If not HSR, then at least Higher Speed Rail

Commentator PHILIP LAIRD looks at the ongoing progress of HSR around the world, and asks if Australia can do more than just continue to study HSR.

October 2014 marks the 50th anniversary of the opening of the Tokaido Shinkansen linking Tokyo and Osaka in Japan. This ushered in a new age of High Speed Rail (HSR) that was followed in 1981 by the French TGV. In 1984, proposals were made for a Sydney-Canberra-Melbourne Very Fast Train.

HSR around the world

The construction between 1959 and 1964 of a new 515-kilometre standard-gauge railway between Tokyo and Osaka involved many people. However, much credit must be given to Shinji Sogo as president of Japan National Railways (JNR) for his promotion and securing funds for the project. Credit is also due to Hideo Shima as JNR vice-president of engineering who addressed many technical challenges including the use of “distributed power”, and the development of “In Cab” signalling and Automatic Train Control (ATC).

Since 1964, the Shinkansen has demonstrated continuous improvement, including several new generations of trains, a new ATC system and an ongoing emphasis on impeccable safety standards. To date more than 5.5 billion journeys have been made on the Tokyo-Osaka line and no passenger lives have been lost due to collisions or derailments.

Extension of the Shinkansen has followed in stages, firstly from Osaka to the island of Kyushu in 1975, and then to the north and east of Tokyo. The most recent extensions in 2011 gave a combined length of about 2500 route kilometers. In 2015 a new Shinkansen is due to open between Nagano and the Sea of Japan (228km) with one in 2016 between Aomori and Hokkaido (149km).

Many European countries have followed France’s HSR lead, including Spain with a growing HSR network, Germany with its Intercity Express (ICE) trains, Italy and Belgium. For some shorter journeys such as Paris-Brussels, HSR has all but displaced flying. In 2007, HSR was extended to London and plans are advanced for a second high-speed line in England.

In Asia, South Korea’s HSR operations started in 2004 between Seoul and Busan and its HSR network will be further extended by 2020. Taiwan’s HSR started operations in 2007 with a 345km route on its west coast. China, starting in 2008 with Beijing to Tianjin, has since continued an ambitious program to deliver an extensive HSR network. The aim is to have an HSR network extending for some 12,000km by 2020.

HSR studies in Australia

Over the past 30 years, there have been many HSR proposals in Australia with trains capable of speeds of 250km/h. There have also been numerous studies, including those of the VFT Joint Venture costing more than $20 million towards 1991 and SpeedRail towards the year 2000 costing up to $30m, and one commissioned by the Federal Government in 2001 costing at least $10m. The recent phase 1 and 2 HSR reports cost at least $20m.

The combined cost in 2014 terms of these studies is about $120m. To this cost must be added the cost of running at least four government inquiries connected with the VFT, along with the cost of other private-sector involvement (including bids in 1997 for Maglev and two other proposals set aside in favour of Speedrail).

There have been other HSR studies as well. These include the CRC for Rail Innovation whose report High Speed Rail: Strategic information for the Australian context with 11 authors was released in January 2010. The CRC report, completed at a very modest cost and informed by UIC, concluded that the time was right to carry out an in-depth concept study of HSR in Australia and that

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The case for Higher Speed Rail

By PHILIP LAIRD

In May 2014 a research report (137), Improving Regional Passenger Rail Services, from the Bureau of Infrastructure, Transport and Regional Economics (BITRE), was released. The research was undertaken by international rail expert Peter Kain with the assistance of Jeremy Dornan. The report of 160 pages and its appendix on trolley trains, and numerous references, is available at bitre.gov.au.

Rather than looking at High Speed Rail (HSR), the report outlined rail upgrading alternatives as options in developing improved passenger rail services in Australia and overseas. As noted (from the summary At a glance):

“Upgrades can serve as both substitutes for and complements to high-speed railways. As substitutes to high-speed rail, they involve smaller drain on government budgets, can be introduced sooner, have a lower environmental impact and provide useful commercial proving-ground for subsequent improvements, including high-speed railways, which can reduce investment risks.”

The report includes 12 helpful case studies. The first two are the X 2000 tilt train trial of the early 1990s for Sydney-Canberra (“a fast train on a slow track”) and the highly successful Victorian Regional Fast Rail that included track upgrades as well as new trains.

Five European case studies are then outlined, including from France, Germany and Austria. plus the X 2000 train between Stockholm and Göteborg (456 kilometres) in Sweden where transit time cuts (to just over three hours – average speed 147km/h) and improved frequency led to an increase in rail’s market share (of air and rail) to 60 per cent.

The case studies conclude with two from Britain, one from Canada (where attention is given to trains at 200km/h along with the HSR option of 250km/h or more), and two from the United States (the Acela train linking Boston, New York and Washington; and the Mid West Chicago-St Louis upgrade).

In addition, the Queensland tilt trains are mentioned. So also is the Perth-Mandurah railway whose average speed of 85km/h “complemented by high reliability and excellent service frequency” (p57) has led to patronage on the railway since its opening exceeding initial forecasts (unlike certain Brisbane and Sydney tollways).

The report concludes with options for Australia by noting (p159) that “The experiences with rail services in this country and overseas – in regional, intercity and airport links – illustrates the potential that may come from upgrading.”

This is similar to the conclusions reached in the 2014 Adelaide Conference on Railway Excellence paper “Building a railway for the 21st century: bringing high speed rail a step closer” that noted, inter alia, “carefully planned medium speed upgrades in key areas would seem to be an expedient alternative” to ongoing debate (with no real action) about HSR. It is of note that the BITRE report and the CORE paper were independently prepared.

even if HSR did not go ahead in the immediate future, there should be a move towards corridor preservation to protect future options.

Corridor protection should now be regarded as an absolute minimum. It was recommended in 1991 by the Joint Venture to allow for HSR in the future, and also by a Victorian Government review panel. The 1991 report of the panel recommended that the land for the VFT be acquired by government and then leased on a long-term basis to the Joint Venture.

There have been many other HSR studies in Australia. These include the 2010 East Coast High Capacity Infrastructure Corridors-A realistic pathway to very fast trains study for Infrastructure Partnerships Australia and a definitive study in 2014 from Beyond Zero Emissions.

Of particular interest is an August 2013 report by the former Commonwealth Government’s HSR Advisory Group. This proposed an incremental delivery that included:

- Formally commit to HSRand settle arrangements with state and territory governments;
- Protection of the corridor (initially through national legislation);
- Referring HSR to Infrastructure Australia for initial assessment, and
- Establishment of a High Speed Rail Authority.

Higher Speed Rail

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Yet, HSR works very well around the world, including in countries without HSR as yet, such as Sweden, Switzerland and the United States with its Acela trains between Boston, New York and Washington.

Indeed, after 160km of substandard track on its North Coast line was rebuilt to modern engineering standards, in 1998 Queensland introduced a tilt train operating at speeds up to 160km/h. It was well received by the travelling public.

This was followed in 2006 by Victoria with its Regional Fast Rail using new trains on four lines with upgraded track at speeds of up to 160km/h. Again, it was well received, with patronage doubling in about four years.

In Western Australia, the new Prospector train between Perth and Kalgoorlie can also operate at 160km/h. Its average speed is 99.5km/h. The world-Continued on next page...
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class Perth-Mandurah training average 88km/h is Australia’s seventh-fastest passenger train – and this speed is much faster than any NSW inter-urban train.

At CORE2014 in Adelaide, a joint paper by Max Michell, Scott Martin and me argued that significant incremental improvements to existing mainline rail corridors would provide rail infrastructure of sufficiently high standard earlier and at significantly lower cost than full HSR. The paper also looks at Australia’s fastest passenger trains: Broken Hill to Parkes averaging 105 km/h followed by the fastest Melbourne-Ballarat (103km/h) and Melbourne-Bendigo trains (101km/h).

It is also of note that Australia’s second-fastest train is a freight train – from Broken Hill to Goobang Junction (Parkes).

Sydney-Canberra options

The CORE paper suggests Sydney–Canberra is the most attractive corridor for an Australian MSR demonstration project that could successfully compete with mature road and air transport links. It would also join Australia’s largest city to the national capital.

For approximately $3.5 billion (less than one sixth of the 2013 phase 2 HSR estimated cost of $23b), a Sydney-Canberra MSR project would be 70km shorter than the existing “steam age” track and would more than halve transit times. The key goal would be reducing Sydney-Canberra rail journey times to an initial two-and-a-half-hour target, with an ultimate city-to-city goal of less than two hours. Such timings are superior to current bus services (three and a half hours with frequent services), and a vast improvement on rail’s current average journey times of four hours 10 minutes. Other benefits would include savings of up to 75 minutes for Sydney-Melbourne interstate freight and passenger train transit times.

A MSR demonstration project linking Canberra to Sydney could proceed in a number of ways. The first stage could be the construction of a ‘T-Line’ from near Goulburn to Yass and a new station at North Canberra as proposed in 1981 by the National Committee of Engineering (the forerunner of the RTSA).

Stage 2 could include the construction of a new MSR alignment between the south of Campbelltown and Goulburn. This could include the “Wentworth route”, that was identified in a 1995 report to State Rail by ARUP/TMG on Sydney-Canberra high-speed options and what is outlined in the 2001 ARTC track audit. The Wentworth route would reduce the length of this section by 26km and save a super-freighter up to 53 minutes and reduce fuel costs.

Stage 3 would further upgrade the route from near Campbelltown to Central Station.

Conclusions

In Australia, the outgoing Rudd government was prepared to allocate a further $52m towards HSR route finalisation and a start on corridor acquisition.

The Abbot government is yet to release a definitive statement on the prospects of HSR in Australia. Instead, a massive increase in road funding, at the expense of rail, was provided for in the May 2014 budget. Australia’s road spending is already more than $20b a year.

A recent US study into energy efficiency has found that Australia has the lowest score for energy efficiency in transport in 16 OECD countries. This will not be improved by more road spending.

It is time for a more balanced approach between road and rail to include some track upgrades to allow for higher-speed passenger and freight trains, plus the acquisition of a future HSR corridor.

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