The Sydney to Melbourne Railway: Yesterday, today and tomorrow


P.G. Laird

ABSTRACT

The paper outlines the changes in the Sydney - Melbourne railway since its official opening on 14 June 1883. These include grade easing during the 1890s, duplication with deviations during the 1910's and the opening in 1962 of the standard gauge track between Albury and Melbourne. It then outlines the numerous studies undertaken in the period between 1975 and 2005 to upgrade the track. During this period, most of the Hume Highway was reconstructed and rail's share of Sydney - Melbourne non-bulk freight fell to its present level of 11 per cent.

In addition to the track upgrading due to be completed by June 2008, the paper recommends the construction of three major deviations; Menangle to Aylmerton, Breadalbane to Yass, and, Bowning to Cootamundra and two smaller deviations. The combined length is 197 km and would replace 257 km of track on “steam age” alignment. The benefits for a 'reference' intermodal freight train include a time saving of 105 minutes, a fuel saving of about 2000 litres of diesel, train and track maintenance savings along with lower external costs. Track straightening for faster and heavier freight trains would also facilitate high-speed passenger tilt train services.

KEYWORDS: Rail deviations, modal shares, time savings, fuel savings

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1. INTRODUCTION

This paper will review the major changes to the railway since its official opening on 14 June 1883, and proposals made over the last 30 years for its improvement. It will then suggest the railway is in need of major reconstruction.

A broad gauge line from Melbourne reached Wodonga in 1873 [1]. It took until 1883 for the NSW Main South line to reach the NSW/Vic border. Meantime, the NSW Main South Line, having reached Gunning in 1875 as a standard gauge line, was extended in stages, to reach Albury in 1881 by the NSW Engineer-in-Chief, Mr. John Whitton. The first intercapital city express commenced on 20 August 1883 and took about 20.5 hours to cover 920 km, with a change of train due to the break of gauge at Albury (north bound) or Wodonga (south bound). In 1886, all passengers changed at Albury.

Improvements were made to give an 18 hour journey by the 1890s [2]. During the late 1890s, several grade easing projects were undertaken, including at Werai (1897) Breadalbane-Cullerin (1896), Gerogery (1897), Frampton (1898), Demondrille (1900) and Morrison’s Hill (1900). By 1908, a 15 hour “limited” Sydney - Melbourne train service was offered.

The 20th Century major Sydney – Melbourne upgrades include:
*During the 1910 and early 1920’s, the programme of duplications and deviations between Picton and Cootamundra.
*During the 1940s, Cootamundra - Junee duplication including the Bethungra Spiral.
*Opened in 1962, the Albury to Melbourne standard gauge line with CTC signalling.

It is of note that the Albury to Melbourne standard gauge line cost was met by a Federal grant along with and Federal loan funds to NSW and Victoria that are due to be repaid by 2012.

Other upgrading work during the early 1980’s includes installation of CTC signalling between Junee and Albury (with Federal loan funds), and, the introduction of "transition curves" prior to the introduction of the XPT. During the early 1990s,
deferred bridge and other maintenance as well as "rectification" of the Bethungra Spiral took place under the Keating Government’s "One Nation" programme.

However, the main construction work on the Sydney - Melbourne corridor since 1962 has been the reconstruction of 86 per cent of the Hume Highway to modern engineering standards with dual carriageways. This was mostly facilitated by full Federal funding of the National Highway System introduced in 1974 by the Whitlam Government. In today’s terms, this is over $5 billion of Federal grants. This has resulted in an increase in road’s modal share of line haul intercity land freight between Sydney and Melbourne of about 50 per cent in 1970 to about 89 per cent.

Rail passenger services have also suffered a loss of modal share. During the 1950s, rail was faster than buses for a Sydney - Melbourne journey and could command a premium fare. A generation later, in the early 1980s, buses using an upgraded Hume Highway were doing well at the expense of rail. However, by the 1990s, air was winning passengers from both rail and buses.

The period from the 1970s to date is also notable for the production of numerous and detailed reports examining ways to improve the existing Sydney – Melbourne railway [3]. We shall consider these reports, present plans and options in more detail in later sections.

2. DUPLICATIONS AND DEVIATIONS

A vital function of the Sydney-Albury line in its earlier years was to bring wheat and wool traffic from the Riverina region to Sydney rather than have such freight go to Melbourne by rail or South Australia by boats on the Murray River [4]. By the early 1910s, traffic had built up to the extent that the NSW Parliament was concerned with delays, and a Royal Commission in 1912 recommended immediate duplication of the line from Picton to Junee. In response to this pressure, the construction of new country lines was suspended to advance the duplication work which was regarded by the Chief Commissioner for NSW Railways in 1914 [5]"... as one of the most pressing matters of state interest at the present moment".

Work continued during the First World War (in spite of the shortages of men, money and materials), not only to duplicate the track from Picton to Cootamundra, but also to introduce a series of deviations to ease ruling gradients for loaded northbound trains from 1 in 40 to 1 in 75 (or 1 in 66 when compensated for curvature). This work was completed in stages (e.g. Mittagong to Goulburn in 1915) and also included a major deviation from Picton to Mittagong (completed in 1919) to ease ruling grades for south-bound trains from 1 in 30 to 1 in 75. Further grade easing for north-bound trains and duplication between Cootamundra and Junee (with the Bethungra Spiral) was completed in 1946.

Table 1  Main South Deviations 1912-1922

<table>
<thead>
<tr>
<th>Location of deviation</th>
<th>km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picton-Mittagong</td>
<td>5.67</td>
</tr>
<tr>
<td>Werai</td>
<td>0.83</td>
</tr>
<tr>
<td>Marulan</td>
<td>0.10</td>
</tr>
<tr>
<td>Razorback-Gunning</td>
<td>4.86</td>
</tr>
<tr>
<td>Gunning</td>
<td>0.76</td>
</tr>
<tr>
<td>Jerrawa</td>
<td>0.93</td>
</tr>
<tr>
<td>Mundoon</td>
<td>1.58</td>
</tr>
<tr>
<td>Goondah</td>
<td>1.22</td>
</tr>
<tr>
<td>Harden</td>
<td>0.64</td>
</tr>
<tr>
<td>Wallendbeen-Jindalee</td>
<td>2.85</td>
</tr>
<tr>
<td>Cootamundra-Frampton</td>
<td>1.74</td>
</tr>
<tr>
<td><strong>Total</strong> (with other minor work)</td>
<td><strong>24.6</strong></td>
</tr>
</tbody>
</table>

Reference [2]

As observed [4,6] the 1910's alignment between Goulburn and Yass requires modern super freighters to take more time and use more fuel than they would on the 19th Century track built by Whitton in the 1870s. By way of example, the section between Goulburn and Yass was extended in length from 84.6 kilometres to 93.1 kilometres as a result of duplication and deviations. The "new" alignment had a total of 39 curves of radius 400 metres (20 chains) or less (with 7 curves as tight as 280 metres). On the other hand, the Whitton alignment it replaced had a ruling curvature of 400 metre radius applying at only 7 curves. Indeed, M - Train simulation [4] showed that a modern superfreighter moving over the 19th century alignment would give transit time savings of 12 cent per kilometre per passenger and fuel savings of 12 per cent when compared with the present track. Apart from completion of the Bethungra spiral in 1946, there was no further notable easing of grades.

2.1 From Cootamundra to Junee

On 8 March 1942, double track from Cootamundra to Frampton was opened [2]. Near Frampton, a one mile (1.6 km) section of the original Whitton line that had been used between 1878 and 1898 with a 1 in 40 gradient was reinstated. Later in 1942, double track was opened between Bethungra and Junee. The Bethungra Spiral for north bound traffic was opened on 15 July 1946 (with an increase of length of about 2.8 km).

This then resulted in an easing of the ruling gradient for north bound trains (which was the predominant direction for freight tonnages) being eased for the most part from 1 in 40 to 1 in 66. However, south bound trains faced a ruling gradient of 1 in 40.
3. STANDARD GAUGE AND UPGRADING
Gauge standardisation could be the subject of a paper in its own right [7]. After a Royal Commission in 1921 and Sir Harold Clapp producing a definitive report in 1945, both advocating extensive gauge standardisation, it took a 1956 report of a Federal Parliamentary Committee chaired by the late Bill Wentworth to set the scene for Albury - Melbourne. This was one of three major projects; Albury - Melbourne (completed as a new line in 1962), Kalgoorlie – Perth (completed in 1968), Broken Hill – Port Pirie (completed 1969 but intended in 1956 to be the first of the three projects).

This new standard gauge line, allowing for through running of Sydney – Melbourne trains, gave an immediate boost to traffic. Freight was able to grow at about 8 per cent per annum during the 1960s [8] and new passenger trains (Spirit of Progress and The Southern Aurora) were well received.

However, within a decade, the gains were beginning to be difficult to hold. Air travel was becoming more affordable, whilst larger trucks on improved roads were gaining freight at the expense of rail.

3.1 The 1970s
During the 1970s, two moves to improve Sydney – Melbourne train services were of note. Within the then Public Transport Corporation, and in the late 1970s, ways were being examined to reduce Sydney – Canberra and Main South passenger train times. This included consideration of a rail deviation with the then NSW Department of Main Roads, who, with full federal funding, were building a new Campbelltown – Mittagong dual Hume Highway (opened in 1980). However, this rail deviation did not proceed. Later, it was decided to purchase XPT sets based on an English High Speed Train.

The second, arising from a personal interest of the Hon. Gough Whitlam as Prime Minister (1972-75), was to initiate modern 25,000 Volts AC electrification between Sydney and Melbourne. Studies undoubtedly assisted by high oil prices in the late 1970s, continued, leading to a report [9] and an offer in 1980 by the Fraser Government to electrify the Sydney - Melbourne railway. Neither the NSW nor Victorian Governments, or their conservative rail systems, favoured the proposal and it did not proceed. However, this technology was introduced into Queensland in 1979 for the start of 25,000 Volt electric train services for Brisbane.

Years later, with no progress on either Sydney – Melbourne electrification or upgrades, contrasting with real progress in Queensland, the situation was well expressed by Mr. Whitlam "Nowhere in the world are two cities as large as Sydney and Melbourne are linked by so poor a railway" [10].

3.2 The 1980s
A Bicentennial High Speed Rail proposal was made in the early 1980s by the Institution of Engineers, Australia to include a new T-Line between Goulburn and Yass, with a spur to Gungahlin in North Canberra. A recent account of this and other proposals is given by the Railway Technical Society of Australasia [RTSA - 11]. Again, neither the NSW Government nor State Rail showed any real interest. However, the State road authorities were quick to see that there was an Australian Bicentennial Road Development program in place that was well funded by the Federal Government.

Also in 1981, a report [12] considered in some detail the costs and benefits of easing the 1 in 40 ruling grade for south bound trains, and considered regrading to 1 in 55 with some curve easing offered the best return.

The general decline of intercity rail in Australia in the face of overseas success (eg, the Tokaido Shinkansen in Japan from 1964 and the French TGV since 1981) encouraged the CSIRO in 1984 to propose a Very Fast Train or VFT. With some private sector support offset by any enthusiasm the Federal, NSW and Victorian Governments, the proposal proceeded to a prefeasibility study prior to the study's termination in 1991 [13].

During 1988, a definitive report regarding the reduction of Sydney to Melbourne freight train times was written within the State Rail Authority [4, 14]. Apart from suggestions such as avoiding a crew change at Goulburn, the measures proposed have been recommended many times since. Some of the recommendations follow.

Stage 1
Use dedicated Superfreighter loco drivers.
Remove a crew change at Goulburn.
Use two locos right through from Chullora - Dynon
Increase Speed Board indicated speeds.

Stage 2
Improved station yards at Moss Vale and Junee.

Stage 3
Upgrade Victorian track from Melbourne to Albury.
Construct a new entry to Chullora terminal.
Build deviations: Cullerin Ranges and Bethungra.
Upgrade Albury - Junee.

Stage 4
Realign and upgrade Moss Vale - Junee track.
Increase axle loads to 25 tonnes.
Build a new goods line Liverpool - Chullora
Build new terminals at Chullora (or Enfield) and Dynon.
Some 17 years later, Sydney - Melbourne superfreighter transit times are now about 14 hours, and most of these goals are still to be implemented. Completion of all stages was anticipated by the report to give a 9 hour transit time.

In the late 1980s, there had been ongoing interest and media comment on investigations by a consortium examining the Sydney - Canberra - Melbourne VFT as above. State Rail then joined with V/Line Freight to conduct a Fast Freight Train (FFT) study with two reports in 1989, one from a High Speed Rail Engineers group on the FFT in the other from 1989 McLennan Magasanik with a Market Feasibility study (see [3] for references to these reports).

3.3  The 1990s

Apart from the formation of National Rail in 1992, and the application of National Competition Policy to rail starting in 1995 (with rail-rail competition on the East-West corridor), for the Sydney - Melbourne railway, the main result of this decade was some deferred maintenance being undertaken during 1992-95. This was by National Rail under the “One Nation” $450m programme. However, it was patch up and the NSW Government and State Rail lost funds due to a lack of detailed planning.

During the 1990s, many more reports and proposals (but not detailed firm plans) were prepared. Those concerned wholly, or for a good part with the need to upgrade Sydney – Melbourne railway follow.

1990 State Rail study re Curve Straightening
1991 National Rail Freight Initiative (NRFI)
1991 Jacana Study
1993 ERDC project report
1993 BTCE economic evaluation
1994 NRC Railway Infrastructure Plan
1994 Examination of the 'Wentworth Route'
1995 BTCE Report for the NTPT
1995 Sydney - Canberra Rail Corridor
1995 Bureau of Industry Economics
1996 Intercity land freight transport
1998 Maunsell report on Operational Standards
1998 'Tracking Australia'
1988 NSW Public Works Committee 'The tilt train'
1998 Booz, Allen and Hamilton, report
1999 Project 11 report

Reference: [3]

In addition, during the mid 1990s, the earlier VFT proposal was revived for the Sydney - Canberra sector as Speedrail. Despite the Howard Government talking up the proposal in August 1998 [3], it did not proceed. In place a major study was commissioned by this Government into Very High Speed Trains which basically found such trains were unable to be afforded. The study was restricted to trains at speeds operating at or exceeding 250 km/h. This effectively excluded the successful Queensland approach of straightening the existing track for faster and heavier freight trains with passenger tilt trains [11], and, the approach used by Amtrack on the Boston - New York - Washington existing rail corridor for their Acela trains.

3.4  The present decade

In May 2001, the Australian Rail Track Corporation (ARTC) released a definitive Track Audit [15]. This included a list of Main South Specific Works follows with a view to reducing Sydney Melbourne freight train transit times from 13.5 hours to 10.5 hours. This Track Audit includes reports by Booz.Allen & Hamilton, a final report by Maunsell McIntyre Pty Ltd (MMPL) ‘Interstate Rail Network Study - Improvements in Superfreighter Performance: Sydney - Brisbane and Melbourne - Sydney’, and a report on the Inland Route by Arup - TMG. As well as discussing basic track upgrades as a minimum freight market improvements (an S1 scenario) and recommending a system wide optimised investment of $507 million under a So scenario, the Track Audit outlined significant track improvements as an S2 "stretch" target scenario.

It took until June 2004 for the NSW Government to formally agree to transfer its mainline interstate track to the ARTC for a 60 year lease. This was assisted by the Federal Government's new AusLink programme [16] with the 2004 Federal Budget providing a grant of $450 million towards the Sydney - Brisbane line, to include some track straightening.

The ARTC lease commenced on 5 September 2004. In February 2005, an initial upgrading strategy was released. This included rail deviations between Sydney, Melbourne and Brisbane. On 31 May 2005 at an industry briefing, the ARTC released its revised investment strategy. However, rail deviations were deferred [17].

By August 2005, the ARTC [17,18] projected that by 2009, with upgrades costing $730 million and excluding deviations, Sydney – Melbourne transit times for 1500 metre freight trains will be 10 hr 40 min (11 hr 10 min for 1800 m trains), with capacity and reliability improvements, and by 2015, rail should have lifted its modal share of Sydney – Melbourne freight from 11 per cent to 19 per cent.

The proposed Sydney – Melbourne upgrades include: [18]
A 36 km dedicated Southern Sydney Freight Line, Concrete resleepering on curves of radius 810 m or less,
Signalling upgrades,
More refuges and crossovers,
A new bridge over the Murrumbidgee River,
Some 16 new passing lanes with 220 km of track between Junee and Melbourne, and,
New track etc in the Melbourne area

Reference: [17]

3.5 Main South Deviation proposals
As noted above, post World War II deviation proposals go back to the 1970s. Many have been studied, restudied, with results recycled into new reports. The ARTC Track Audit [15] noted many of these proposals, including three major NSW Rail Deviations as follows.
Glenlee - Mittagong (Wentworth)
Goulburn - Yass (Centennial)
Bowning - Frampton (Hoare)

The Wentworth deviation was proposed by the Hon Bill Wentworth [19], the Centennial deviation was a version of the earlier Bicentennial proposal noted above, and the Hoare Deviation was noted [15, Project 5.22, p 65] as 93.3 km of new construction between Bowning and Frampton and suggested by Mr John Hoare of Concord CE Pty Ltd (and former Westrail CCE) to the University of Wollongong. It would save about 23 km in route length with superf Freighters and some 51 minutes. Further discussion of this deviation (rated as an S2 Project) and a shorter Bowning - North Cootamundra deviation is given by the RTSA [11]. The various proposals were noted in 2004 by the Australian Transport Council [20].

As well, the ARTC Track Audit [15, p63] noted four smaller rail deviations near Maldon, Werai, Cullerin and Harden together with the construction of realignments at 12 locations. These works were then costed at less than $5 million per minute of travel time saved.

The combined length of deviations from Menangle to Aylmerton (initially Yanderra), Breadalbane to Yass, and, Bowning (initially Illalong Creek) to Cootamundra is 164 km and they would replace 219 km of track on "steam age" alignment [21]. Consideration is also recommended to two further deviations: Werai to Penrose, and to bypass the Bethungra Spiral. In total, the five deviations would require construction of 197 km of new track, and replace about 257 km of 'steam-age' alignment which require trains to traverse about 50 circles of curvature. The benefits for a 'reference' intermodal freight train with 3 NR locomotives include a time saving of 105 minutes, a fuel saving of about 2000 litres of diesel. There are also appreciable train and track maintenance savings and a reduction in net external costs from inter-city land freight.

3.6 Other deviations
The recent failure to date to even start construction work on just one Main South deviation stands in contrast to the extensive Queensland Main Line Upgrade between Brisbane and Cairns.

From 1992 to 1997, Queensland Rail undertook a MainLine Upgrade (MLU) between Brisbane and Cairns. This included 120 km of high quality rail deviations with easy grades and curves. The work supplemented about 40 km of deviations between Nambour and Gladstone undertaken as part of Queensland's Main Line Electrification project completed in 1989. The MLU allowed improved rail freight services to and from North Queensland [including livestock trains]. It also facilitated the rail transport of fruit and vegetables from North Queensland to the Sydney and Melbourne markets. In November 1998, Queensland Rail introduced a highly successful electric passenger tilt train service between Brisbane and Rockhampton.

Concise reasons for proceeding with the Queensland MLU Project were given by Project Manager Mr R. Hunter [22]: "Without substantial upgrading, the quality of rail freight services possible could not keep pace with the quantum improvements enjoyed by our major competitor, road transport. ...The Mainline Upgrade Project is targeted at improving services and picking up market share, and reducing the costs of providing these services to enable rail to compete more effectively on price."

Subsequently, further deviations were constructed at Mackay, with extensive concrete resleepering. After many years of study, approval was given on 29 August 2005 to duplicate the Caboolture - Beerburrum track on an improved alignment by 2009, and to proceed to Beerburrum - Landsborough, at a total cost of about $450 million.

Other recent Australian examples include the recently completed new track on the Ballarat line as part of Victoria’s Regional Fast Rail project. During the 1960s, gauge standardisation between Perth and Kalgoorlie in the 1960s included a dual gauge route through the Avon Valley from Midland to Northam, with high clearances and easy ruling grades. This replaced an older section with steep grades and poor alignment, and assisted in reducing Kalgoorlie - Perth freight train times from 31 hours to 13 hours. Today rail wins 81 per cent of interstate freight in and out of Perth. This would be impossible on the old track.

Overseas examples include the 8 km Kaimai tunnel in New Zealand opened in 1978 that brought a 'dramatic' increase in traffic and assured a good future for the Port of Tauranga. Further rail deviations were built during the 1980s associated
with electrification of part of the NZ North Island Main Trunk. As well, Canadian Pacific’s Roger’s Pass Project completed in 1989 with its 17 km tunnel and earlier deviations gave CP a ruling gradient of 1 in 100 for west bound freight trains to Vancouver. The Roger’s Pass Project cost CP over $500 million.

All of these deviations have been good investments. In general, the benefits of replacing sub-standard alignment include:
- Reduced point to point distance.
- Faster and heavier freight trains and improved rail passenger services.
- Transit time, fuel and less brake wear savings to train operators.
- Reduced track maintenance costs.
- Reduced road accidents involving heavy trucks due to rail’s ability to more effectively compete with trucks.
- The potential for elimination of level crossings, flood mitigation, and improved clearances.

In short competitive trains need competitive tracks [23]. As well, as noted by the surveyor of the Alice Springs-Darwin railway, Mr D Smith [24] “The simple fact is that there is no profit in putting fuel in the tank, and maintaining track, that takes you at right angles to the direction you really want to go.”

### 3.7 The cost of present deficiencies

By way of contrast to the Queensland gains, the One Nation interstate track work of the early 1990s included only two minor deviations north of Grafton to ease grades.

As noted by the South Australian Minister for Transport, the Hon Diana Laidlaw MP [25] in a keynote speech to a Rail 2000 conference in 1995 "The Adelaide-Melbourne standard gauge program has been done on the cheap - the sharp curves and grades through the Adelaide Hills remain as an impediment to efficient operations. ... The Albury-Sydney line retains its steam alignment and the Sydney to Brisbane line remains the most difficult line in the country to operate, despite the high level of freight traffic between the two Pacific seaboard capitals."

As observed by the ARTC [18], Sydney - Melbourne intercity general freight tonnages are now about 11 mtpa with rail winning only about 11 per cent of this (as opposed to about 50 per cent in 1970). The low share for rail reflects the substandard nature of the track, the rebuilding of 86 per cent of the Hume Highway to modern engineering standards (at a cost to date exceeding $5 billion in todays terms) with arguable and appreciable 'highway subsidisation' of line haul road freight [3].

However, the over-reliance on road freight, with over 3000 intercity trucks on the Hume Highway some nights, comes with significant external costs. From data supplied by the NSW Roads and Traffic Authority and Vic Roads, during the 4 years to 31 December 2003 articulated trucks were involved in 38 fatalities (35 per cent) out of a total of 108 fatalities in road accidents on the Hume Highway in both states.

External costs of road and rail freight in both urban and non-urban areas were addressed in the ARTC Track Audit [15]. These estimates have recently been revised [26] as 2000 costs of 2.75 cents per ntkm for road haulage in urban areas, 1.98 for road haulage in non-urban areas, 0.43 for rail haulage in urban areas, and 0.17 for rail haulage in non-urban areas. These costs, adjusted to 2005 values (at 3 per cent pa) suggest that, for intercity freight moving between Sydney and Melbourne by road diverted to rail line haul, with road pick up and delivery, there is a net reduction of external costs of about $16.70 per tonne. This assumes a road distance of 840 km, a rail distance of 940 km, urban hauls of 50 km for each line haul mode, plus a total of 50 km urban road pick up and delivery for each rail line haul. The external cost for each tonne of road hauled intercity freight is about $19.80 as against $1.70 per tonne for rail line haul and $1.40 per tonne for road pick up and delivery.

With an estimated 9.8 million tonnes of line haul Sydney - Melbourne intercity freight on the Hume Highway during 2005, the estimated external costs are approximately $164 million.

### 4. THE FUTURE

Both the Australasian Railway Association [27] and the ARTC have anticipated significant train operational and economic benefits from the relatively modest upgrades now committed. Further benefits would result from more intermodal terminal capacity within Sydney.

However, using BTRE forecasts [28] by 2015, Sydney - Melbourne intercity freight will have grown to about 15 mt. Thus an ARTC projected 19 per cent modal share for rail by 2015 will lead to an increase of 2 mtpa of intercity line haul road freight on the Hume Highway. Moreover, it is probable that by 2015 with completion of the Albury Bypass and construction of dual carriageways for the remainder of the Hume Highway, B-Triple trucks will be running between Sydney and Melbourne.

For rail freight to be competitive on this corridor with trucks, some track straightening will be required. As discovered by the NSW Roads and Traffic Authority in their upgrades of the Hume Highway and the Pacific Highway, it does take time
to plan, assess environmental impacts and acquire land for major road deviations. But the road builders take this advanced planning very seriously. It is recommended that rather than wait for the results of the North - South Rail Corridor study, the ARTC make a serious start on advanced planning of North - South rail deviations this year.

In a world of higher oil prices coupled with competitively neutral access charges for rail and road plus the construction of about 200 km of new track between Menangle and Junee to modern engineering standards, rail could aspire to a 50 per cent modal share of Sydney-Melbourne freight [21]. Currently, Sydney-Melbourne line haul road freight uses an estimated 19 litres of diesel per tonne of freight as opposed to about 7.5 litres for line haul rail freight, which would reduce to about 6.5 litres if the 200 km of new track was built. The difference, allowing for road pick up and delivery when rail line haul is used if rail was now winning 50 per cent of freight is about 50 million litres of diesel on 2005 tonnages. Rail electrification, as proposed by the Federal Government in 1980, would give further savings.

5. CONCLUSION
The 50 year period from 1912 to 1962 saw three major upgrades of the Sydney - Melbourne Railway. The period 1962 to 2005 has seen no major upgrade.

By way of contrast, the Hume Highway has been reconstructed for 86 per cent of its length to modern engineering standards and road now gains an estimated 89 per cent of the Sydney - Melbourne intercity general land freight market.

The over-reliance on road freight comes with significant external costs. These costs are currently estimated at over $160 million per year.

The ARTC $730 million programme now underway to upgrade the Sydney - Melbourne railway will give some benefits.

However, advanced planning of rail deviations should now commence with a view to starting some actual construction by the end of this decade. Reconstruction of about 200 km of new track in five locations would reduce point to point distance by 60 km, remove the worst of the “steam age” alignment and give significant benefits to Sydney - Melbourne intercity freight.

The recommended track upgrades would also support an improvement in Southern NSW regional rail passenger transport. This would complement the successful Queensland electric tilt train service and the new new Victorian Regional Fast Rail Project [11,29].

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