Improving land freight transport efficiency in Australia

Philip G Laird

Senior Lecturer
Department of Mathematics
Wollongong University

Abstract:

Australia's land freight task is outlined along with the present external costs of road freight and subsidies to interstate rail freight operations. If the mainline rail tract alignment in South East Australia was upgraded to Fast Freight Train standards, and an efficient rail network was to win 70 per cent of the freight on the major interstate transport corridors, there would be a reduction in total transport costs of some $200 million a year. There would also be an annual saving of about 200 million litres of diesel fuel, with reductions in emission of Greenhouse gases.

Department of Mathematics
University of Wollongong
Wollongong NSW 2500
Telephone: (042) 270 421 / 270 130 Fax: (042) 297 768

Introduction

The need to reduce the total costs of land freight transport in Australia is clear, and ranks in importance with reducing the costs of coastal shipping and waterfront activity.

From Table 1, it may be seen that Australia's land freight task has grown eight fold since 1950. Road transport's freight task has since increased ten fold and its modal share of domestic surface transport on a tonne kilometre basis has increased from about 23% to about 34 % in 1987-88. Whilst Government rail was the dominant land transport mode in 1950, its modal share of surface transport has since fallen from about 31% to less than 19% in 1987-88. Rails loss of modal share in Australia is in common with overseas countries (Bureau of Transport and Communications Economics, 1990) and is highlighted on the important Sydney - Melbourne corridor where despite land freight almost doubling from 1964-65 to 1985-86 at 5.9 million tonnes, rails modal share for land transport on this corridor fell from about 57% in 1964-65 to about 23% in 1985-86.

The growth of the road freight industry in Australia is in common with other Western countries, and in part is due to a much improved road system. Current expenditure on the Australian road system extending over some 800,000 kilometres is over $4000 million a year (BTE, 1988). Over $5000 million has been spent on the 16,000 km National Highway Network since its inception in 1974 allowing for substantial improvements; as an example, Sydney Melbourne driving time on the Hume Highway has been reduced from 15 hours to 10 hours. A further $4000 million for National Highway and National Arterial road development is to be allocated over the next five years. Other factors generally recognised as contributing to the growth of the road freight industry (Lonie, 1980, McDonell, 1980, BTE, 1984a, May et al, 1984, EPAC, 1989 and others) include: ability to deliver door to door, the inter-state operation of trucks in a relatively unregulated regime since 1956 followed later by intrastate freight transport deregulation in most states, the development of a freight

Table 1 Australian domestic freight transport: Billion tonne kilometres

YEAR	Road	Government Rail	Non Govt Rail	Sea	Total
1950	8.2	10.9	0.4	16.1	35.6
1970-71	27.3	25.2	13.8	72	138.3
1987-88	91	49	30	96	266

Sources: P.J. Rimmer (Gilmour, 1978), Inter-State Commission (1987b) and Bureau of Transport and Communications Economics (1989). Note that these figures are not always directly comparable between years.

forwarding industry, problems in the railways, improvements in articulated truck technology allowing for heavier loads and faster speeds, and low road cost recovery. A chronic overcapacity in the number of heavy truck owner-drivers has also allowed for low cost trucking services.

The fully distributed financial cost (including terminal, vehicle, running and overhead costs but excluding road system costs) of providing long distance interstate trucking services was found by the Inter-State Commission (1987b) to be $1290 million for a 20 billion tonne km freight task for 1985-86; an average of about 6.5 cents per net tonne km.

In the late eighties, road freight productivity was further increased in Australia with relaxation of mass limits allowing a six axle articulated truck to raise its Gross Vehicle Mass (GVM) from 38 tonnes to 41 tonnes in most states by 1987 (Dobinson, 1988), and 42.5 tonnes in all mainland states by 1989. Most states have now moved to allow B-Trains or "B-Doubles" with a length of 23 metres and a maximum GVM of 59 tonnes to operate on selected high standard roads under permit. There has also been an improvement between the states of uniformity of road vehicle regulations affecting trucking (ISC,1988a and EPAC,1989), and deregulation of grain transport. Further road freight growth activity is expected, with the Bureau of Transport Economics (1987b) having projected a 150 BTKM freight task for articulated trucks by the year 2000.

There are no fewer than five different Government rail systems: the Federal system, Australian National and State Government systems in four states; Queensland, New South Wales (State Rail), Victoria (V/Line) and Western Australia (Westrail). Australian National was formed in 1975 from the former Commonwealth Railways, South Australian Railways (with the Adelaide metropolitan system remaining with the South Australian State Government) and the Tasmanian rail system.

Overall, rail track improvements in South East Australia (including the States of New South Wales and Victoria and the cities of Adelaide and Brisbane) have not matched road improvements. Long distance rail freight operations in South East Australia are hindered by some mainline line track with "steam age" alignment and no fewer than three different rail gauges (narrow, 1067mm; standard, 1435mm; and broad, 1600mm).

Up to 1962, standard gauge track was restricted to New South Wales with extensions to Canberra in the Australian Capital Territory and South Brisbane in Queensland along with an isolated section from Port Pirie in South Australia to Kalgoorlie in Western Australia. Standard gauge was extended with Commonwealth assistance from Albury to Melbourne in 1962, and from Perth to Kalgoorlie and Port Pirie to Broken Hill in the late sixties (along with extensive reconstruction giving easier grades and curves). A new standard gauge route was constructed to Alice Springs in 1980, and standard gauge freight operations were extended from Port Pirie to Adelaide in 1982.

As of 30 June 1988, Australia had a total of some 37,840 route kilometres of Government rail track. This comprises some 16,000 km narrow gauge, 15,160 km standard gauge and 6680 km broad gauge (based on figures from Railways of Australia (1989) that include 177 km of dual gauge route in Western Australia).

ARRDO (1981) noted that Australia's main line rail system then comprised some 22,440 route kilometres of track, including major export routes, connections between capital cities, and extensions to major ports. Despite the improvements noted above, this mainline track has many significant deficiencies as noted, for example, by Lonie (1980), ARRDO (1981), Nayda et al (1984) and the Inter-State Commission (1987a, 1989b). These include the lack of standard gauge access to major ports at Melbourne and Brisbane, and all mainline interstate routes east of Parkes (NSW) and Adelaide being incapable of taking intermodal traffic such as trailers on flat cars or double stacked containers because of obstructions such as narrow bore tunnels or low overbridges. These same mainlines are also subject to freight train weight restrictions because of steep ruling gradients, and speed restrictions because of tight track curvature in many locations. The Commonwealth Grants Commission (1988, Vol 2 Table B1) noted in 1978 that for the four State Government systems, 11% of the track kilometres were on grades steeper than 1 in 60, and 10.9% of track had curvature less than 600 metres. These features limit rail freight productivity and hence result in higher freight rates to users (or higher rail freight deficits); they also increase transit times.

During the eighties, grade and curve easing of older coal railways serving ports at Gladstone and Mackay took place. Queensland also completed a mainline electrification project in 1989 with over 2000 kilometres of track electrified at 25,000 volts A.C. at a cost of $1090 million. The project has enabled electric traction of coal and wheat trains in Central Queensland and along with grade and curve easing improved general freight and passenger train operations between Brisbane and Rockhampton. The entire electrification project has resulted in reduced costs for locomotive maintenance and improved locomotive and wagon turn around times along with a saving of 128 million litres of liquid fuel a year (Read and Drake, 1989).

The recent improvements in Queensland track alignment are similar to those overseas including New Zealand's North Island Main Trunk line. Such improvements are now necessary for much mainline rail track in South East Australia in order to gain maximum rail productivity and reduced freight transit times.

The need for change

In this section, we identify three main areas where there is increasing economic and other pressure to lower Australia's freight transport costs. These are:

1. The high external costs presently associated with road freight,
2. Better management of intersystem rail freight so as to improve its quality of service and financial performance, and,
3. Conservation of liquid fuel and reduction of Greenhouse gases.

Each factor could lead to rail assuming a greater share of Australia's freight task.

Road freight external costs

The main external costs of road freight are the under recovery of road system costs, the cost of road crashes involving heavy trucks, road congestion, and air pollution.

Earlier references to hidden subsidies to the road freight industry (through the under-recovery of road system costs) include Wentworth (1956), Bland (1972) and McDonell (1980). More recent references by Government agencies and inquiries to road cost recovery from heavy vehicle operations in Australia include the Bureau of Transport (and Communications) Economics (1984a, 1988a), May et al (1984), the Inter-State Commission (1986, 1987b, 1990), the Industries Assistance Commission (1986, 1989), McColl (1988), the Business Regulation Review Unit (1988), and the House of Representatives Standing Committee on Transport, Communications and Infrastructure (1987, 1989). Of these references, all but one (McColl, 1988) found significant under recovery of road system costs from heavy truck operations. On the other hand, the Bureau of Transport and Communications Economics (1988a) estimated that all articulated truck operations failed to cover their fully allocated road costs when offset by all registration charges and all fuel taxes by some $1283 million in 1985-86, and noted the option of weight distance taxes. This economically efficient form of road user charge for heavy trucks has been in successful use in New Zealand since 1978 (see ISC, 1986,1987b and Laird, 1987).

Recent improvements in road cost recovery in Australia include the introduction of the Federal Interstate Registration Scheme in January 1987 with increased fees as of July 1988, and the introduction by New South Wales and Victoria in 1987 of permit fees for vehicles operating at increased mass limits. However, large hidden subsidies remain, with an upper mid range estimate to road system costs attributable to articulated truck operations of approximately 1.5 cents per net tonne kilometre at present.

Other external costs of heavy vehicle operations are also considered by McDonell (1980), Bureau of Transport Economics (1984a, 1987a), May et al (1984), Inter-State Commission (1986, 1988b, 1990), and Laird (1987). The annual costs of all road crashes in Australia are $5700 million (EPAC,1989), and the cost of those involving heavy vehicles in NSW has been estimated by the NSW Roads and Traffic Authority in 1989 as $218 million a year (Staysafe, 1989). Further analysis shows that the average NSW road crash cost of freight moved by articulated trucks is about 0.5 cents per net tonne km

A sharp increase in the number of fatal road accidents involving articulated trucks on NSW roads in 1988 followed by the loss of 250 lives on NSW roads in crashes involving heavy vehicles in 1989 (including two major crashes on the Pacific Highway) has led the Federal Government to require speed limiters for all new articulated trucks as of 1991. The NSW Government has also stated that it will require the compulsory installation of tachographs in articulated trucks in 1991.

Other costs of road freight activity, such as road congestion and air pollution were also considered by the Inter-State Commission (1990)

Long distance rail freight performance

Most rail freight activity in Australia is the intrastate haulage of minerals and grains to a port. Government rail's intersystem freight task for 1985-86, with the consignment of just over 7 million tonnes at 12 33 BTKM, was then only 25 per cent of the total rail task (ISC,1987b). This was despite improvements to interstate rail freight operations including the introduction of 'Superfreighter' services in 1984 and the formation by Railways of Australia of a National Freight Group in 1985 (ISC,1987a). Estimates of the freight tonnages moved on the ten transport corridors linking Australia's five mainland state capitals for 1987-88 are given in Table 2. These show that although rail carries over 70% of the land transport tonnage on all the intercapital routes to Perth, except Perth - Brisbane, rails share was less than 30% of land freight in the Melbourne-Sydney and Melbourne - Brisbane Adelaide corridors. The total for road for all ten corridors was 11.46 million tonnes for road with 8.16 million tonnes for rail. Whilst interstate rail freight had increased to more than 9 million tonnes for 1988-89, the observation from an overseas view of Nash (1985) that the incursions of road freight transport into the rail market are surprising for a country of Australia's size still holds.

The Inter-State Commission (1987b) noted for intersystem rail freight in Australia for 1985-86, a fully distributed financial cost of $570 million (giving an average unit cost of 4.6 cents per net tonne km) and a revenue of $400 million leaving a shortfall of $170 million. Levels of cost recovery of fully distributed financial costs for intersystem freight

Table 2 Interstate 1987-88 Freight Tonnages and Distances

	Road (Mt)	Rail (Mt)	Road (km)	Rail (km)
Sydney Melbourne	5 09	1.93	880	960
Sydney Brisbane	1 77	1.84	990	987
Sydney Adelaide	0.94	0.7	1430	1656
Sydney Perth	0.2	0.58	3984	3961
Melbourne Brisbane	1.09	0.3	1664	1947
Melbourne Adelaide	1 82	1.47	700	777
Melbourne Perth	0 15	0.53	3420	3350
Brisbane Adelaide	0.22	0.13	2443	2643
Brisbane Perth	0.06	0 04	4320	4948
Adelaide Perth	0.12	0.64	2720	2573

Sources: Laird (1990) based on Australian Bureau of Statistics (1989) data with interstate rail assinged as intercapital city movement and the ABS estimates of intercity road freight doubled as the ABS Interstate road freight statistics are obtained from companies moving more than 20,000 tonnes interstate a year,and,for near compatiability of 1985-86 ABS based data with the findings of the Bureau of Transport and Communications Economics (1990) for 1985-86 road freight tonnages.

ranged from 42% for V/Line to 84% for Westrail (ISC,1987b), with Australian National second at 73%. As well as having good management, Westrail and Australian National also have the nations best intersystem infrastructure in terms of track axle loadings, grades, curvature and clearances.

Although overall rail deficits are often subject for comment, these mostly arise in the provision of passenger services. The Industries Assistance Commission (1989) noted a total rail deficit of $1650 million for 1987-88, and that rail freight deficits now arise mainly in NSW (about $300 million) and Victoria (estimated at some $200 million). Both State Rail and V/Line carry less than car load (LCL) freight with heavy losses. The State Rail Authority of NSW was reviewed by American consultants (Booz-Allen and Hamilton, 1989) with a view to improved performance; also New South Wales and Victorian rail freight operations take place over some track with poor alignment and break of gauge. As well, the freight task performed by Victorian railways at some 3.1 Billion tonne kilometres (BTKM) for 1985-86 (ISC,1987b) is small compared to the 13.7 BTKM 1987-88 ABS estimated freight task for articulated trucks operating in Victoria. V/Lines annual freight task is equivalent to about a weeks work by Canadian National and V/Line's financial performance is depressed compared with other Australian rail systems.

By way of contrast to rail problems in New South Wales and Victoria, Australian National made a slight surplus in 1987-88 on mainland freight operations after allowing for interest and overheads, and Westrail is well advanced towards commercial rail freight operations. This is despite rail finances being affected by under recovery of road system costs from heavy vehicle operations (see, for example, ARRDO (1981), Nash (1985), Curran (1988), and the 1988 Annual Report of Australian National). Queensland Railways assisted by a large coal transport task with efficient low cost operations has had operating profits of about $100 million a year for some years now.

A variety of references (including ARRDO (1981), Nash (1985), ISC (1987a and 1987c), EPAC (1989), IAC (1989), and the Rail Industry Council (1990)) note the importance of quality of service, including reliability, freedom from loss or damage of goods, and quick transit times with these factors in many cases outweighing cost when a decision is being made to send goods by either rail or road. As recommended by the Inter-State Commission (1987a) ". . reduction in transit times on interstate services (should) be a priority of the rail systems. . . ." and ". . that the rail systems develop improved management structures for interstate services" (with this recommendation repeated in connection with landbridging of shipping containers (ISC, 1989a)).

The House of Representatives Standing Committee on Transport, Communications and Infrastructure (1989) found that intersystem rail freight operations would be better handled by a single authority, with some preference for this role being assumed by Australian National.

In 1989, a study was commenced by the National Freight Initiative (1990) comprising Government rail systems, the Commonwealth and major freight forwarders to examine five main options for improved intersystem rail freight operations. Further examinination of options with national integrated operations will be undertaken in 1990.

Conservation of liquid fuels

It is generally recognised that liquid fuel savings may result from the use of rail or sea transport as compared with road transport, with long distance rail freight being approximately four times more fuel efficient than road freight (ATAC,1979). Railways of Australia (1980) noted considerable variation of fuel intensities between interstate routes for rail freight, including 4.2 Litres per 1000 trailing tonne km for Adelaide-Perth, and 10.2 Litres per 1000 trailing tonne km for Sydney-Melbourne: a ratio of about 1 to 2.5. The difference is accounted for in the fact that the Adelaide-Perth track has gentle ruling gradients of 1 in 100 with curves of minimum radius 400 metres, whereas the Sydney Albury track has a steep ruling gradients of 1 in 40 and numerous curves of radius tighter than 400 metres.

Variation in rail freight fuel efficiencies in mainline rail freight operations of a factor of up to four were found in a Bureau of Transport Economics (1981) study, that notes "... The disparity between the efficiencies of different parts of the railway system suggests that there is also considerable potential for lifting the maximum attainable efficiency of some railways by improvements to grading and alignment ...".

Railways of Australia (1980) also showed that if 60% of the total tonnage of long distance freight then being moved by road was diverted to rail, some 85 ML of diesel would be saved each year. A separate analysis by Gentle (1983) showed a diversion of freight from road to rail so that rail had 50% of the non-bulk freight on six major intercapital routes, some 46 ML of fuel per year could be saved on 1983 figures. Using 1987-88 data, and noting recent improvements in both road and rail freight fuel efficiency, Laird (1990) found that if the mainline interstate rail links of South East Australia were upgraded so as to Fast Freight Train standards with easier ruling grades and better track curvature, and rail was to win 70% of land transport on ten main interstate transport corridors linking the five mainland State capital cities, an estimated 200 million litres per year of diesel fuel would be saved.

The Federal Department of Resources and Energy (1986) noted that modal shifts from long distance road transport to rail or sea would be more likely if there was full recovery of road costs due to heavy trucks. Whilst declining self sufficiency in Australia's proven oil reserves and oil industry projections of Australia's oil import bill reaching $5.5 billion by 1998 are reasons for concern, the use of liquid fuel has environmental costs as well, including the production of Greenhouse gases. Thus the views given over ten years ago by the Australian Transport Advisory Council (1979) are still relevant: "Transport is almost wholly reliant on petroleum fuels and there are no widely available fuel substitutes at this time. Nevertheless, rail is relatively energy efficient compared to road for long distance freight ... (and) ... does have fuel substitute options, such as coal-oil slurries or electrification ... As far as possible pricing and cost recovery policies should be consistent across the modes so as to encourage use of modes appropriate to particular tasks. Appropriateness may be defined broadly as minimising the total social cost of transport services, including externalities."

Options for rail freight upgrading

In this section we outline a number of rail infrastructure upgrading options (for more detail, see Laird, 1989). Some, but not all of these options, were considered as part of a package developed by ARRDO as part of a five year programme of rail investment costing $2700 million and yielding good economic returns (Norley and Kinnear, 1983). This package included Brisbane - Rockhampton upgrading that was completed with electrification by 1989; along with the Alice Springs - Darwin proposal, it will not be considered in this section.

The main reason for rail track upgrading is that modern intermodal operations and highly efficient rail operations require good rail infrastructure. Overall, this simply does not exist on the interstate rail links between Adelaide, Melbourne, Sydney and Brisbane. It is recognised that improvements in rail management and productivity, particularly in New South Wales and Victoria will also be required for more efficient rail operations.

Selective rail upgrading in the past has led to increased freight transport efficiency in Australia. One example was reconstruction of the Perth-Kalgoorlie railway as part of gauge standardisation in the sixties coupled with standard gauge access to Alice Springs and Adelaide. This allowed Australian National and Westrail to run 1800 metre long intermodal trains from Adelaide to Alice Springs or Perth. With good levels of service, a high modal share has resulted.

Extension of intermodal rail freight to Parkes : Proposals by Australian National to extend piggyback from South Australia to Parkes in New South Wales were examined by the Inter-State Commission (1987a), and found to be technically feasable with some potential economic and financial benefits. Subsequently, the House of Representatives Standing Committee on Transport, Communications and Infrastructure (1989), noted efficiency gains that could result from measures including on-line locomotive refuelling at Broken Hill and the extension of crossing loops between Broken Hill and Parkes to 1800 metres in length. These measures are now under examination by Australian National and State Rail.

Sydney Melbourne Rail Freight : Sydney and Melbourne are Australia's two largest cities. With adjoining cities such as Newcastle and Wollongong in NSW and Geelong in Victoria, a total of about 7 million tonnes of freight are now moved each year on the Sydney - Melbourne land transport corridor.

As noted above, the Sydney Albury rail track alignment has a steep ruling gradient of 1 in 40 and numerous curves of radius tighter than 400 metres. These factors combine to reduce freight train tonnages and increase train transit times and fuel consumption. There are also deficiencies in clearances from both overbridges and tunnels that preclude the use of piggyback (ISC,1987a).

The Federal Government offered to upgrade and electrify the Sydney-Melbourne railway in 1980. The Institution of Engineers, Australia (1981) then proposed upgrading including new track between Goulburn and Yass (to remove the worst sections of track alignment between Melbourne and Sydney) and a spur line to North Canberra. Neither option was taken up by the NSW and Victoria Governments or their rail systems.

The delay of the State Rail Authority of NSW and V/Line in Victoria to seriously consider improvements to the Sydney-Melbourne rail track alignement undoubtedly encouraged serious examination of a Very Fast Train with a completely new track between Sydney and Melbourne. However, the VFT concept would not be suitable for the transport of millions of tonnes of freight that moves each year between Sydney and Melbourne (VFT Joint Venture, 1989). This challenge could be met by the Fast Freight Train or FFT proposal of V/Line (1989) made in October 1988 that would reduce Sydney Melbourne freight transit times from about 13 hours to 9 hours at a cost of up to $535 million (Sydney Morning Herald, 12/2/90).

Adelaide Melbourne Gauge Standardisation: Adelaide-Melbourne gauge standardisation was considered by Australian National in the early eighties (Nayda, et al, 1985) and again in the late eighties (as reported by the Inter-State Commission, 1989b). One option includes a new route to the north of the Adelaide Hills and conversion of broad gauge to standard gauge track via Serviceton, Ararat and Geelong to Melbourne. At an estimated cost of $305 million, this option would allow for heavier freight trains, a reduction in transit time from 14 to 10 hours, better locomotive and wagon utilisation and double stacking of containers.

Overall broad gauge standardisation option: The problems caused by three rail gauges to rail operations in Australia led to a Royal Commission on the Matter of Uniform Gauge in 1921 and a 1945 Commonwealth report recommending measures including the conversion of all broad gauge track in Victoria and South Australia to standard gauge (Harding, 1958). Intersystem rail freight forms about 50% of V/Lines total freight task (ISC, 1987b), and the Lonie Victorian Transport Study in 1980 considered that interstate rail freight in Victoria had good growth prospects and attention could be given to gauge standardisation to Westernport and Geelong. It is suggested that consideration should again be given to conversion of all broad gauge track in Australia outside of the metropolitan areas of Melbourne and Adelaide (with dual gauging as required within these cities for rail freight movements). Most of the change required would be in Victoria.

It is worth noting that Britain, Canada and the United States converted their broad gauge railways to standard gauge in the eighteen eighties. In each country, after the decision to change the gauge of a line was taken and the necessary preparations made, the actual gauge contraction took place in within a few days.

Sydney Brisbane :The present Sydney-Brisbane standard gauge line was for most of its length originally constructed as a branch line from Maitland to Kyogle, with a standard gauge extension to South Brisbane built to economy standards in the 1920's. Recent improvements include Sydney - Newcastle electrification, new bridges and new signalling. In terms of grades and curvature, parts of the Sydney Brisbane track are generally considered worse than the Sydney Melbourne track. A further limitation is that Brisbane's main port at Fisherman Islands does not have standard gauge access (BTE, 1984b, and ISC, 1989b).

Melbourne Brisbane rail freight : Most Melbourne Brisbane freight moves by trucks (less than 24 hours) along the Newell Highway with easy grades west of the Great Divide. Freight consigned by rail has to go through Sydney and over many hundreds of kilometres of track with steep grades and/or sharp curvature, and takes at least 36 hours. The rail systems have the option of upgrading secondary lines west of the great divide through Parkes, Dubbo and Narrabri, plus dual gauging or gauge standardisation in Southern Queensland to allow an improved rail freight service. This would be more attractive should a tunnel proposed to be built under the Toowomba Ranges (to facilitate coal exports from the Darling Downs) proceed and be constructed with good clearances and have standard gauge or dual gauge track.

New South Wales coal exports : Rail access to a major NSW coal loading port at Port Kembla is mainly by way of Sydney and is subject to curfews on coal train movements during peak hour times and steep ruling gradients requiring four modern electric locomotives to haul trains carrying about 2300 tonnes of coal. (See also CGC, 1988, Vol 2, p C37). Although some 25 kilometres of right of way for a new Maldon Port Kembla railway were constructed along with approach viaducts for a major bridge by 1985, work on a 4 kilometre tunnel was stopped in 1988 by the NSW Government.

Other comment

If rail was to win 70% of land transport on the ten main transport corridors linking the five mainland state capital cities (see Table 2) whilst maintaining its modal share on the corridors linking Perth to Sydney, Melbourne and Adelaide, this would have required the transfer of some 5.76 million tonnes of freight from road to rail based on the 1987-88 figures given in Table 2. In turn, this would reduce the road freight task by 6.1 billion tonne km and increase the rail freight task by 6.7 billion tonne km.

As recognised by the Inter-State Commission (1987a) more line haul freight on rail would give improved land transport efficiency, reduced road wear and tear, and fewer road accidents. Using the costings of this Commission (1987b) quoted above for road, as adjusted for inflation, of 7.5 cents per net tonne km, a 6.1 billion tonne km reduction in road freight would save about $458 million a year of truck operating costs. It would also save about $91.5 million of unrecovered road system costs (using 1.5 cents per net tonne km) and about $30.5 million of road crash costs (using 0.5 cents per net tonne km). The total savings of road transport costs are then about $580 million per year on 1987-88 figures.

The average cost of rail freight over an upgraded long distance line should be able to be reduced to at most 4.5 cents per net tonne km over track upgraded to Fast Freight Train standards. A 6.7 billion tonne km increase in the rail freight task would then incur costs of about $300 million a year. There would also be the cost of pick up and delivery by truck at each end of the line haul, which we take as $110 for each 16 tonnes (based on the cost for each service for a container quoted by Railways of Australia in a 1989 submission to the ISC) giving, for transfer to rail of 5.76 million tonnes a year of road freight, a sub total of about $80 million. The total annual rail based costs are then about $380 million.

Thus there are annual savings of $200 million a year in total transport costs from the upgrading the railways linking Adelaide, Melbourne, Sydney and Brisbane to Fast Freight Train standards, and rail winning 70% of land transport on these corridors along with retaining its existing share in and out of Perth. In addition, reduced rail operating costs of at least 1 cent per net tonne km due to improved track alignment would apply to the present rail freight movement over the existing rail network in South East Australia. Taking a total annual saving of $200 million, and based on a 20 year return and a 10% real discount rate, a capital investment of $1700 million in rail track and other infrastructure upgrading is justified. Whilst this may not be enough to implement all the options described above, further analysis shows that there are potential annual savings of $100 million a year on the Melbourne - Sydney corridor; more than enough to justify Fast Freight Train services between Melbourne and Sydney.

Why then has this investment not taken place so far? In the first place, the above analysis assumes full recognition of all external road freight costs. If these costs continue to be externalised, there is less incentive to make the necessary rail investment.

The second problem is that State Rail and V/Line presently have massive operating losses and indebtedness far exceeding those of the other three Government rail systems in Australia. There are also the needs of metropolitan rail systems as shown by a New South Wales Government five year allocation of $2600 million for all of State Rail's capital works, some $2000 million is for Sydney's City Rail.

The third problem is that Federal funds made available for mainline rail upgrading have been very limited since completion of the new standard gauge line to Alice Springs in 1980. As seen by a Canadian authority (Stevenson, 1987) the Hawke Government "......appeared to attach a lower priority to rail transport than any other Commonwealth Government since the Second World War. It was apparently much more interested in Highway freight transport."

The House of Representatives Standing Committee on Transport, Communications and Infrastructure (1989) noted that in the application of the Australian Land Transport Program from 1985 to 1988, some $1250 million was allocated to land transport, almost all of which was spent on roads, with about $3.5 million spent on rail. The Committee also noted that of some $118 million collected from the five Government rail systems in Federal fuel excises in 1987-88, about one third was hypothecated to road funds whilst the balance was paid to consolidated revenue. Noting the replacement Australian Centennial Roads Development program also provides for the diversion of rail fuel taxes to road works, the Committee recommended (with legislative changes if need be) to ensure that a percentage of the fuel excise rail systems pay to the Federal government should be available to them for infrastructure improvements, and to compensate for the detrimental position rail systems have been in, the component of the excise each has paid to road funds should be returned to them.

In general terms, the Committee (1989) considered ". . . that a greatly increased amount of freight could be carried across the continent more efficiently and with greater safety than it ever could be by road. Road has been preferred because it is seen as providing reliable transit times. If rail were more efficient and carried the amount of freight it should, lives would be saved, less non-renewable resources would be used and less pollution would be generated. For rail to become more efficient, money has to be spent upgrading such things as the permanent way, communications and terminal facilities and providing more and purpose-designed rolling stock. The case for one national rail system for freight and passenger services is obvious."

In this regard, if the proposed National Freight Initiative does not proceed to the formation of a new single interstate freight organisation, there appears to be a strong case for an extension of Australian National's operations with this including a merger with V/Line.

Conclusions

As Australia's land freight task continues to grow, it is imperative that if becomes more efficient without imposing undue and external costs. The Federal Government has assisted in the improvement of roads and road transport, it now has the option of seeking to improve rail freight efficiency with measures including selected upgrading of rail track alignment and further gauge standardisation.

More attention should be paid to the costs and benefits of improvements to axle loadings, grades, curvature, and structure gauges for mainline interstate and export rail track. Rationalisation and gauge standardisation should be considered for the entire non-metropolitan rail system in Victoria and South Australia. Merger of Australian National, V/Line and parts of the New South Wales rail system scould also be considered.

In assessing the costs and benefits of mainline rail upgrading, external road freight costs should not be understated. The medium term need to conserve liquid fuels and the potential need to reduce greenhouse gases should also be taken into account.

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