a bottle neck being created before the 300+ drivers that will be employed on Crossrail can gain practical experience in operating under ETCS conditions. Providing later refreshing training would be expected to result in a much larger number of qualified but inexperienced drivers commencing operation of trains under ETCS conditions at one time.

The doubling of frequency of the existing Connect two trains per hour service to a four trains per hour local service to Heathrow will encourage increased use of public transport to the airport and reduce the safety risks arising from use of road transport on congested highways for these journeys.