

THE PLANNING AND MANAGEMENT OF RAIL STANDARDISATION PROJECTS IN AUSTRALIA

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ABSTRACT:

The background to the Melbourne/Albury, Kalgoorlie/Kwinana, Port Pirie/Broken Hill and Adelaide/Crystal Brook rail standardisation projects is briefly reviewed, and a number of mistakes in planning and management are identified. A preliminary study of the Adelaide/Crystal Brook standardisation project suggests that it would be more economic to convert the existing broad gauge line between Adelaide and Port Pirie to standard gauge than to construct a new standard gauge line from Adelaide to Crystal Brook.

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INTRODUCTION*

Prior to the Second World War standardisation of the whole Australian rail network was seriously entertained,¹ and even as late as 1950 it had been suggested that most of the narrow gauge (1067 m.m.) and broad gauge (1600 m.m.) lines in Victoria, South Australia, Western Australia and Queensland should be converted to standard gauge (1435 m.m.).²

However, in 1956 a Committee of Government members reported that complete conversion to standard gauge was too vast and expensive an undertaking, and proposed a modified scheme linking all the mainland capital cities.³ During the same year a committee appointed by the Federal Parliamentary Labor Party arrived at somewhat similar conclusions.⁴

Since then the Commonwealth Government has concentrated on the standardisation of key mainland inter-capital rail links. Under this program new standard gauge lines (on new alignments) have been constructed between Melbourne/Albury, Kalgoorlie/Kwinana, and Port Pirie/Broken Hill, whilst planning is well advanced for construction of a new standard gauge line (generally on a new alignment) between Adelaide and Crystal Brook (on the Sydney/Perth standard gauge line).

* The author would like to acknowledge the assistance of Mr. P.G. Sands, Director, Maunsell & Partners Pty. Ltd., in the preparation of this paper. However, all the usual caveats apply.

1. See Webb, G.R. (1971).

2. See Department of Transport (1950).

3. See Government Members Rail Standardisation Committee (1956).

4. See Federal Parliamentary Labor Party (1956).

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The essential background to each of these major projects is briefly reviewed in the present paper, and a number of shortcomings in planning and management are listed. The paper also includes a brief study of the Adelaide/Crystal Brook project, which suggests that operating economies and substantial financial savings could be obtained by proceeding immediately with conversion to standard gauge of the existing broad gauge track between Adelaide and Port Pirie, rather than proceeding with construction of a new standard gauge line between Adelaide and Crystal Brook.

THE MELBOURNE-ALBURY PROJECT

Background

Work commenced on the Melbourne/Albury project in October, 1957, some 12 months before an Agreement⁵ was approved by the Commonwealth Parliament (October 1958) for construction of the new railway.

The premature start was authorised by the Victorian Government in order to provide employment for railway staff who were faced with dismissal. However, this prevented prior detailed planning by the Victorian Railways, and consideration and agreement by the Commonwealth authorities of the nature and extent of the work to be carried out. (With this project the Commonwealth Government provided all the finance and met 70 per cent of the cost, the New South Wales and Victorian Governments each repaying 15 per cent, with interest, over 50 years.)

5. Railway Standardisation (New South Wales and Victoria) Agreement, No. 83 of 1958.

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Mistakes in Planning and Management

The following mistakes were made in the planning and management of the Melbourne/Albury project.

First, no economic evaluation was made of the proposal to construct an independent standard gauge railway between Melbourne and Albury, nor was any evaluation made of bogie exchange as an alternative method of gauge standardisation at that time.

Second, the project was commenced without detailed engineering and financial investigations. This was made clear by the Chairman of the Victorian Railways Commissioners (Mr. Brownbill) in a letter to the New South Wales Commissioner for Railways (Mr. McCusker) on 1 June, 1961:

The project was started at short notice in order to assist in alleviating increasing unemployment.

As a result, the only plans available were of the sketchiest nature, and this was reflected in the inaccuracy of the original estimates.

In particular, there was no opportunity to carry out detailed planning of the path of the standard gauge track through the major station yards en route nor of its entry into Spencer Street.⁶

The cost of the project was increased also by delays in the supply of ballast, sleepers and rails, which resulted in substantial overtime working. However, the main reason for

6. A copy of the letter is on Victorian Railways File No. 4512, 1959.

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the increase in the project cost was failure to prepare detailed plans and estimates. This meant that the Commonwealth, New South Wales and Victorian Governments committed themselves to a project whose final cost was uncertain.

Under these circumstances it is not surprising that the final cost of the project to the three Governments amounted to \$31.95 million, as against an estimated cost of \$21.45 million in the Agreement.

Third, the standard gauge line was laid with class 2 rail, i.e. rail weighing 47 kilograms per metre instead of class 1 rail, i.e. rail weighing 54 kilograms per metre. This attracted criticism at the time,⁷ and before this rail reaches the end of its economic life it may be necessary to replace it with class 1 rail.

Fourth, the track was laid in lengths of 27.4 metres.⁸ At the time of construction of this line, parts of the existing standard gauge line between Sydney and Albury already were welded into lengths of 438.9 metres, whilst the Commonwealth Railways had continuously welded track extending over many kilometres on the Trans-Australian Railways.

Despite these precedents, the new standard gauge line was laid in short lengths, partly as an economy measure (to eliminate welding costs), and partly because this procedure still was being followed, allegedly, in the United States.

7. See Railway Transportation (1961). Vol. 10, p. 4.

8. The 1961 Agreement for construction of the Kalgoorlie/Kwinana railway stipulated the rails should be laid initially in welded lengths of 82.3 metres.

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Thus, the Victorian Minister for Transport (Mr. Wilcox) stated in the Legislative Assembly in 1968 that:

the track was laid following what was accepted as the best American practice at that time where rails were being welded into lengths of 90 feet.⁹

Nevertheless, within five years of the opening of the new standard gauge line, it was found that the joints were overstressed and this was resulting in rail end failure and the cracking of sleeper plates. In order to overcome this problem, it was necessary for the overstressed rail end to be cut off, and for the rails to be welded into lengths of 82.3 metres. Subsequently the welding of these rails was extended to lengths of 329.3 metres and later to continuous welded rail.

Fifth, the line was built with only 18 crossing loops, each only 884 metres in length.¹⁰ The limited number of loops and their relatively short length meant that the line only had an annual capacity of about 2.6 million tonnes. This utilisation was reached by the early 1970's. The lack of capacity on the Melbourne/Albury standard gauge line is currently the major limitation on the railways increasing their share of the Sydney/Melbourne freight traffic.¹¹

9. See Victorian Legislative Assembly, Parl. Papers 1967-68.

10. The 1961 Agreement for construction of the Kalgoorlie/Kwinana railway provided for crossing loops to be 1524.4 metres in length.

11. See Bureau of Transport Economics (1975).

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THE KALGOORLIE-KWINANA PROJECT

Background

In October 1961 an important Agreement¹² was made between the Commonwealth and Western Australian Governments, providing for the standardisation and development of certain railway lines in Western Australia.

This Agreement was necessary to meet the conditions of an Agreement¹³ entered into in November 1960 between the Western Australian Government and the Broken Hill Pty. Co. Ltd. for the establishment of an integrated iron and steel works at Kwinana, to enable iron ore to be transported by rail from Koolyanobbing to Kwinana.

The 1961 Agreement provided for both standardisation and upgrading of the main line from Kalgoorlie to Perth and Freemantle, and developmental works (including a new standard gauge spur line from Southern Cross to Koolyanobbing, a standard gauge line from Kewdale to Kwinana, and improvements to certain narrow gauge lines), as well as the provision of a large number of new standard gauge vehicles. The total cost of the project was estimated at \$82.42 million. Some of the works subsequently were varied by agreement between the two Governments.

It was agreed the work would be regarded as consisting of half standardisation and half developmental. The standardisation component was financed in full by the Common-

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12. Railway Agreement (Western Australia) Act, No. 67 of 1961.
 13. Broken Hill Pty. Company's Integrated Steel Works Agreement Act, No. 67 of 1960.

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wealth Government with the State repaying 30 per cent, with interest, over 50 years. The development component was financed 30 per cent by the State Government and 70 per cent by the Commonwealth Government, with the State repaying the Commonwealth advance, with interest, over 20 years.

Mistakes in Planning and Management

The following mistakes were made in the planning and management of the Kalgoorlie/Kwinana project.

First, the project was commenced in November 1962 before a complete Master Plan had been prepared with detailed cost estimates. A preliminary report¹⁴ on the cost of the standardisation scheme was issued in January 1961, and put the cost of the work at \$77.3 million. However, the report was prepared at short notice, and stressed that the estimated capital cost had "been based on approximation due to lack of survey information and properly detailed plans of proposals."¹⁵

As work proceeded and the concept of the project changed and expanded, it appeared the cost would go over \$100 million. At this stage the Western Australian Government Railways agreed to prepare a Master Plan. This took a great deal of effort and was not submitted until February 1965.¹⁶ The project cost in this Master Plan was estimated at \$110 million.

14. See Smith (1961).

15. Ibid, p. 13. The engineering consultants to the project also expressed alarm at the lack of any planning in 1962. See Maunsell & Partners Pty. Ltd. (1962).

16. See Western Australian Government Railways (1965).

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When examined in detail it was apparent this Master Plan did not allow for all requirements nor for escalation to completion and contingencies. The Engineering Consultants to the project (Maunsell and Partners Pty. Ltd.) therefore were requested to prepare a definitive Master Plan, listing in detail the items in each section of the work, with estimated final costs. This report was submitted in March 1966¹⁷ and estimated the final project cost at \$130 million. The work was completed within this figure.

Second, the design standards, in some respects, were too low for the traffic to be carried. Early in the project the Western Australian Government Railways submitted a detailed proposal seeking approval to vary standards to:

- (a) lay 54 k.g. rail instead of the approved 47 k.g. rail from Koolyanobbing to Kwinana, in view of the expected weight of the iron ore trains;
- (b) install sleepers of 127 m.m. depth instead of the approved depth of 114.3 m.m. through the Avon Valley, where dual tracks (1435 m.m./1067 m.m.) was to be laid;
- (c) provide grade separation at all crossings of major roads by the standard gauge line in the Perth Metropolitan area;

17. See Maunsell & Partners Pty. Ltd. (1966).

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- (d) install Centralised Traffic Control (CTC) between Koolyanobbing and Kwinana to enable the ore trains to be turned round in 24 hours.

This submission¹⁸ was supported by reports from the Engineering Consultants, Maunsell and Partners Pty. Ltd. However, the Commonwealth Treasury was concerned at estimates of increased cost on the project, and agreement was given only for the CTC installation and the provision of some of the proposed road/rail over and under passes.

The WAGR installed 127 m.m. sleepers in the Avon Valley and met the higher cost over the project standard. However, the 47 k.g. rails have proved to be too light for the loaded ore trains with heavy axle loads. The rails are showing surface wear and have been subject to creep under the Koolyanobbing/Kwinana traffic. Additional work has been carried out on the track to give improved stability, but despite this there have been derailments and imposition of speed limits. It seems likely that the 47 k.g. rail from Koolyanobbing to Kwinana will need to be relaid with 54 k.g. rail early in the 1980's.

Grade separation, as a project cost, was refused at most of the road crossings between Midland Junction and Kwinana - mainly developing areas at that time. Today grade separation is most desirable at these metropolitan crossings but the cost of undertaking this work would be very high.

18. See Western Australian Government Railways (1963).

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THE PORT PIRIE-BROKEN HILL PROJECT

Background

The Commonwealth Government decided in April 1963 to standardise the narrow gauge line between Port Pirie and Broken Hill, following rejection of a report¹⁹ by the South Australian Parliamentary Standing Committee on Public Works proposing upgrading of the Port Pirie/Cockburn narrow gauge line.

This report was made following the failure of the State's claim in the High Court (February 1962)²⁰ for a declaration that the Commonwealth Government was obliged under the 1949 Agreement,²¹ to proceed immediately with the standardisation of the railway between Port Pirie and Broken Hill (Port Pirie/Cockburn owned by the South Australian Railways and Cockburn/Broken Hill owned by the Silverton Tramway Company Ltd.).

The Commonwealth authorities also agreed to convert the existing narrow gauge line between Peterborough and Terowie to broad gauge (approximately 23 kilometres), and provide associated standard gauge railway works, including facilities, at Broken Hill. Conversion of existing and construction of new standard gauge locomotives and rolling stock also was agreed.

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19. See South Australia Parliamentary Standing Committee (1963).
 20. State of South Australia v. Commonwealth of Australia, 1962 ALR.
 21. Railway Standardisation (South Australia) Agreement Act, No. 83 of 1949.

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After the decision to proceed with this project was taken, the South Australian Railways undertook surveys of the route and prepared a Master Plan showing the work to be carried out, with detailed estimates of cost. The project works were estimated to cost about \$40 million (in 1963 prices). The final cost of the project, including \$2 million compensation to the Silverton Tramway Company Ltd., was about \$52 million.

The work was carried out on the usual standardisation terms, with all finance provided by the Commonwealth Government, and the South Australian Government repaying 30 per cent, with interest, over 50 years. The New South Wales Railways accepted responsibility for extending the passenger platform at the existing station (standard gauge) in Broken Hill.

Mistakes in Planning and Management

The following mistakes were made in the planning and management of the Port Pirie/Broken Hill project.

First, the decision to proceed with the project was a political one, was made without a report on the work to be carried out, preparation of cost estimates and an economic evaluation, and without negotiations being opened and agreement reached with the Silverton Tramway Company Ltd. (These negotiations proved to be extremely difficult and protracted).

Second, the work between Port Pirie and Cockburn was carried out under the 1949 Agreement, instead of under a new agreement. As a result there was no formal agreement specifying the work to be carried out and the locomotives and rolling stock to be converted and supplied. Also, the 1949 Agreement did not specify the standards to be adopted.

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(The work between Cockburn and Broken Hill was carried out under a new Agreement,²² which specified the agreed standards and listed the works to be carried out.)

Third, when the decision to go ahead was given, no consideration had been given as to the authority who would be responsible for (a) constructing, owning and operating the 30 miles of standard gauge railway between Cockburn and Broken Hill, and for (b) owning and operating the terminal facilities at Broken Hill. Eventually it was decided the South Australian Railways would be responsible for (a) and the New South Wales Railways for (b).

Fourth, no consideration had been given at that time to the work which would be required at Broken Hill. This proved to be both extensive and expensive, and included road overpasses over the new railway, new terminal facilities, conversion of the railway tracks within the mine leases, and new facilities for former clients of the Silverton Tramway Company Ltd.

Fifth, the South Australian Railways refused the assistance of engineering consultants on this project.

Sixth, it appears larger contracts should have been called for earthworks and more supervision should have been given to this work and to the tracklaying. The earthworks between Port Pirie and Broken Hill were carried out by local contractors under a series of relatively small contracts and the tracklaying was done by the South Australian Railways. The reason for this was to award contracts to South Australian

22. Railway Agreement (New South Wales and South Australia) Act, No. 126 of 1968.

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firms and give employment opportunities to South Australians, rather than call public tenders for a few large contracts, as was done in Western Australia, which could have gone to large interstate civil engineering contractors.

The Lees Committee which reported in 1973 on the management of the South Australian Railways pointed out:

This line was opened to traffic in January 1970. Since that time there have been many more speed restrictions and much more repair work than would have been expected of a new line just 'bedding-in'. We have doubts as to whether adequate supervision was available to control the earthworks and ballasting.²³

Seventh, the South Australian Railways refused to allow base plates to be fitted to sleepers, except on curves. This was done to reduce the South Australian share of the project.²⁴ However, as the Lees Committee emphasized, the saving proved to be a false economy:

This line was only base plated on the curves although the practice with standardisation projects in all other States has been to base plate all rails. Since the line opened to traffic some 13 additional miles have been base plated and the South Australian Railways have paid the full cost. South Australian Railway engineers have expressed the view that in about 5 years the whole line will require retamping and at this time, complete base plating will be carried out.

23. See Lees, Evans and Rodway (1973).

24. See Webb, G.T. (1974).

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The estimated cost of this base plating is about \$1.5 million. This is much more than the cost if plates had originally been inserted when South Australia would only have paid 30% of the cost. In view of practice in other States... it is difficult to see why base plates were not used. (pp. 47-8)

Eighth, the South Australian Railways insisted on constructing a considerable number of new 4 wheel standard gauge wagons, rather than an equivalent number of bogie standard gauge freight wagons.

Lastly, the South Australian Railways insisted that in constructing the new standard gauge facilities at Port Pirie all Sydney/Perth freight and passenger traffic should enter the yard and station. This has resulted in operating delays. The station also has a dead end, requiring the reversing out of passenger trains. It is expected that in the near future the Australian National Railways Commission will construct a by-pass line around the Port Pirie yard and station to facilitate the fast through movement of freight trains between Sydney and Perth.

THE ADELAIDE-CRYSTAL BROOK PROJECT

Background

In 1969, with the approaching completion of the Broken Hill/Port Pirie and the Kalgoorlie/Kwinana standardisation projects, the standardisation of the Port Pirie/Adelaide broad gauge railway (already provided for under the 1949 Agreement) was discussed between officers of the Commonwealth Department of Shipping and Transport and the South Australian Railways.

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Two means of achieving this were examined, namely, conversion of the existing 1600 m.m. track to 1435 m.m. on the existing formation, or construction of a new standard gauge line on a new alignment. The South Australian Railways favoured the second approach, which had been the method adopted with the Broken Hill/Port Pirie and Kalgoorlie/Kwinana standardisation projects for replacement of narrow gauge with standard gauge lines.

In August 1969 the Department of Shipping and Transport requested the engineering consultants, Maunsell and Partners Pty. Ltd., to prepare a report on the most efficient method by which Adelaide could be connected by a new standard gauge line to the Port Pirie/Broken Hill standard gauge line. The report by the consultants was issued in March 1970,²⁵ and recommended that the new standard gauge line connect at Crystal Brook. The total cost of the project was estimated at \$47.5 million (1970 prices).

Protracted negotiations took place over the next four years on the work to be carried out (particularly in the Adelaide metropolitan area). In January 1974 a detailed Master Plan²⁶ was submitted by the consultants. This estimated the cost of the project, as then planned, at \$77.7 million (1974 prices).

In May 1974 an Agreement was signed on behalf of the Commonwealth and South Australian Governments for construction of this standard gauge railway.²⁷ The work was

25. See Maunsell and Partners Pty. Ltd. (1970).

26. See Maunsell and Partners Pty. Ltd. (1974).

27. Adelaide to Crystal Brook Railway Act, No. 85 of 1974.

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to be in accordance with the Master Plan prepared by Maunsell and Partners Pty. Ltd., dated January 1974. The estimated cost of the work was not stated in the Agreement.

Present Position

Planning for construction of the Adelaide/Crystal Brook standard gauge railway is well advanced but construction work on the proposed new formation has not commenced. If the work started in 1976, it probably would be 3 to 4 years before standard gauge operations could commence into and out of Adelaide. The final cost probably would be of the order of \$120 million.

It is suggested that in the present economic climate consideration should be given to the following measures:

- (a) deferring construction of the new standard gauge line from Adelaide to Crystal Brook;
- (b) proceeding with conversion of existing and construction of new locomotives and rolling stock, as provided for in the 1974 Agreement;
- (c) proceeding with conversion from broad to standard gauge of the track on the existing alignment between Adelaide and Port Pirie (this could be done by pulling one rail over, reducing the gauge from 1600 m.m. to 1435 m.m.);

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- (d) construction of a new standard gauge loop, from the Adelaide/Port Pirie line to Crystal Brook (this loop line possibly could commence about 11 kilometres out of Crystal Brook). This would avoid taking Adelaide/Sydney freight and passengers through Port Pirie.

It is considered the above could be completed within 12 months and probably at a cost under \$40 million.

This would give the following advantages:

- (a) A substantial savings in loan funds at the present time (and future interest payments thereon);
- (b) a needed impetus at the present time to the railway rolling stock industry;
- (c) A standard gauge connection to Adelaide within 12 months instead of waiting for another 3/4 years. Not only would this speed up freight and passenger trains between Adelaide and Sydney and Perth, but also would offer considerable operational savings.

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SOME CONCLUDING OBSERVATIONS

It is suggested the following action should be taken:

- (a) no new gauge conversion or railway up-grading projects should be undertaken, with financial assistance from the Commonwealth Government, until:
 - . the Bureau of Transport Economics has carried out an economic evaluation of the project and of any alternative methods of satisfactorily achieving the objective,
 - . the nature and extent of the project work has been clearly defined, and standards have been agreed,
 - . a complete Master Plan for the project work has been prepared,
 - . detailed cost estimates have been taken out, including allowances for escalation and contingencies,
 - . draft agreements have been settled, and planning, financial, administrative and supervisory arrangements have been agreed.
- (b) an immediate review be made of the means of providing a satisfactory standard gauge connection to Adelaide at the earliest possible date and at the minimum cost.

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