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The Asian evolution of high speed rail

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Abstract
In Australia, in 2001, the Howard government released an East Coast HSR Scoping Study. This followed two major investigations by the private sector into HSR options for Australia; the first being a Sydney Canberra Melbourne Very Fast Train as proposed in 1984 by CSIRO, and the second being the Sydney Canberra Speed HSR proposal.

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The Asian evolution of high-speed rail

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http://www.railexpress.com.au/archive/2013/november-2013/november-6-2013/top-stories/the-asian-evolution-of-high-speed-raillIt is interesting to see the progress made by Asian countries since 2001 in developing high-speed rail while Australia is missing out.


By Philip Laird*

In Australia, in 2001, the Howard government released an East Coast HSR Scoping Study. This followed two major investigations by the private sector into HSR options for Australia; the first being a Sydney Canberra Melbourne Very Fast Train as proposed in 1984 by CSIRO, and the second being the Sydney Canberra Speed HSR proposal.

In April 2013, the then Gillard government released a major report on HSR which settled on a route of some 1748 km between Melbourne, Sydney and Brisbane, with a spur line to Canberra, at an estimated cost of $114 billion.

In 2001, Japan was the only country in the Asia Pacific region with High Speed Rail.

Four Asian countries now have HSR. Along with Japan, they are Korea, Taiwan and China. Korea’s HSR operations started in 2004 between Seoul and Busan and Taiwan’s HSR started in 2007 along 345 km 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 a HSR network extending for some 12,000 km by 2020.

This is all part of a well funded program that includes provision for more metros; indeed, an additional 1000 km of subways and light rail is expected to be built by 2015.

Not only do four Asian countries now have HSR, but other Asian countries are also planning to gain HSR. This includes a HSR link between Kuala Lumpur and Singapore by 2020. This is again, part of a well funded program, with Malaysia expected to invest MYR160 on rail-related programs, including a high-speed service to Singapore, by 2020.

The new service, operating over some 330 km of track, will aim for express trains to complete the journey in 90 minutes. Detailed planning, including intermediate station locations, is under way.

As noted by Malaysian Prime Minister Datuk Seri Mohd Najib Razak, "Now, more than ever, we are seeing a massive expansion of the rail network in Asia, including in Malaysia."

Vietnam and Thailand are also seriously considering HSR projects, each with a view
to making a start on shorter corridors.

The following will outline how Japan has continued to improve its Tokaido Shinkansen between Tokyo to Shin-Osaka that commenced operations in 1964; and, the projects since 2001 to extend its overall Shinkansen network. In outlining more recent developments, it is necessary to bear in mind that many Shinkansen related projects have very long lead times and require investments on many fronts. This includes not only extensive planning and land acquisition but also investment in both track and other ground facilities as well as rolling stock.

In short, a long term perspective is required to develop HSR. Indeed, as recently observed by Professor Morichi, it has taken some 47 years to extend the 515 km Tokaido Shinkansen in both directions to operate between Shin-Aomori and Kagoshima-Chuo to a length of about 2117 km.

**Improving the Tokaido Shinkansen**

The Tokaido Shinkansen demonstrates aspects of ‘continuous improvement’ in the efforts of JR Central to not only maintain, but also improve, its market share.

This results in more than 80% of Tokyo-Osaka travellers choosing to travel by Shinkansen, despite strong competition from aviation. Moreover, with the help of JR West, the “break even” point has been pushed further south where by 2008, some 50 per cent of Tokyo-Hiroshima travellers were choosing to travel by high speed train.

The initiatives taken since 2001 to achieve such results include the following:

1. The introduction of new rolling stock, with attention paid not only to passenger safety and comfort, but also energy efficiency (assisted by lighter weight construction at world’s best practice). This includes the introduction in 2007 of the series N700 with tilting mechanism to allow travel at speeds of 270 km/h around curves of 2500 metres radius (where the older trains are limited to 255 km/h).

2. The new Shinagawa station - some 6.8 km from Tokyo and closer to Shinjuku - was opened in 2003.

3. The introduction in 2006 of a new ATC system.

4. Ongoing emphasis on impeccable safety standards.

5. Ongoing emphasis on punctuality, with an average delay from schedule of 0.6 minutes (despite weather constraints).

6. Offering more services, including at peak hours. Now, over 300 regular services between Tokyo and Shin-Osaka are offered each day (from 6:00 am to midnight). Train sets on this line have a capacity of about 1300 passengers.

7. Development of “Express Reservation” facilities that include the ability to book seats through a mobile phone. Plus the use of automatic ticket gates.

In the financial year 2012 (Japan’s being 12 months to 31 March), the revenue to JR Central from the Tokaido Shinkansen was a substantial 1011 billion yen. At an exchange rate of $A1=80 yen, this is about $A12.8 billion. By way of comparison, 2012-13 net domestic and international passenger revenue for the
Qantas Group was about $A13.7 billion.

There are also environmental benefits from the Tokaido Shinkansen as it uses one sixth of the energy, per passenger, than do planes.

Although there were some accidents in the early years of operations, these trains have now carried billions of passengers without the loss of one life due to a train derailment or collision.

It was estimated in the late 1990s (The Economist, a 1998 article ‘A better way to fly’) that if all those who travel on the Shinkansen express lines “switched to car travel, there would be at least 1800 extra deaths and 10,000 serious injuries per year.”

It may also be noted that JR Central is actively pursuing a goal of construction by 2026 a Tokaido Shinkansen Bypass (Chuo Shinkansen) with a superconducting Maglev between the Tokyo and Nagoya areas.

Other Shinkansen Lines

Since 2001, the Tohoku Shinkansen to the north of Tokyo has been twice extended; firstly from Morioka to Hachinohe and in December 2010 to Shin-Aomori; a combined distance of 179 km. From there it is scheduled to be extended 149 km (and through the Seiken tunnel) to Shin-Hakodate by 2015.

In 2004, Shinkansen trains started running between Shin-Yatsushiro and Kagoshima-Chuo. The Hakata to Shin-Yatsushiro section was opened in March 2011. The total distance is 257 km. A firm future goal is for a Shinkansen to link Nagasaki to Hakata.

In addition, a Hokuriku Shinkansen between Nagano and Kanazawa, of length 228 km, is scheduled for completion in 2014. Under the National Shinkansen Rail Construction law, this new line may in the future be extended to Osaka. However, this may take many years to achieve.

Back in Australia, the outgoing Rudd government was prepared to allocate a further $50m 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.

In summary
Japan has continued to improve and extend its Shinkansen an extra 436 km since 2001 despite an economy in recession, with new lines due to open over the next two years. China has embarked on an ambitious HSR program of 20,000 km due by 2020. Taiwan with its 23 million people has completed 345 km of HSR. Korea is soon to celebrate 10 years of HSR whilst other Asian countries are planning to develop HSR.

Surely Australia’s 23 million people can at least start HSR on an incremental basis. A good place to start is linking our largest city of Sydney to the federal capital of Canberra.

* Professor Morichi was speaking at the 10th Eastern Asia Society for Transportation Studies conference held September 2013 at Taipei.
Philip Laird, FCILT, of the University of Wollongong, and a frequent contributor to Rail Express, presented a paper at this conference. This is available on request to him at plaird@uow.edu.au