

A commentary on the absence of a validated timetable for HS2

This note has been prepared by Jonathan Tyler and Chris Stokes as a supplement to the recent paper *HS2 – the case for a review*. The former was co-author of the paper, the latter a speaker at the workshop discussion on which the paper was based. Both of us have extensive experience of strategic railway planning and of timetabling in particular.

HS2 Ltd has only published simplistic diagrams of its proposed services that merely show the origins, intermediate stops and destinations of an hourly set of trains. This does not enable interested parties to understand the temporal distribution or connectivity of the services relevant to their area. Even more importantly, it does not enable those with professional knowledge to test whether plans for the infrastructure are appropriate for the services envisaged, especially with regard to junction and station capacity and bearing in mind that all railway planning, even on a new specialised line, is liable to throw up potential conflicts and hence the need for compromises.

The fact that HS2 Ltd has refused to publish a properly-validated operational timetable is therefore extremely concerning. On occasions the company has appeared to hide behind references to future regulatory regimes, but that is simply not tenable when there is a high risk of costly errors in infrastructure specifications and of changes to the proposals that could disappoint certain places and weaken the business case.

It is in our view indefensible that for a scheme costing at least £57 billion a timetabling exercise that need cost no more than £100,000 has not been commissioned.

Ironically, the first attempt to do so (as far as we are aware) since our own work at an earlier stage of the project (2011-12) comes from a foreign observer. Sven Andersen is an experienced – but now retired – timetable planner with Deutsche Bahn (the German state railway). He has presented papers at international conferences on the operation of high-speed railways and is associated with the International Union of Railways [UIC]. Attached is a copy of the note he prepared after reading our workshop report.

We do not agree with all of his analysis (and we do not share his view that the starting point for Britain's high-speed plans should be a complete Scotland ... London route). Nevertheless we are circulating his note, with his agreement, because it raises a number of extremely important matters that are overdue for analysis and public discussion. The following points are particularly significant.

* The outline timetable shows 16 trains/hour, based on HS2 Ltd's diagram (here from a version published in a French magazine). Herr Andersen's judgment, informed by his experience and by UIC advice, is that that is the limit of what is operationally practical. This contrasts with HS2 Ltd's persistent claim that modelling of signalling systems indicates that 18 trains/hour is feasible.

* The HS2 route is designed for a maximum speed of 400 km/h and a routine operating speed of 360 km/h, yet the distance between Leeds and London is only 310 km and those trains will have two, three or four intermediate stops. In other words, and by comparison with Chinese practice, the proposed line-speed is inappropriately high. Calculation of what achieving an Edinburgh > London timing of 2.5 hours would require suggests that 300 km/h should be the maximum speed.

* Five trains are shown to call at Birmingham Interchange (in his text he questions whether the three from the north should stop there, but we regard that as desirable). Rightly, in order to offer an attractively flexible service for the market concerned, they are distributed evenly across the hour. However this has implications for the pathing of the services running through from the 'classic' network that have not been put into the public domain.

- * Five evenly-spaced trains in each direction in each hour do not justify a four-platform station. Two would suffice, unless HS2 Ltd see the extra provision, at considerable cost, as necessary for regulating the merging of the self-contained Birmingham Curzon Street services with the classic services – which they have otherwise claimed is not a problem.
- * The note includes calculations about the length of the additional tracks that are required to enable trains calling at an intermediate station to decelerate and accelerate without impeding non-stop trains. This is especially important where a train moving away from a stop must slot in between a pair of trains running at the line's maximum speed. We have not checked the calculation in detail, but our impression is that Herr Andersen is right to question whether the relevant tracks at Birmingham Interchange are of sufficient length.
- * The layout at the delta junction outside Birmingham is complex in order to accommodate trains running into and out of Curzon Street from and to both the northern and southern sections of the high-speed line as well as the through trains bypassing Birmingham. Grade-separation will eliminate the conflicts that present problems on the classic network, but that does not necessarily avoid the problem that paths optimally specified elsewhere may clash on the two-track section into Curzon Street. Herr Andersen believes that this may well occur.
- * He also criticises the decision to secure half-hourly services for both Edinburgh and Glasgow by joining and splitting a pair of 200-metre trains at Carstairs. His argument is partly that the practice in Japan arises from specific circumstances irrelevant to HS2, partly the time-cost and potential unreliability of this operation and partly the plan to do it at a station that serves a tiny local population – while not serving Carlisle, a significant regional city and a railhead for a large area. We understand the advantage of the two-portion scheme but share his concern about these details.
- * The draft timetable includes examples of bunched timings that reduce effective frequencies, for example the xx:15 and xx:32 departures from Leeds that arrive at London Euston within 3 minutes of each other, the xx:45 and xx:06 from Preston arriving within 6 minutes and the 24-27-9 minute spacing of arrivals in London from Manchester. Further work might identify a scheme presenting fewer disadvantages of this kind, but we suspect that it is an inevitable consequence of seeking to satisfy a wide range of varied market requirements on a constrained network.
- * Moreover the proposed hourly frequency between Newcastle and Birmingham, between Scotland and Birmingham and between the eastern route and Birmingham Interchange is not especially attractive, with the added complication that travellers to and from places south of Birmingham would face the awkward interchange between Curzon Street and New Street. A further point is that the pathing of these trains could afford travellers from stations such as Durham and Oxenholme that will not have direct London trains a simple one-change option – but only if it is carefully planned, for which no evidence has yet been forthcoming.
- * Finally, although Herr Andersen does not mention this explicitly, we note that neither HS2 Ltd nor Network Rail has published for consultation any timetable illustrating how services on the existing railway could be developed to secure no less a quality than is currently offered for places not on the high-speed route while making effective use of the capacity released by the transfer of long-distance services to HS2 (including increased provision for freight trains). We were both involved in earlier exercises to do this, as mentioned above, but since then there has been silence from the two responsible bodies. That is an extraordinary state of affairs for so large a project with so many consequences.

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