The Tasmanian Rail System: An Assessment of Costs and Benefits

Report

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The Tasmanian Rail System

An assessment of costs and benefits

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FOREWORD

In 1975 the Commonwealth Government took over responsibility for the Tasmanian Railway System. The railway was combined with the non urban part of the South Australian Railways and Commonwealth Railways to form Australian National. Today 'Tasrail' operates as a semi-autonomous division of Australian National.

In 1985-86 the Commonwealth Government decided to seperately identify the Tasrail subsidy and agreed to a 3 year 'contract' arrangement with Australian National which specified the Commonwealth funds that would be provided over the period.

The Commonwealth also decided that, in order to ensure that all the facts were available when considering future arrangements for Tasrail, the Bureau should undertake a study of the economic, financial and social consequences of closing Tasrail.

Reports of this nature depend heavily on the co-operation of those involved, the railway management and unions, the customers and in most cases other levels of government. I would like to thank all those who willingly made their time available to the Bureau's staff during the course of the study, particularly staff at AN and Tasrail.

The study team was initially directed by Mr C. Sayers, with Mr D. McLennan taking over responsibility during the study. The team leader was Mr D. Baussmann and Mr I. Bickerdyke, Mr N. Burton, Ms B. Bhall, Mr M. Streeting, Ms C. Stevenson and Mr D. Crawford all made significant contributions.

I believe this report will form a valuable source of information in considering the future of Tasrail.

M Haddad
Director

Bureau of Transport Economics
Canberra
December 1987

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SUMMARY

In 1985-86 the Commonwealth Government agreed to a contract arrangement to finance the operating losses incurred by the Australian National (AN) Tasmanian rail system over the three-year period, 1985-86 to 1987-88. The contract provided for a payment of $18.4 million in 1985-86 declining to $17.8 million and $16.2 million in the following two years. To assist in the consideration of future arrangements for the Tasmanian railway system (Tasrail), the Commonwealth directed the Bureau to undertake an assessment of the costs and benefits of closing Tasrail.

The railway

The Commonwealth Government took over the Tasmanian Railway in 1975 and assumed full operational and financial responsibility in early 1978. Based on the findings of the 1976 Joy Report, Tasmanian passenger services were terminated in 1978 and the Commonwealth agreed to finance a major track rehabilitation program over a ten-year period.

AN has undertaken a range of initiatives to improve railway productivity, including provision of modern locomotives and rolling stock, the refurbishing of some existing rolling stock and changes in operating practices. Staff numbers have been reduced by 50 per cent and further reductions are planned. A program of planned freight rate increases has been implemented.

From 1982-83 to 1985-86 the Tasrail operating loss has been consistently around $20 million per year in real terms. Over the first two years of the contract, the loss has been $22.9 million and $15.5 million. The analysis in this study suggests that on current planning, the annual operating loss will be reduced to around $3 million by the end of the century. This result is subject to considerable variation depending on railway efficiency and freight levels. The annual operating loss could be as high as $6 million, while favourable conditions may result in an operating profit of up to $5 million around the turn of the century.

The task

In 1986-87, Tasrail performed an all time high 430 million net tonne-kilometres of which three commodities (woodchip logs, coal and containers) accounted for 75 per cent. Over the ten-year period to 1986-87, the Tasrail task increased by 75 per cent although the task has been relatively stable in recent years. The growth in Tasrail traffic to present levels largely reflects substantial growth in woodchip log traffic in 1979-80 and 1980-81.

The future task, 1988-89 to 2007-08

Under the most likely, or medium growth scenario, the Tasrail task is expected to continue increasing in the short-term reaching a peak of 514 million net tonne-kilometres in 1988-89. Growth in the 20 years following 1988-89 is expected to be constrained by an anticipated decline in woodchip log traffic (1989-90) and the declining pulpwood log task from 1990-91. Consequently, the forecast task declines to a low of 407 million net tonne-kilometres in 1996-97 before slowly increasing to 449 million net tonne-kilometres in 2007-08.

High and low growth scenarios were also developed for the study. Favourable circumstances for rail traffic growth may see the task reach 702 million net tonne-kilometres in 2007-08. If such a result is to be achieved, key developments include the establishment of a pulp mill at Wesley Vale which is linked to the rail network and the rail carriage of Hobart container traffic to and from the northern ports. Adverse conditions applicable to rail task growth may see the Tasrail task fall to 350 million net tonne-kilometres by 2007-08.

Projections of the freight task if Tasrail ceases operations reflect both the shorter distances by road on some routes and the carriage of acid by sea (on the basis that there would be public resistance to large quantities of acid travelling by road). The road transport task for the medium growth scenario is projected to be between 20 and 25 per cent lower than the corresponding rail task throughout the forecast period. If Tasrail operations were discontinued in 1988-89, the transfer of forecast rail freight to road transport would increase the Tasmanian road transport task by 25 per cent or 410 million net tonne-kilometres.

The assessment

The assessment addresses the impact of closure from three viewpoints - economic, financial and social. The economic assessment compares the resources released by closing the railway with the resources used to move the freight task by road (and sea for acid). The financial assessment examines the impact of closure on the financial position of

the Commonwealth and State governments, Australian National, railway employees, the road transport industry and the railway customers. The social assessment examines a range of impacts such as environmental and safety aspects and the impact on the Tasrail workforce. It is important to recognise that it is not possible to add together elements from each of these assessments as each evaluation addresses the issues from a different perspective and forms a part of the overall analysis.

Economic assessment

The economic assessment compares the net present value of the resources released (or saved) by closing the railway with the stream of costs required to perform the task in the absence of the railway. The net present value and benefit cost ratios were calculated for discount rates of 4, 7 and 10 per cent.

ECONOMIC EVALUATION OF TASRAIL CLOSURE (MEDIUM TRAFFIC FORECASTS)

	Discount rate		
	4 per cent	*7 per cent*	*10 per cent*
Resources released by closing Tasrail ($m)	547	381	289
Resources consumed in moving Tasrail task ($m)	535	376	290
Net resources released ($m)	11	4	-1
Benefit cost ratio	1.02	1.01	1.00

Note Figures may not add to totals due to rounding.

Results of the economic assessment show that the benefit cost ratio is relatively stable regardless of the choice of discount rate. Sensitivity tests were carried out for high and low freight forecasts, higher levels of road damage, higher shipper costs, a less efficient railway and different methods of valuing labour costs. The results suggest that the outcome is not particularly sensitive to the parameter values although some combinations could reduce the Benefit Cost (BC) ratio to just under one.

Distribution of gains and losses

The financial and social assessment allow identification of those who benefit and those who lose if the railway closes. The Commonwealth Government would benefit by closing the railway. The costs of closure are offset by income from sale of assets while increases in welfare payments are more than offset by savings in deficit payments and increases in revenues derived from the road transport industry. The Tasmanian Government could face marginal financial losses if the railway closed. Increases in State revenue derived from the road transport industry would not fully offset increased road damage costs and expenses associated with social adjustment programs.

The Tasmanian road transport industry is a clear beneficiary of closure. Turnover and employment would both increase by around 25 per cent and the benefits would also flow on to firms supplying the industry (vehicle suppliers and repairers, fuel retailers). The benefits would be primarily regional to Tasmania although some would flow through to mainland industries. The road construction industry would also benefit from a slight increase in activity.

The current Tasrail workforce would be directly affected by the closure of Tasrail. Almost half the current workforce would gain employment in the ensuing 12 months. Around 25 per cent would have been expected to leave the Tasrail workforce over the next four years in any event as part of the program to increase productivity. The younger and more highly skilled workers may actually gain employment at higher salary levels (for example, in the road transport industry) but there is a group of less skilled workers who would be obliged to rely on welfare benefits and consequently suffer a reduction in income.

AN would lose 12 per cent of its turnover but the effect on AN is essentially neutral as the Commonwealth Government funds Tasrail losses. AN does lose the opportunity to generate profits if Tasrail is able to exceed its targets. The railway supply industry would lose business if Tasrail ceased operations.

Tasrail shippers would face higher transport costs if the road transport industry carried their freight. In some cases these costs would be partially offset by elimination of double handling but overall there would be substantial increases in costs.

The Tasmanian motorist would suffer some loss in amenity and safety as a result of the higher level of heavy trucks on the roads. The safety element would be offset by the elimination of level crossing accidents

as a risk. The low level of traffic generally on Tasmanian roads suggests that in most instances motorists would suffer little perceptible disadvantage.

Some specific locations would suffer benefits and losses in terms of noise and impacts. Areas currently affected by railway operations would gain while some areas particularly exposed to the impact of additional truck traffic would suffer some loss in amenity.

The financial and social assessments shed some light on the distribution effects but do not suggest a conclusive result. The primary value of this analysis is to quantify as far as possible the magnitude of the impact on the various groups so that they can be properly taken into account in the process of assessing future courses of action regarding Tasrail.

Implications

In summary the study shows that there has been substantial progress in improving the efficiency of Tasrail. The traffic task has increased by 75 per cent. Staff productivity increased by 220 per cent and the subsidy level has been reduced by over 50 per cent in real terms. There is scope for further reductions in the subsidy level by a combination of increases in freight rates and productivity improvement (staff reductions, capital investment and changes in operating practices). To achieve these improvements will require the combined efforts of railway management, labour and unions, customers and Governments. In favourable circumstances the targets set in the Tasrail corporate plan can be achieved or even exceeded. In less favourable circumstances a substantial reduction in the deficit can still be achieved.

There are a number of external factors which could substantially influence the performance of Tasrail. Positive factors include achievement of high traffic levels and changes in the competitive position of the road transport industry by way of increased road damages charges or higher fuel prices. Negative possibilities include lower than expected freight task and improvements in the competitive position of the road transport industry (removal of rail protection levy).

On balance the economic analysis suggests that there is not a strong case to support closing Tasrail. Sensitivity tests confirm that the results might vary from a slight margin in favour of closing the railway to a slight margin in favour of retaining the railway. If the freight task approaches the high forecast then the railway could

return a modest operating surplus and there is a better case to retain the railway. If the freight task approaches the low forecast and railway performance improvements are not achieved, the railway will continue to make substantial losses and closure is more attractive.

Alternative scenarios

The terms of reference confined the study to examine the impact of closure as compared to continued operation of Tasrail. There are several alternative scenarios which might be considered in the event that the Commonwealth Government decided to withdraw funding of Tasrail. The State Government could decide to take over funding of Tasrail in which case, provided similar policies are pursued, the economic analysis is essentially unchanged. A private operator might take over some or all of the operations of Tasrail and could be expected to pursue similar policies to current management, although the timescale may be shortened.

Finally, there could be an argument for delaying the final decision on closure of Tasrail until the success or otherwise of current management strategies is apparent. The inconclusive nature of the economic analysis suggests that the resource cost of delaying a final decision would not be significant, while many of the current uncertainties may be clarified over time.

CHAPTER 1

INTRODUCTION

This report presents the results of a comprehensive study undertaken by the Bureau of Transport Economics into the financial, economic and social consequences that might be expected to result from the closure of the Tasmanian railway system.

The system, which operates under the name of Tasrail, has required a significant subsidy for each year of the ten-year period it has been operated by the Commonwealth Government-owned Australian National Railways Commission (AN). In 1985-86 the Commonwealth Government agreed to finance the subsidy by a three-year contract with AN. To help in considering future arrangements for the railway the Government also decided that the Bureau should undertake this study.

In brief, the Bureau was required to undertake a comprehensive economic and social assessment of the costs and benefits of closure of the Tasmanian rail system. Emphasis was placed on identifying financial and economic costs and benefits to AN, the Commonwealth and State Governments and to the Tasmanian community. Those who would gain, and those who would lose following closure were also required to be identified.

The approach followed by the Bureau in complying with the Terms of Reference is reflected in the structure of this report. The approach involves analysis undertaken at three distinct but interrelated levels:

- An economic cost-benefit analysis, showing the identifiable and measurable costs and benefits resulting from closure from the national viewpoint. The study was undertaken in accordance with the recognised methodology for such studies (see Mishan 1982).
- A financial analysis of the impacts of closure on the main parties involved, showing the financial gains and losses that each party might incur.

- An analysis of the social and environmental consequences of closure of the Tasrail system, insofar as these consequences can be identified and measured and they are not covered in the other forms of analysis.

The results of these three levels of analysis enable the Terms of Reference to be addressed and relevant conclusions to be drawn.

The substance of this report is set out in the following six chapters, supplemented by a number of technical appendices covering details of specific cost and benefit areas. Chapter 2 provides an overview of the railway system - a brief history, its physical dimensions, its task and its recent operational and financial performance. For readers unfamiliar with the railway, this chapter provides a perspective of the railway's role in Tasmania.

The key question of future traffic task for the railway is addressed in Chapter 3. A detailed forecasting exercise, involving considerable consultation with Tasrail and its major shippers, was undertaken to derive the task forecasts over a 20-year period from 1988-89. The chapter provides a summary of the forecasting procedures and results. A detailed explanation is provided in a separate Bureau Information Paper, entitled *Tasmanian Industry Outlook: Implications for Tasrail* (BTE 1987a).

Chapters 4, 5 and 6 cover the analysis from the economic, financial, and social and environmental viewpoints, respectively. Each chapter explains the methodology and presents the results for each level of analysis.

The final chapter draws together and summarises the findings of the earlier chapters and puts them into perspective. It also discusses other aspects of closure that fell outside the detailed analysis in the previous chapters, but which may be relevant to the primary issue under review.

The appendices generally provide more detailed analysis of such areas as road pavement damage, trucking strategies and costs in the event of closure of the rail system, and the resources and operations of Tasrail.

CHAPTER 2 CHARACTERISTICS OF TASMANIAN RAILWAYS

This chapter provides a description of Tasmanian railways, beginning with a brief history of the first railways and the major events prior to the Commonwealth takeover. It describes the Commonwealth takeover and the track rehabilitation that followed, and presents the recent performance and current situation of the railway.[1]

HISTORY

Construction of Tasmania's first railway began in 1868. It was opened to traffic on 10 February 1871 as a broad gauge line extending 72 kilometres from Launceston to Deloraine. The line was originally owned by the Launceston and Western Railway Company, but was taken over by the Tasmanian State Government within a year of opening as a result of financial difficulties for the company.

The second line, opened in 1873, was a narrow gauge track from Hobart to Western Junction, a distance of 196 kilometres. To complete the line to Launceston, the difference in gauge was overcome by the laying of a third rail for the 16 kilometres from Western Junction to Launceston, to provide a dual gauge over this section. The line was the forerunner of the present narrow gauge system operating throughout the State. It was originally owned by the Tasmanian Main Line Railway Company before being taken over by the State Government in 1890.

The first branch line built by the Government, from Parattah to Oatlands, was opened in May 1885. The building of branch lines continued until, by 1900, Tasmanian Government railways totalled approximately 684 kilometres. Further extensions continued to be made to the track until the track length reached a peak of 1093 kilometres in 1930. Since then, many branch lines have become uneconomic,

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1. This study does not include consideration of the future of the privately owned Emu Bay Railway line, which carries mineral concentrates from the west coast to Burnie.

largely due to increased competition from road transport, and have been closed. Of the original branch lines, only the North Eastern, Derwent Valley and Fingal lines are still in operation.

The most recent section of track to be built was the Coldwater Creek to Bell Bay line which was opened in August 1974. The completion of this section made available a continuous high standard track from Launceston to the port of Bell Bay.

In 1950, Tasmania became the first State to replace its steam locomotives with mainline diesel electric locomotives.

Passenger and freight services were operated on the railway from its commencement. However, passenger services have gradually been withdrawn. Hobart's suburban service was closed in 1975, and the last long distance service, the *Tasman Limited* from Hobart to Wynyard, was withdrawn in 1978. Since then, Tasmanian Railways have operated solely as a freight railway. The network as it currently exists is shown in Figure 2.1.

COMMONWEALTH TAKEOVER OF TASMANIAN RAILWAYS

On 23 May 1975, the Commonwealth and Tasmanian Governments agreed to the acquisition of the Tasmanian Government Railways by the Commonwealth, to become effective from 1 July 1975. The transfer was part of a wider Commonwealth program to form a single national railway organisation to be operated by the Australian National Railways Commission.

For transfer of the railway's assets, the Commonwealth Government agreed to pay the State $5 million. The State also received additional Financial Assistance Grants through the established Commonwealth-State revenue sharing arrangements. The initial increase in the grants was to be $3.3 million and this, in turn, increased according to the formula used to calculate the grants (ABS 1978). The agreement was approved by the *Railways (Tasmania) Act 1975* in the Commonwealth Parliament, and the *Railways (Transfer to Commonwealth) Act 1975* passed by the Tasmanian Parliament.

The assets[2], financial liabilities and responsibility, and operations of the Tasmanian Government Railways were taken over by the Australian National Railways Commission as from July 1975. Provision was made in the Agreement for the Tasmanian Transport Commission to continue to

2. Except for some land and minor buildings, and the plant, equipment and materials in the precision tool annexe at Launceston.

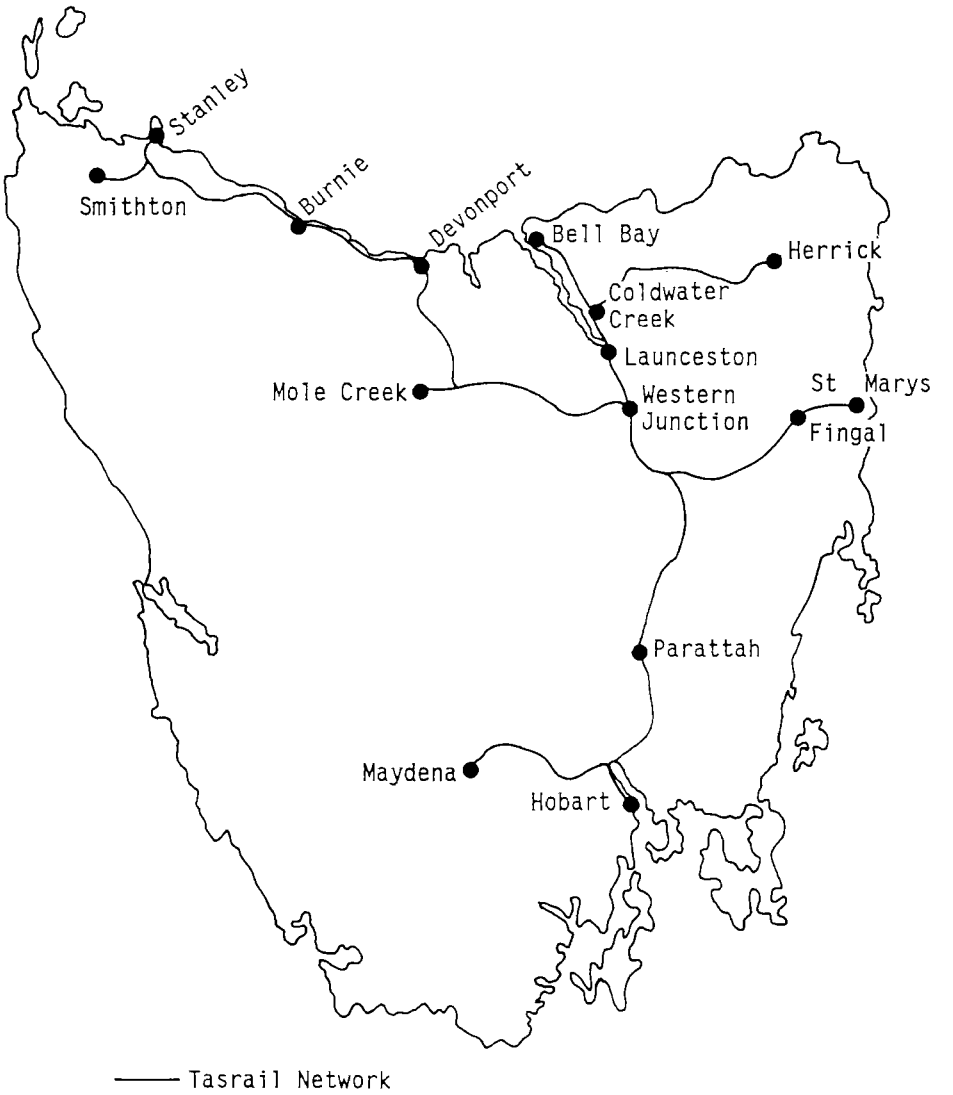

Figure 2.1 Tasrail network

operate the railways, subject to direction by the Australian National Railways Commission, for a period of time during which final arrangements, particularly those relating to transfer of employees, were to be made. The transfer of Tasmania's railway from the Tasmanian Transport Commission to AN was completed in February 1978 when the Commission relinquished control of the railway and handed over administration of the system.

The major rights retained by the State Government under the agreement include:

- To consult with the Commonwealth Government on any proposals to increase freight rates.
- To dispute the abolition of any service where in the opinion of the State Government that service is desirable, with the dispute being resolved by arbitration in the event of a solution not being reached.
- To consult with the Commonwealth Government on the operation of new or existing railways which are of particular concern to the State.

The State was granted representation on the Australian National Railways Commission and the Australian Shipping Commission for an initial period of 5 years (ABS 1978).

Joy Report on Tasmanian railways

The Commonwealth Budget of August 1976 instituted a Committee of Inquiry into the Tasmanian Rail System (1977). The committee presented their report - known as the Joy Report - on 12 November 1976. The major findings and recommendations of the report are as follows:

- losses were incurred primarily because the railway could not compete against increasing road transport operations for traditional traffic and because some bulk freight contracts were entered into on unfavourable terms;
- Tasmanian Railways would never make a profit but could substantially reduce its deficit in real terms;
- a rehabilitation program involving expenditure of $23 million was required to provide adequate facilities for existing traffics;
- the railway was unlikely to achieve an increase in traffic;
- the 'common carrier' obligation should be terminated and only traffic that could be economically handled should be carried;

- the *Tasman Limited* passenger service should be withdrawn from service as soon as possible;
- freight rate increases should be implemented as soon as possible; and
- the existing fleet of four wheeled wagons should be scrapped and the older bogie wagons modernised in order to improve operating efficiency.

Rehabilitation program

The Joy Report concluded that only 6 per cent of Tasmania's railway track was laid to a high standard. The remainder of the State's track ranged from fair to very poor condition. The reasons for such conditions were identified as follows:

- inadequate drainage resulted from the formation often being too narrow;
- ballast was mostly of poor quality and was rarely used effectively;
- sleepers were untreated local hardwoods which were not suitable; and
- rails were too light and joints generally poor.

As a result of these findings, in November 1978, the Commonwealth Government undertook to provide funds for the rehabilitation of the permanent way. It estimated the cost of rehabilitation (in 1978 dollars) to be $20 million, to be spent over a ten-year period. Work on rehabilitation had already commenced in 1977-78, prior to the Commonwealth funding. Due to the high incidence of derailments that occurred about this time, work was concentrated on the lowest standard sections.

Since 1976, $22.5 million[3] has been spent on track rehabilitation. The rehabilitation program is expected to be completed in 1987-88 with the undertaking by the Commonwealth Government to provide a further $7 million over 3 years from 1985-86 in the form of an interest bearing loan. At June 1987, with one year to go in the rehabilitation program, Tasrail estimated that 74 per cent of the track was in a good to very good condition, 17 per cent was in a fair condition and 9 per cent was in a poor condition. The traffic demand for the section of

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3. This includes $2.2 million spent in 1976-77 before commencement of the rehabilitation program funded by a Commonwealth loan of $20 million.

track considered to be in poor condition is low and the option of closing some of these lines is a possibility.

Other new works completed since 1975 include new freight terminals in Hobart and Launceston, major track deviations at Latrobe and Fingal, the building of a new Perth viaduct, four new bridges and reconstruction of yards and major crossing loops at Devonport and Hagley (Australian National 1986b).

RECENT PERFORMANCE

Background

During the period from 1982-83 to 1984-85 the level of subsidy for AN's Tasmanian operations remained at over $20 million per year in real terms. A three-year financial package for the State's railways was agreed upon by the Commonwealth Government and Australian National in August 1985. A new business name, 'Tasrail', was also introduced to enable the railway to establish its own identity.

The package involves agreed revenue supplements totalling $52.4 million to be provided over three years. The breakdown for this total is $18.4 million, $17.8 million and $16.2 million for the years 1985-86, 1986-87 and 1987-88 respectively, in addition to the loan of $7 million for track rehabilitation.

Financial performance

For the first year of the package arrangement, in 1985-86, Tasrail's deficit (in nominal prices) was $21.2 million, $2.8 million above the agreed level. The difference was funded by Australian National. However in 1986-87, the deficit was $15.5 million, $2.3 million below the agreed level. A summary of Tasrail's financial performance for the period 1977-78 to 1986-87 is shown in Table 2.1 and Figure 2.2.

In real terms (constant 1986-87 prices), Figure 2.2 shows that the operating loss has been reduced from $33.9 million in 1977-78 to $15.5 million in 1986-87; this is a reduction of 54 per cent over the period.

Figures 2.3 and 2.4 show revenue per net tonne-kilometre and expenditure per net tonne-kilometre, in constant 1986-87 prices. Tasrail's revenue per net tonne-kilometre decreased 32 per cent from 7.7 cents in 1977-78 to 5.2 cents in 1986-87. This is primarily due to Tasrail freight rates not increasing in line with inflation over this period of time. For the same period, expenditure per net tonne-kilometre decreased 58 per cent from 21.5 cents to 9.1 cents, a result of increased efficiency by Tasrail.

TABLE 2.1 TASRAIL FINANCIAL PERFORMANCE AT CONSTANT 1986-87 PRICES[a], 1977-78 TO 1986-87

($ million)

Year	*Revenue*	*Expenditure*	*Operating loss*	*Deficit*	*Revenue/ Expenditure ratio*
1977-78	18.9	52.8	-33.9	-33.9	0.36
1978-79	19.2	48.5	-29.4	-29.4	0.40
1979-80	22.2	45.2	-23.0	-23.0	0.49
1980-81	22.9	47.6	-24.8	-24.8	0.48
1981-82	20.5	45.8	-25.3	-25.3	0.45
1982-83	19.8	46.3	-26.5	-26.5	0.43
1983-84	19.2	43.5	-24.3	-24.3	0.44
1984-85	19.5	42.5	-22.3	-22.3	0.46
1985-86	19.8	42.6	-22.8	-3.0	0.46
1986-87	22.4	37.9	-15.5	+2.3	0.59

a. The price deflator used was the ABS price deflator for expenditure on Gross Domestic Product.

Note The method of Government subsidy changed after 1984-85. The subsidy is now a predetermined amount rather than the realised deficit. The figures shown are the net result.

Source Australian National (pers. comm. 1987).

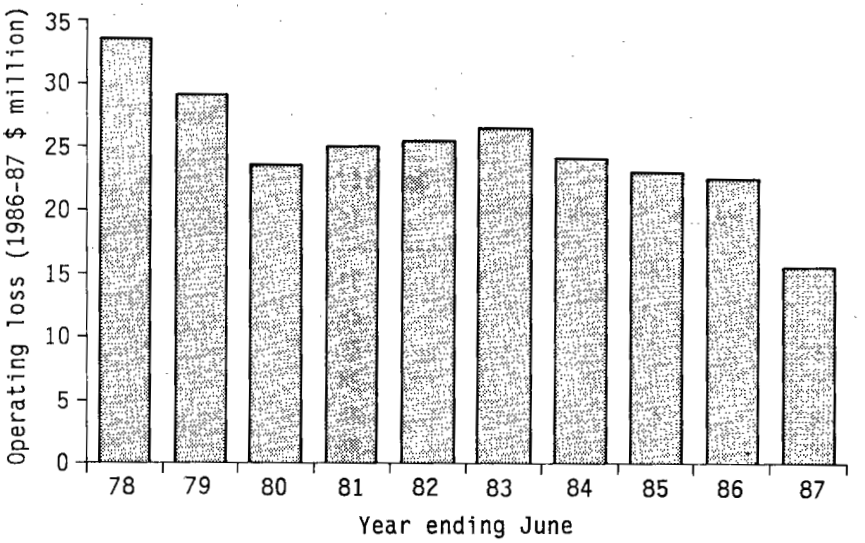
Freight task

Over the 10 years to 1986-87 Tasrail's task, shown in Figure 2.5, increased by 75 per cent from 246 million net tonne-kilometres to 429 million net tonne-kilometres. This increase corresponds to an average annual growth rate of 6.4 per cent. Figure 2.6 shows that the aggregate tonnage carried for the same period has increased 38 per cent from 1.6 million tonnes in 1977-78 to 2.2 million tonnes in 1986-87.

CURRENT SITUATION

Network

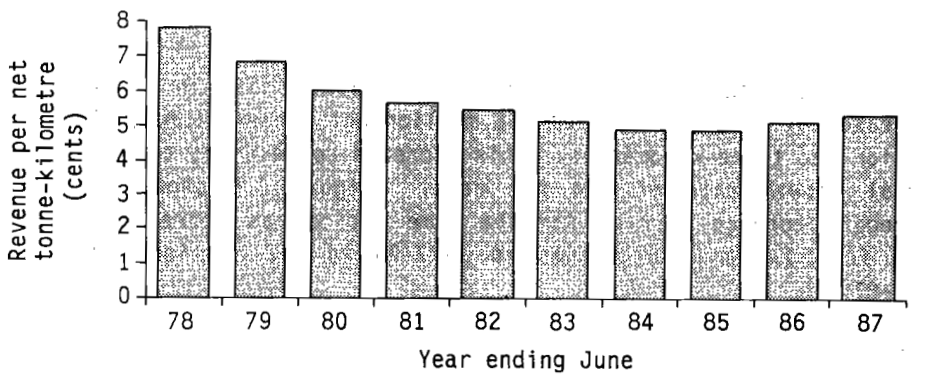
The railway network throughout Tasmania has undergone extensive rehabilitation over the last ten years, but the actual routes and lines open have essentially remained unchanged over this period of time. The lines and length of track open for 1986 are shown in Table 2.2.



Note The price deflator used was the ABS implicit price deflator for expenditure on gross domestic product.

Source Australian National (pers. comm. 1987).

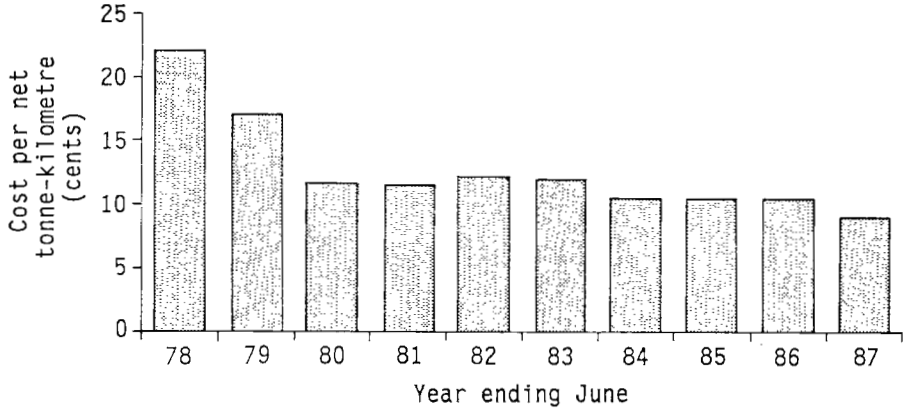
Figure 2.2 Tasrail's operating loss at constant 1986-87 prices, 1977-78 to 1986-87



Note The price deflator used was the ABS implicit price deflator for expenditure on gross domestic product.

Source Australian National (pers. comm. 1987).

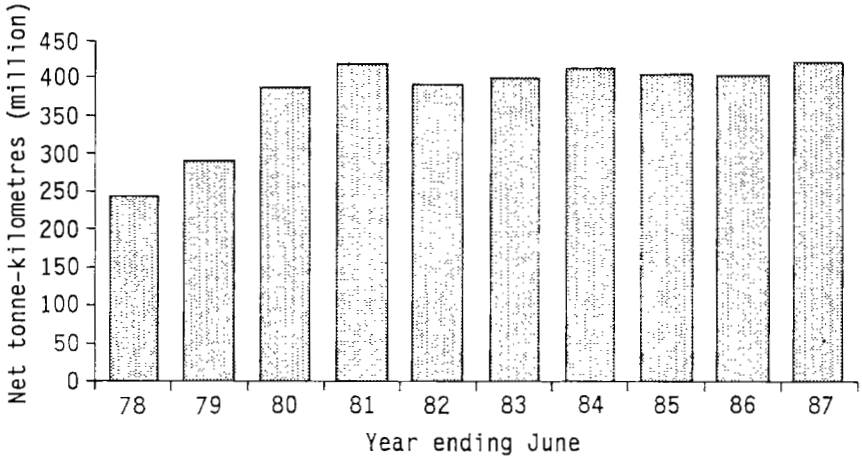
Figure 2.3 Revenue per net tonne-kilometre at constant 1986-87 prices, 1977-78 to 1986-87



Note The price deflator used was the ABS implicit price deflator for expenditure on gross domestic product.

Source Australian National (pers. comm. 1987).

Figure 2.4 Expenditure per net tonne-kilometre at constant 1986-87 prices, 1977-78 to 1986-87



Source Australian National (pers. comm. 1987).

Figure 2.5 Tasrail freight task, 1977-78 to 1986-87

TABLE 2.2 LINES AND LENGTH OF TRACK OPEN, 1986, TASMANIA

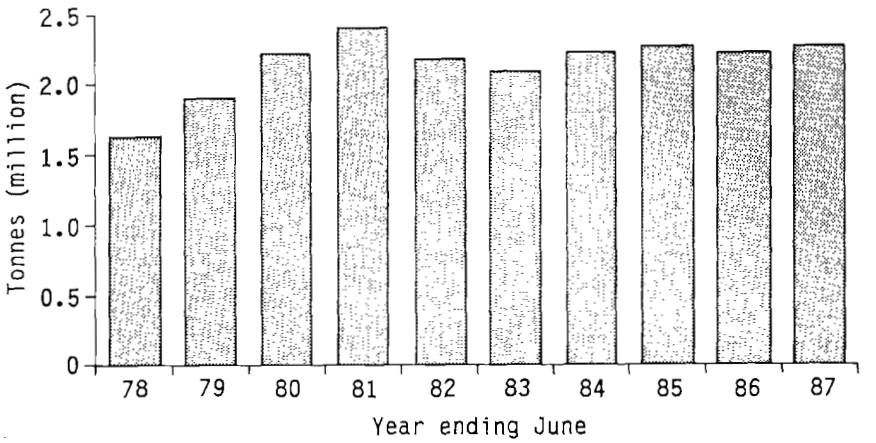
Line	*From*	*To*	*1986 (km)*
South Line	Hobart	Western Junction	197
Derwent Valley Line	Bridgewater Junction	Florentine	70
Fingal Line	Conara Junction	St Marys	75
Western Line	Launceston	Wiltshire Junction	261
Bell Bay Line	Launceston	Bell Bay	57
North Eastern Line	Coldwater Creek Junction	Herrick	124
Mole Creek Line	Lemana Junction	Mole Creek	20[a]
Stanley-Smithton Line	Stanley	Smithton	35
Route distance open			839

a. While not currently in use, the Mole Creek line is considered to be open on an 'on demand basis'.

Source Australian National (pers. comm. 1986).

Rolling stock

In addition to the track rehabilitation program, Tasrail is also aiming to upgrade the locomotive and rolling stock fleet. The entire fleet is being converted from vacuum to Westinghouse air brakes and fitted with centre couplings. The purpose of this program is to improve operations and reduce maintenance costs. Up to June 1987, 20 locomotives and 405 wagons had been transferred from Australian National's mainland operations to Tasmania.



Source Australian National (pers. comm. 1987).

Figure 2.6 Tasrail tonnage, 1977-78 to 1986-87

At the end of June 1987, Tasrail's rolling stock fleet comprised 900 wagons and an operational locomotive fleet of 41. The first of 16 locomotives purchased from Queensland Railways was received by Tasrail in 1987. The locomotives are expected to replace some of the aging locomotives in the Tasrail fleet.

Staffing levels

Figure 2.7 shows that Australian National's employment levels in Tasmania have fallen from 1686 staff in 1978 to 917 at June 1987. This represents a fall of 46 per cent. The decline in staff levels has largely been acheived through attrition - the natural decline in staff employment levels through voluntary resignation, retirement or death - and voluntary early retirement schemes. Two voluntary early retirement schemes were offered to employees during 1986: the Separation Gratuity Incentive Scheme and the Voluntary Termination Incentive Scheme. These schemes are explained in Appendix V.

Over the same period, the productivity of employees', measured by net tonne-kilometres per employee, increased by 220 per cent. The increase[4] in employee productivity is shown in Figure 2.8.

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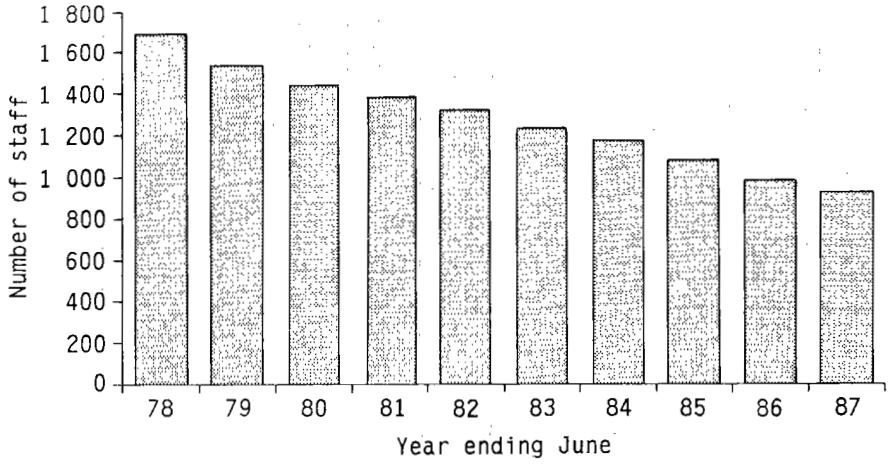
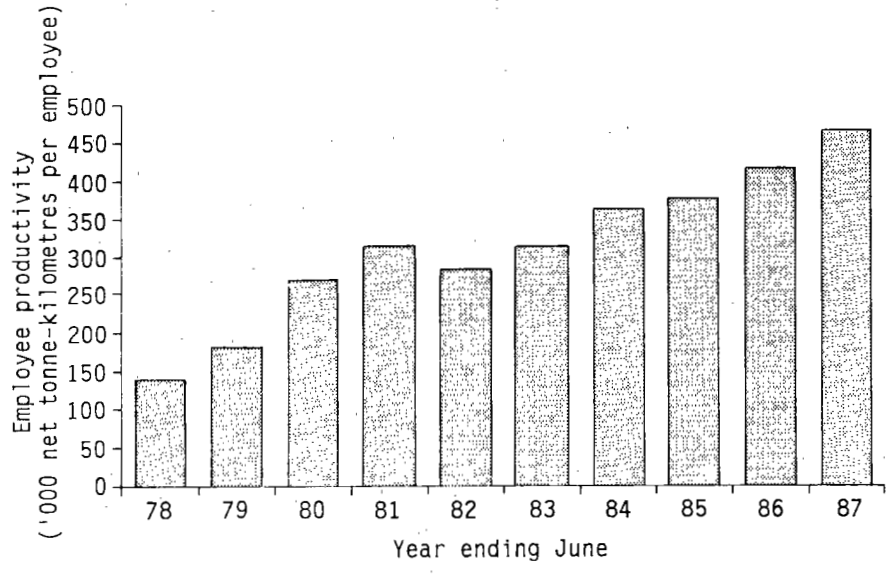
4. The decline in employee productivity for the year ended June 1982 reflects the reduced freight task for that year.



Source Australian National (pers. comm. 1987).

Figure 2.7 Tasrail workforce, 1977-78 to 1986-87



Source Australian National (1987).

Figure 2.8 Employee productivity, 1977-78 to 1986-87

SUMMARY

Over the last ten years, Tasrail's performance has improved due to both a physical upgrading of the system and an improvement in staff and operating efficiency. The major factors in this improvement in performance are:

- An increase in the freight task by 75 per cent for the period 1977-78 to 1986-87. This corresponds to an increase in aggregate tonnage of some 38 per cent for the period.
- Staff levels have fallen 46 per cent over the period despite the increasing freight task. This has resulted in a 220 per cent increase in staff productivity.
- As a direct result of these improvements, the level of operating loss has been reduced in real terms by 54 per cent since 1978.

CHAPTER 3 TASRAIL FREIGHT TASK PROJECTIONS

This chapter describes the freight carried by Tasrail and provides details of estimated rail traffic for the 20-year period, 1988-89 to 2007-08. In addition, the carriage of the projected rail task by alternative modes is considered.

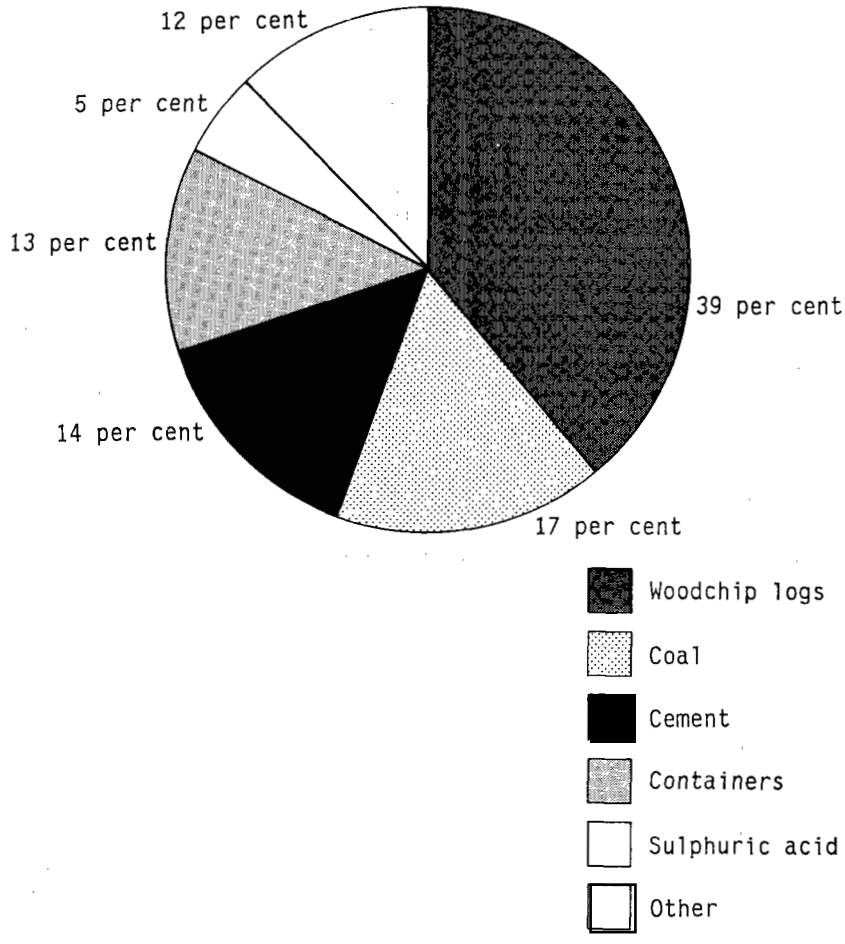
MAJOR COMMODITIES AND THE FREIGHT TASK

There are eight major commodities carried by Tasrail:

- woodchip logs
- coal
- cement
- containers
- sulphuric acid
- pulpwood logs
- fertiliser
- timber and sawlogs.

Container traffic is the only non-bulk traffic handled by Tasrail following the cessation of less than container load (LCL) traffic from 1 January 1986.

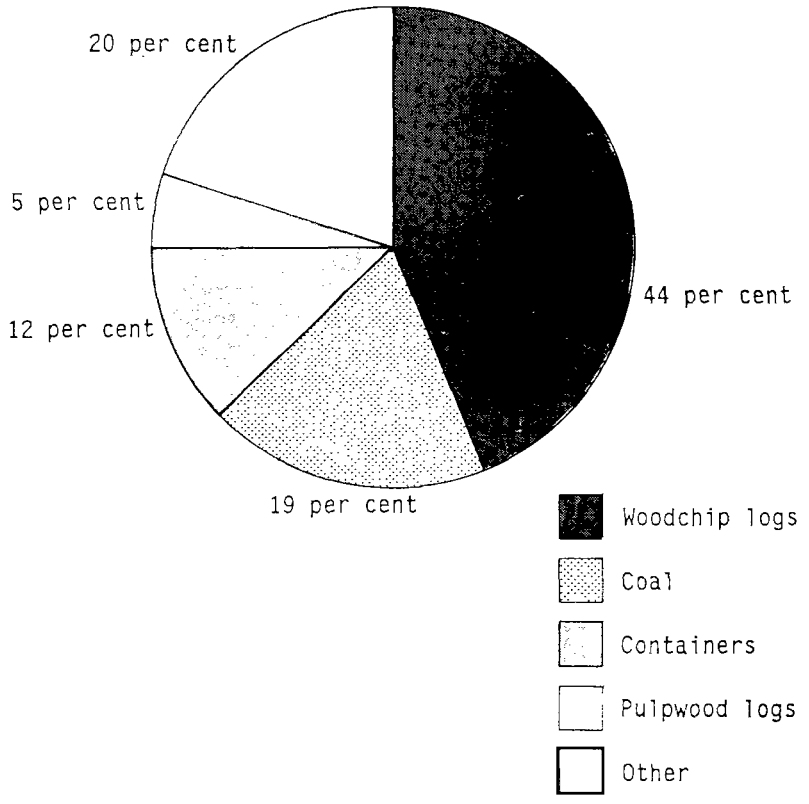
In 1986-87, Tasrail carried 2.2 million tonnes of freight corresponding to a task of 429 million net tonne-kilometres. Figure 3.1 illustrates the importance of the four major commodities in tonnage terms. Together, woodchip logs, coal, cement and containers represented 83 per cent of Tasrail tonnage in 1986-87. The freight task (that is, total net tonne-kilometres) is also heavily concentrated with woodchip logs, coal and container traffic accounting for 75 per cent of the task in 1986-87 (see Figure 3.2). While cement is particularly significant in tonnage terms, the short-haul nature of the majority of movements reduces its contribution to 4 per cent of the Tasrail task.



Source Australian National (pers. comm. 1987).

Figure 3.1 Major commodities, freight tonnes, 1986-87

The dominance of a small number of commodities in the task is also reflected in the small number of firms that are major customers of Tasrail. Six firms, namely, Australian Pulp and Paper Mills (APPM), Australian Newsprint Mills (ANM), the Electrolytic Zinc Company of Australasia (EZ), Forest Resources, Goliath Cement and Cornwall Coal either received or dispatched over 85 per cent of the freight task in 1986-87.



Source Australian National (pers. comm. 1987).

Figure 3.2 Major commodities, net tonne-kilometres, 1986-87

Recent trends

The Tasrail freight task has remained relatively constant in recent years following strong growth over the three-year period 1978-79 to 1980-81 (see Figure 2.5). This growth can be largely attributed to the growth of the woodchip log rail task, particularly in the years 1979-80 and 1980-81. More recently, the 7 per cent aggregate increase achieved in 1986-87 enabled the task to increase to a record level of 429 million net tonne-kilometres. Commodities other than woodchip logs achieving strong growth over the last ten years included sulphuric acid and coal. Cement and fertiliser were the only major commodities where the Tasrail task actually declined over the period.

FREIGHT TASK FORECASTS

In order to carry out the economic and financial analyses, forecasts were developed for the rail task covering the 20-year period 1988-89 to 2007-08.

Methodology

Three forecasts (high, medium and low growth) were prepared for each of the eight major commodities carried by Tasrail. These forecasts are expected to contain the plausible traffic levels for each commodity. The high growth forecast is intended to reflect a scenario (or a set of assumptions) 'favourable' to high growth in the freight task, while the low growth scenario adopts an 'adverse' set of assumptions for rail task growth. Therefore, the high and low growth forecasts provide an upper and lower bound to likely traffic levels. The medium growth forecast has been based on an assessment of the most likely scenario rather than a simple average of the high and low growth scenarios. Specific developments which are considered to be unlikely, but may move the traffic task outside these ranges are discussed later in this chapter.

The demand for rail transport is a derived demand in the sense that it is influenced by commodity demand and supply characteristics and factors influencing the choice of transport mode. Initial evaluation of these factors for individual commodities confirmed that a formal econometric modelling approach would not adequately capture the effect of these variables. Consequently, the three scenarios developed for each commodity were based on specific assumptions regarding factors such as commodity sales growth and distribution, production capacities and rail modal shares.

Full details regarding the derivation of the scenarios prepared for the eight major Tasrail commodities are presented in BTE (1987b). A brief description of the rail task and outlook for each of these commodities is presented below.

Woodchip logs

Currently, some 870 000 tonnes of woodchip logs are railed from numerous origins to the two woodchip mills located at Long Reach operated by APPM and Forest Resources. Major origins include Wiltshire Junction, Rogerville, Herrick, Malahide and South Burnie. In recent years, around 40 to 45 per cent of woodchip mill inputs have been transported by rail to Long Reach.

Woodchip export volumes are constrained by licences issued by the Commonwealth Government and the sound marketing prospects for Tasmanian woodchips suggest that export volumes will be maintained close to licence levels. From 1 January 1989, allowable exports will increase marginally to 2.889 million tonnes, subject to 5-year resource reviews. It is probable that Huon Forest Products (HFP) will operate from 1989-90 as an additional woodchip export licensee resulting in the reduction of APPM and Forest Resources export tonnage by around 20 per cent. Following some short-term increases in Tasrail woodchip log tonnage to 1988-89,under all scenarios, decreases in rail tonnage of between 20 and 25 per cent are forecast under the medium and low growth scenarios, after the commencement of HFP operations.

The high growth forecast provides for a decline of 15 per cent in Long Reach woodchip log traffic following the commencement of HFP operations. However, the possible development of a pulp mill in northern Tasmania may offset this decrease. The establishment of a joint-venture pulp mill by APPM and foreign investors at Wesley Vale in the early 1990s is currently being evaluated. Such a mill would generate a requirement for 1.8 million tonnes of pulpwood annually. The implications for Tasrail of this development cannot be determined with any precision. Industry sources suggest that rail may carry anywhere between 20 and 60 per cent of Wesley Vale requirements. The high growth forecast assumes that all APPM woodchip logs are redirected from Long Reach to Wesley Vale and that an additional 200 000 tonnes is moved by rail to the new mill.[1]

Coal

The Cornwall Coal Company operates two collieries in the Fingal-Mount Nicholas area and some 365 000 tonnes of coal are moved by rail to Tasmanian customers. With the exception of a small quantity of coal moved by road to Scottsdale, all coal is transported by Tasrail from Duncan to major Tasmanian secondary industries. Three major users, APPM (Burnie), ANM and Goliath account for approximately 80 per cent of Cornwall's coal sales. The movement of coal by rail is likely to be governed by the demands of existing consumers.[2] A number of coal users, including ANM and Tioxide, are planning to achieve improved

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1. The high growth scenario assumes that a 12 kilometre spur line would be provided from Latrobe to Wesley Vale
2. The major scope for significant increases in coal demand related to the development of a coal-using thermal power station by the Hydro-Electric Commission. Such a development is now considered most unlikely during the forecast period.

efficiency in their coal usage. Therefore, coal demand is not expected to increase proportionally with projected output increases for these firms. As a result, only modest growth is anticipated under the medium growth scenario. The low growth scenario assumes that there is no growth in the coal rail task, while the high growth scenario incorporates the development of a coal-using pulp mill at Wesley Vale.

Cement

Cement is produced at Railton, near Devonport, by the Goliath Portland Cement Company Limited. The cement produced by Goliath is sold to customers throughout Tasmania and railed to the port of Devonport (a distance of 22 kilometres) for shipment to mainland and overseas customers. In 1986-87, Tasrail transported 300 000 tonnes of cement of which 265 000 tonnes was Railton-Devonport traffic. Mainland sales are largely secured via a long-term contract with one major customer; however, these sales are less important to the cement rail task due to the short-haul between Railton and the port of Devonport. Major intrastate destinations include Derwent Park, Burnie and Hobart. Mainland consignments are exclusively handled by rail, while around 30 per cent of intrastate tonnage is moved by Tasrail, and the balance by road transport.

Given the relatively small size of the Tasmanian market, future significant increases in Goliath sales are likely to be on the mainland. Consequently, while significant increases in Railton-Devonport tonnage were included in the high and medium growth scenarios, the impact on the cement task will be modest. The low growth scenario assumes no change to the present cement task.

Containers

In 1986-87 just under 300 000 tonnes of container traffic was moved by rail. Four major customers (the three freight forwarders Sea Pak, TNT Seafast and Hammond Palmer, together with ANM) account for around 80 per cent of total loaded rail container tonnage. Major rail origin-destination pairs for loaded containers include Boyer-Hobart, Bell Bay-Launceston and Bell Bay-Hobart. Containers are the only major commodity carried by Tasrail not subject to regulation under the rail protection scheme (see Appendix VII).

The Tasmanian container market can be considered in two segments. For those containers ranging in gross weight up to 12 tonnes, road transport operators are generally able to carry two containers and are therefore in a very strong competitive position in relation to rail transport. Conversely, the competitive position of rail is greatly

enhanced for those containers above the 12 tonne range. Another important factor influencing the relative competitiveness of rail is the ability of road transport operators to obtain a backload.

Under the high and medium growth scenarios, some growth in the freight forwarder rail task is anticipated in response to growth in the Tasmanian economy. The low growth scenario is based on the progressive loss of rail container traffic to road as the poor rail cost recovery position of container traffic is addressed by large increases in real freight rates.[3] ANM rail container traffic from Boyer is expected to grow under all three scenarios in line with forecast ANM output increases. In addition, the high growth scenario provides for the redirection of container traffic presently shipped through the port of Hobart to the northern port of Bell Bay from 1991.[4] Tasrail is assumed to capture 200 000 tonnes of additional container traffic at this time.

Sulphuric acid

Sulphuric acid is produced as a by-product of zinc production by EZ at Risdon, near Hobart. Apart from its application in EZ fertiliser manufacture, the significant Tasmanian sulphuric acid consumer is Tioxide Australia, located at Heybridge, near Burnie. In addition, a very small quantity of acid is railed to ANM (Boyer) from Risdon. In 1986-87, almost 120 000 tonnes of sulphuric acid was handled by Tasrail.

Around 50 per cent of Tioxide acid requirements are moved by sea to the port of Burnie and then railed to Heybridge, while the remaining 50 per cent is transported by rail directly from Risdon to Heybridge. The long-haul Risdon-Heybridge movements constitute 98 per cent of the Tioxide sulphuric acid rail task.

Since sulphuric acid shipping capacity from Risdon to Burnie is presently fully utilised, it is likely that further increases in the quantity of acid demanded by Tioxide Australia will be met by long-haul rail movements ex-Risdon rather than short-haul ex-Burnie. While the vessel currently transporting the acid to Burnie by sea from

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3. In the first Tasrail Corporate Plan, covering the period 1986-87 to 1995-96, the poor cost recovery position of container traffic was highlighted. In addition, it was noted that an assessment of the long-term viability of container traffic was required.
4. This assumes that Union Steam Ship Company of Australia (USS Co) services to and from the port of Hobart are withdrawn following the expiration of the current ANM-USS Co agreement.

Risdon is due for replacement about 1990, industry sources suggest the sulphuric acid transport task will not be a significant factor in the consideration of a replacement.

Expansions currently being undertaken by Tioxide and plans for further expansion announced by the company will greatly increase the acid input required in the next two to three year period. All three scenarios provide for Risdon-Heybridge traffic to increase from about 50 000 tonnes in 1986-87 to over 100 000 tonnes in 1989-90. Further increases in subsequent years are forecast under the high and medium scenarios.

Pulpwood logs

Until recently ANM drew supplies of hardwood pulpwood by rail from Florentine to Boyer. However, as the intensity of ANM operations have been greatly reduced in the area served by the Derwent Valley Line, these rail shipments have now ceased. Consequently, Tasrail pulpwood log traffic is now based on softwood (pine) pulpwood logs obtained from Forestry Commission plantations in northern Tasmania. In 1986-87, Tasrail carried just under 100 000 tonnes of pulpwood logs.

ANM currently source pulpwood logs by rail from four locations in northern Tasmania including Blumont, Conara, Fingal and Railton and future ANM transport requirements by rail are expected to be based on these sources. The commissioning of the ANM thermo-mechanical pulp plant in mid-1987 will greatly increase the need for pine pulpwood in future years. However, wood from ANM's own forests around Boyer will be available from 1990-91 and rail traffic from Forestry Commission sources will begin to decline at this time. Following the expiration of the current ANM-Forestry Commission agreement in 1995-96, the requirement for external sources of pulpwood is expected to be virtually eliminated. Consequently, all three scenarios assume that ANM pulpwood requirements can be satisfied by ANM resources in 1996-97. The high and medium growth scenarios assume that wood continues to be sourced on a 'top up' basis from northern Tasmania to meet projected input requirements in latter years. The low growth scenario assumes that no pine pulpwood will be carried by rail after that date.

Timber and sawlogs

The transport of sawn timber and sawlogs by Tasrail involves a number of origin-destination pairs. Major movements of sawlogs include Florentine-Western Junction and Wiltshire-South Burnie. Major sawn timber origin-destination pairs include South Burnie-Tonganah, South Burnie-Launceston and Tonganah-Bell Bay. Total rail timber and sawlog traffic was 60 000 tonnes in 1986-87.

Projected sawlog tonnage to 1988-89 reflects an expected short-term increase in Florentine-Western Junction tonnage. Following the 1988-89 year, tonnage on this route is anticipated to decline significantly as sourcing from the Florentine area is reduced.

Sawn timber tonnage is expected to be around 35 000 tonnes over the forecast period. This is an increase over the current tonnage of about 10 000 tonnes reflecting expected traffic originating from Scottsdale to various locations throughout Tasmania.

Compared to the high growth scenario, the medium and low growth scenarios assume a proportionally lower tonnage is carried over all origin-destination pairs for both sawlogs and sawn timber.

Fertiliser

Fertiliser, predominantly single superphosphate, is produced in both bulk and bagged form by EZ and sold to customers throughout Tasmania. Both rail and road transport are used extensively with each carrying approximately 50 per cent of total tonnage. In 1986-87, Tasrail carried almost 60 000 tonnes of EZ fertiliser.

Annual fertiliser demand is dependent on a number of factors including climatic conditions, crop and pasture response to fertiliser application and the prices of farm inputs and outputs. Consequently, the annual fertiliser transport task has fluctuated from year to year.

EZ has faced some limited competition from mainland suppliers. However, the high cost of sea freight in relation to final fertiliser price suggests that EZ will retain their dominance of the Tasmanian market. While annual sales will be directly related to those factors mentioned above, the efficiencies achieved through the recently established bulk depot concept may enable rail to capture some market share from road transport, particularly in cases where large quantitites of bagged fertiliser are moved by road.

The three scenarios developed for the rail fertiliser task are based on little change to the current volume, which was taken to be a six-year average of rail fertiliser tonnage (that is, 1980-81 to 1985-86).[5] Growth rates for rail fertiliser tonnage range from 1 per cent under the high growth scenario to -0.5 per cent under the low growth scenario.

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5. The 1986-87 year was excluded as Tasmanian fertiliser demand was depressed significantly due to seasonal factors.

Kraft pulp

The high growth scenario provides for the inclusion of Wesley Vale-Burnie baled kraft pulp traffic originating from the proposed APPM pulp mill. It was assumed that Tasrail would carry all APPM kraft pulp and that export pulp is shipped through the port of Burnie. At full production rates the mill will produce 440 000 tonnes of pulp annually.

Other commodities

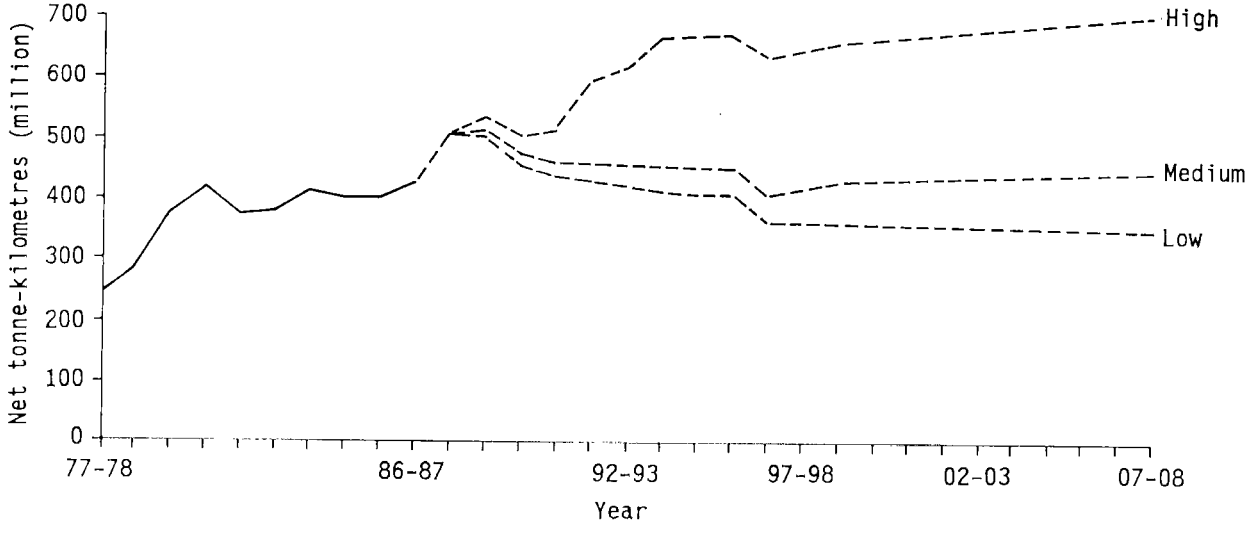
Other commodities carried by Tasrail include clay from Tonganah to South Burnie, wood waste, dolomite and quartz. With the exception of clay, all these volumes are currently less than 10 000 tonnes per annum. Prospects for these commodities suggest that the contribution of these minor commodities to the freight task will not change greatly over the forecast period. The introduction of a number of other commodities is possible although there is no firm evidence to suggest that volumes will be large for these products. Therefore, a figure of 100 000 tonnes (corresponding to an estimated task of 22.1 million net tonne-kilometres) was adopted under all three scenarios to reflect the contribution of minor commodities throughout the forecast period.

Total traffic estimates

Changes in the Tasrail task between 1977-78 and 1986-87 and forecasts to the year 2007-08 are illustrated in Figure 3.3. Details of the freight task projections under the medium growth scenario are contained in Table 3.1. Analogous information for the high and low growth scenarios is presented in Tables 3.2 and 3.3.

There is a significant increase in the task up to and including 1988-89 under all scenarios due to anticipated growth for almost all the major commodities. The subsequent decline in the following two years under the medium and low forecasts is due to the expected substantial fall in woodchip log movements to Long Reach. However, this decline is more than offset by the commencement of traffic to and from Wesley Vale under the high growth forecast from the early 1990s. Another notable decline is anticipated under all scenarios in 1996-97 when pulpwood logs currently railed from northern Tasmania to ANM (Boyer) are replaced by wood sourced in the Boyer area.

Forecast traffic levels in 2007-08 under the high, medium and low growth scenarios are 702, 449 and 350 million net tonne-kilometres respectively. The corresponding average task growth rates for the period 1987-88 to 2007-08 are 2.4, 0.2 and -1.0 per cent under the three scenarios.



Sources Australian National (pers. comm. 1987). BTE estimates.

Figure 3.3 Tasrail freight task, 1977-78 to 2007-08

TABLE 3.1 FORECAST RAIL TASK UNDER THE MEDIUM GROWTH SCENARIO, 1988-89 TO 2007-08
(million net tonne-kilometres)

	Year				
Commodity	*1988-89*	*1992-93*	*1997-98*	*2002-03*	*2007-08*
Woodchip logs	191	141	141	141	141
Cement	19	20	22	23	23
Coal	82	85	88	89	90
Containers	51	53	56	58	61
Pulpwood logs	75	51	9	24	26
Sulphuric acid	32	39	41	44	46
Fertiliser	26	26	27	28	28
Sawn timber and sawlogs	16	13	13	13	13
Other	22	22	22	22	22
Total	514	451	418	440	449

Note Figures may not add to totals due to rounding.

Source BTE estimates.

SPECIAL CIRCUMSTANCES

The three scenarios developed for individual commodities have, as far as possible, included probable rail task gains and losses. While not included explicitly in the task projections or in the analyses presented in latter chapters, there are some possible developments generating changes in the composition of the future Tasrail task and these are briefly outlined below.

Potential increases in the rail task

- If HFP are not granted an export woodchip licence, APPM and Forest Resources woodchip export tonnage could at least be maintained at current levels. This would avoid the substantial loss of rail traffic following the expected commencement of HFP operations from 1989-90. A decline of around 20 per cent or 180 000 tonnes in Long Reach rail woodchip tonnage is forecast.

TABLE 3.2 FORECAST RAIL TASK UNDER THE HIGH GROWTH SCENARIO, 1988-89 TO 2007-08
(million net tonne-kilometres)

	Year				
Commodity	*1988-89*	*1992-93*	*1997-98*	*2002-03*	*2007-08*
Woodchip logs	201	183	203	203	203
Cement	20	23	28	28	29
Coal	84	110	137	140	142
Containers	52	106	112	118	124
Pulpwood logs	75	51	10	26	29
Sulphuric acid	32	41	45	49	54
Fertiliser	26	27	29	30	32
Sawn timber and sawlogs	17	13	13	13	13
Kraft pulp	0	17	33	33	33
Other	22	22	22	22	22
Total	530	610	648	681	702

Note Figures may not add to totals due to rounding.

Source BTE estimates.

Potential declines in the rail task

- It is possible that one or more major Tasmanian coal consumers could source coal from the mainland in the future. Given their proximity to suitable port facilities, APPM (Burnie) and ANM would be the most likely consumers to consider such a change. Together, these two companies consume around 200 000 tonnes of coal moved by rail annually.
- The current Commonwealth Government inquiry regarding the Lemonthyme and Southern Forests is considering the future of some 30 per cent of the Southern Concession and 50 per cent of the ANM Concession. Any decision to completely stop logging in these areas may greatly impact upon future ANM and HFP operations.
- The future shipment of all Tioxide acid requirements by sea to Burnie would reduce the acid rail task from about 40 million net tonne-kilometres to between 1 and 2 million net tonne-kilometres, although the tonnage would remain constant.

TABLE 3.3 FORECAST RAIL TASK UNDER THE LOW GROWTH SCENARIO, 1988-89 TO 2007-08
(million net tonne-kilometres)

	Year				
Commodity	*1988-89*	*1992-93*	*1997-98*	*2002-03*	*2007-08*
Woodchip logs	191	134	134	134	134
Cement	16	16	16	16	16
Coal	80	80	79	78	77
Containers	48	43	38	33	29
Pulpwood logs	75	51	0	0	0
Sulphuric acid	32	37	37	37	37
Fertiliser	25	24	24	23	23
Sawn timber and sawlogs	15	12	12	12	12
Other	22	22	22	22	22
Total	504	419	361	355	350

Note Figures may not add to totals due to rounding.

Source BTE estimates.

. If the Tasmanian Government terminated the rail protection scheme some rail tonnage would probably be lost to road transport.

CARRIAGE OF THE RAIL TASK BY ALTERNATIVE MODES

Since the analyses undertaken in the following chapters considers the implications of rail closure, it is necessary to consider the carriage of the Tasrail freight task by alternative modes. During the course of the study all major Tasrail shippers indicated that the viability of their business concerns were not directly dependent on the continuing provision of a rail service. On the basis of this advice, all of the rail freight flows are assessed to be carried by alternative modes, with no consequent impact on the output of Tasrail customers.[6]

6. The possibility of output reductions following rail closure is considered in Appendix IX.

An important observation is that all of the eight major Tasrail commodities, with the exception of coal and sulphuric acid, are presently moved in significant volumes by road transport. As a result it was concluded that road transport would carry the bulk of the Tasrail freight task in the event of rail closure. The one probable exception would be sulphuric acid destined for Tioxide Australia located at Heybridge. The most likely outcome would involve the supply of all acid requirements from Risdon and/or mainland sources direct to Burnie by sea transport, and movement to Heybridge by road or pipeline (see Appendix IV).

The road task projections outlined in Table 3.4 correspond directly with the medium rail task forecast (excluding all sulphuric acid destined for Heybridge). Based on the estimated existing road freight task of 1500 million net tonne-kilometres[7] in 1985 (ABS 1985d), the immediate transfer of all rail freight in 1988-89 (excluding acid) to road would increase the road task by some 25 per cent or around 400 million net tonne-kilometres.

A comparison of Tables 3.1 and 3.4 shows that the road task is significantly smaller than the corresponding rail task, even allowing for the fact that all sulphuric acid destined for Heybridge is excluded from the road task tabulations. This reflects differences in rail and road distances between origin-destination pairs. That is, in general, road distances are somewhat shorter than corresponding rail distances. For example, the Wiltshire-Long Reach rail distance is 300 kilometres, while the equivalent road distance is 210 kilometres.

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7. Includes all articulated trucks and rigid trucks where the tare weight is greater than eight tonnes.

TABLE 3.4 FORECAST CHANGE TO ROAD TRANSPORT TASK CORRESPONDING TO RAIL MEDIUM GROWTH SCENARIO, 1988-89 TO 2007-08
(million net tonne-kilometres)

	Year				
Commodity	*1988-89*	*1992-93*	*1997-98*	*2002-03*	*2007-08*
Woodchip logs	148	109	109	109	109
Cement	18	19	21	22	22
Coal	76	79	81	82	82
Containers	45	46	49	51	54
Pulpwood logs	65	44	8	19	20
Sulphuric acid[a]	-	-	-	-	-
Fertiliser	24	24	25	25	25
Sawn timber and sawlogs	12	9	9	9	9
Other	22	22	22	22	22
Total	410	352	324	339	343

a. Excludes all acid destined for Heybridge.
\- Rounded to zero.

Source BTE estimates.

CHAPTER 4 ECONOMIC ASSESSMENT OF RAIL CLOSURE

This chapter is concerned with the economic consequences of rail closure. The economic analysis in this report involves a comparison of the amount and cost of the resources that will be required to carry the identified freight task either by rail, or by alternative modes if the rail system is closed. The base case assumes Tasrail would continue to operate in its existing form although account is taken of planned efficiency improvements and investment programs. The modified case assumes that Tasrail is closed in mid-1988 and its future freight task is handled by road transport (or sea transport in the case of sulphuric acid).

The analysis is undertaken from a national viewpoint and assesses the effects of rail closure on the Australian community as a whole.

METHODOLOGY

There are three main aspects of methodology that warrant discussion: identification of the benefits and costs of rail closure, the valuation of these benefits and costs and the appropriate method of appraising the benefits and costs.

Identification of the benefits and costs

The economic analysis involves a comparison of the benefits and costs of undertaking particular projects or options.[1] In economic terms the major benefits of rail closure are the resources released on closure and the saving of resources that would have been required to meet the freight task in future years. The main economic cost of rail closure is the requirement for new resources to carry the identified rail freight task by alternative modes (road and sea).

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1. For a detailed discussion of the principles of cost-benefit analysis see, for example, Mishan (1982) or Sugden and Williams (1978).

Other economic benefits and costs of rail closure fall into two groups: those which can be assigned monetary values and those which are largely unquantifiable. The economic assessment covers only the former grouping.

The effects of rail closure which are difficult to calculate in precise monetary terms include such aspects as the effects of the different transport modes on the environment, the costs of increased road congestion and the possible impact on the tourist industry in Tasmania. These costs and benefits are not included in the economic evaluation because of measurement problems but are discussed in Chapter 6 as part of the social and environmental consequences of rail closure.

Revenue projections for Tasrail or its alternatives, in future years are not included in the economic analysis as revenue changes are transfers rather than use of actual resources and are precisely offset by expenditures of Tasrail customers. Differences in revenue likely to be earned by Tasrail and its alternatives are, however, part of the financial analysis and are discussed as part of the financial consequences of rail closure in Chapter 5.

A full list of the benefits and costs examined in the economic analysis is shown in Table 4.1. The residual item in both columns reflects any remaining benefits or costs beyond the twenty year appraisal period. These are calculated by taking the benefits and costs in 2007-08 and assuming they will continue at these levels.

Valuation of the benefits and costs

There are a number of methods of valuing the resources used in a project, depending upon the nature of the evaluation exercise.

In an economic evaluation the essential requirement is to ascertain the value to society of the resources required for the freight task, whether carried by Tasrail or the alternative modes. This is normally done by reference to the opportunity cost of the resources.

Opportunity cost is defined as the benefit foregone, or the opportunity lost, by not using a resource in its next best alternative use. This definition is based on the premise that resources are not unlimited and consequently there may be a sacrifice to society when resources are applied to one use rather than another.

In a competitive market, the opportunity cost of a resource will be equivalent to the value society derives from the resource in its current use. However, in markets where imperfections materially

TABLE 4.1 DETAILS OF ECONOMIC BENEFITS AND COSTS OF RAIL CLOSURE

Benefits of rail closure	*Costs of rail closure*
Release of capital resources	Capital expenditure by road hauliers
Rolling stock	Prime movers
Plant and equipment	Trailers
Land	
Saving of future capital resources	Investment by road hauliers in future years
Saving of rail operating costs	Road vehicle operating costs
Labour	Labour
Fuel	Fuel
Other	Tyres
	Maintenance and repairs
	Insurance
	Administration
	Other
Rail accidents avoided	Road accidents incurred
Casualties	Casualties
Property damage	Property damage
Possible shipper benefits	Possible shipper costs
	Cost of transporting acid
	Ship
	Pipeline
	Road
	Road pavement damage cost
	New investment in roads
	Maintenance of roads
Residual benefits	Residual costs

affect the price/quantity mix of resources, the two values may diverge. In this analysis valuation of assets is generally based on the opportunity cost concept.

It is important that the economic and financial approaches to the valuation of a resource are clearly distinguished. Financial

accounting focuses on the financial transactions of an entity and the financial cost of a resource is the dollar value paid to its owner for the use of its service. By contrast, the economic concept of resource valuation is concerned with the real value of resources used regardless of the financial transactions that may have taken place.

Although the concern of this chapter is with economic costs and benefits, it will often be necessary in undertaking the analysis to calculate financial costs in the first instance and to adjust these costs by shadow pricing techniques to derive estimates of the economic costs.[2]

In the case of commodities such as fuel, for example, the financial valuation is represented by observed prices including any taxation elements. The economic valuation is calculated by considering the relevant resources involved and therefore generally disregards taxes and subsidies. The financial value gives an inaccurate guide to the value which might be produced by the resources in other uses.

All benefits and costs in the economic evaluation are expressed in 1986-87 prices.

Appraisal of the benefits and costs

Once all the economic benefits and costs of rail closure have been identified and valued, the problem remains of expressing the alternatives in an easily understood form, preferably in terms of a single figure. The most common criterion used in project evaluation, and the one adopted in this study, is the net present value approach.

Under the net present value approach, the benefits and costs of rail closure are estimated for each year of the chosen period of appraisal and then calculated in terms of their present value by the use of discounting procedures. Discounting is the process of calculating the present value of a stream of future payments and is a recognition that individuals and society have a time preference between income and expenditure in different periods. It is analogous to the payment of interest on borrowed funds. The rate of discount or interest applied is one of the determinants of the present value.

The difference between the present value of the discounted benefits and the discounted costs of rail closure is known as the net present value of the closure option.

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2. The concept of shadow pricing, particularly as it relates to labour resources, is discussed in Appendix V.

It follows that, from a national viewpoint, the economic assessment would favour closure of the railway if the net present value of the closure option is positive, that is if the benefit-cost ratio is greater than one.[3] However, it should be noted that a change in the discount rate may change the net present value. For the purpose of this study the benefit and cost streams are calculated using discount rates of 4, 7 and 10 per cent.

The period of appraisal for the study is 1988-89 to 2007-08, with provision for residual benefits and costs occurring after that time to be included in the evaluation. This approach was favoured due to the uncertainty attached to benefits and costs up to and beyond 20 years and the fact that developments after that time would not have a significant impact on the evaluation results, due to the effects of discounting over long periods.

ESTIMATION OF BENEFITS AND COSTS

Estimates of the various benefits and costs associated with rail closure requires an assessment of the quantity of resources likely to be used by road and rail and appropriate valuations of these resources.

The amount of resources required by Tasrail or by road transport depends to a significant extent upon future traffic. In Chapter 3, the analysis of the major industries in Tasmania enabled forecasts of the rail and road freight tasks to be presented for the years 1988-89 to 2007-08, under high, medium and low scenarios. The medium scenario is adopted as the base case for calculations of economic benefits and costs in this chapter.

Valuation of the benefits and costs of rail closure

The methods employed in estimating the value of specific benefits and costs are outlined below. A detailed discussion of the estimation procedures occurs in the appendixes. The section below also includes first year (1988-89) estimates of the value of the benefits and costs.

Release of capital resources

The nature and value of the capital resources that would be released on closure are discussed in Appendix III.

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3. The benefit-cost ratio is simply the ratio of discounted benefits to discounted costs.

It was judged that most of Tasrail's rolling stock would have no alternative use (that is become redundant) and would be sold for scrap value. The exception might be recent locomotive acquisitions from Queensland Railways, which could possibly be resold overseas and some specialised wagons which could be used on the mainland. Plant and equipment was similarly regarded as being mainly suitable for salvage except for containers, which could be sold at market values, and motor vehicles and machinery (book values). Land occupied by buildings, goods yards and some of the rail route has an economic value equal to its market value less any conversion costs.

It was assumed that the value of Tasrail assets would be fully realised in 1988-89. The economic value of capital resources released in 1988-89 is estimated to be around $24 million. This estimate could be subject to a small margin of error due to some uncertainty regarding the valuation placed on individual components, particularly machinery and motor vehicles.

Saving of future capital resources

Investment by Tasrail in future years could take three forms: investment to replace existing assets, investment in rolling stock to accomodate increased volumes of traffic and new investment aimed at improving productivity.

Calculations of investment savings are based on advice from AN of its future capital requirements. The economic cost of this form of investment is estimated at $6.4 million in 1988-89.

Saving of rail operating costs

Rail operating costs were estimated for the years 1988-89 to 2007-08 by applying the traffic forecasts to the Tasrail network on the basis of the methods explained in Appendix III. Adjustments were made to the financial costs of the labour and fuel components to obtain estimates of resource costs.

The economic valuation of labour resources is discussed in detail in Appendix V. Economic values were derived by comparing the number of workers expected to be employed each year by Tasrail, with the optimum workforce required to operate an efficient railway. For each year that the Tasrail workforce is in excess of this optimum level, the excess numbers employed are regarded as surplus and their costs are subtracted from financial costs to derive economic costs.

Economic values for labour were also estimated on the basis of an assessment of the alternative employment opportunities for the Tasrail workforce. These estimates result in a lower economic valuation being

placed on Tasrail labour and are used as part of the sensitivity analysis later in the chapter.

The price of fuel was adjusted for excise and customs duties to reflect its true cost to society.

The economic evaluation allows for a productivity increase of 1 per cent per annum until 1996-97. Beyond that period, the railway is assumed to be approaching optimum efficiency and productivity is held at a constant level.

The increase of 1 per cent per annum is the same as that adopted by AN in its corporate planning. In view of the fact that this figure is a target, a lower rate of increase in productivity is considered as part of the sensitivity analysis.

The operating cost savings for Tasrail, adjusted to resource costs, in 1988-89 were estimated at $25 million.

Rail accidents avoided and road accidents generated

The relative safety of road and rail is discussed in more detail in Appendix X.

The rate of rail accidents in Tasmania over the five year period 1982 to 1986 was utilised for the appraisal period. Additional road accidents were calculated by reference to the number of extra trucks on Tasmanian roads in the event of rail closure and the average distances likely to be travelled.

The savings to society of rail accidents avoided and the cost of additional road accidents incurred were valued according to preliminary results of research being undertaken by the BTE.

It is concluded that the community might be at a higher risk of injury but at a lower risk of fatalities following closure of Tasrail. The net effect of rail closure on accidents would consequently be small with an estimated cost to society of around $60 000 in 1988-89. However this total annual cost is indicative only and should be treated with caution. It also excludes costs associated with industrial accidents in both modes.

Shipper costs

Details of possible benefits and costs to shippers if Tasrail closed are developed in Appendix IX.

Additional resource costs may be imposed on some current Tasrail customers due to necessary changes in handling facilities, as the

operations of all the major customers have been geared towards a long-term continuing use of rail transport. Detailed costs information on the capital expenditure required to modify these facilities was not available. However, for purposes of the analysis, a cost of $5 million has been assumed as a reasonable estimate.

Capital expenditure by road hauliers
The traffic forecast in Chapter 3 indicates a road freight task of around 400 million net tonne-kilometres in 1988-89.

In Appendix VI it is estimated that road hauliers would require 237 new prime movers and 379 new trailers to carry the additional freight in 1988-89 at a resource cost of $42 million. Appendix VI contains details of the methodology used in estimating resource requirements for road hauliers.

The increased activity in the road haulage industry may also require new depots and other buildings in some cases. These are estimated to cost $2 million in the first year of the appraisal period.

Investment by road hauliers in future years
Over the 20-year appraisal period the capital investments would have to be replaced several times.

In Appendix VI it is estimated that new prime movers purchased in 1988-89 would require replacement after 8 years. On the basis of the estimated future road freight task, new investment in prime movers would amount to around $23 million (net of taxes) after 8 years and $25 million after 16 years of the appraisal period. Trailers would require replacement after 12 years, at a total resource cost of $11 million.

Road vehicle operating costs
Road vehicle operating costs and the assumptions underlying their derivation are detailed in Appendix VI. The two most important cost factors in the operation of articulated trucks in Tasmania are fuel and labour costs, each accounting for about one-third of total operating costs.

The financial cost estimates for each item were calculated in terms of cost per vehicle kilometre and converted to total annual costs using various utilisation rates depending upon the commodity being transported. Labour resource costs were assessed to be equal to financial costs. Other resource costs were derived by netting out taxes from the purchase price of fuel and tyres and by excluding vehicle registration charges and third party insurance costs because they are both transfer payments.

The estimated vehicle operating resource costs in 1988-89 were around $90 000 per vehicle, or $22 million in total.

Cost of transporting acid

In the event of rail closure the Bureau's assessment is that the sulphuric acid currently transported from Hobart to Heybridge by rail would not be carried by road due to the environmental hazards involved.

For the purposes of the economic evaluation it is assumed that all Tioxide's acid requirements would be carried to Burnie by ship. The acid might be transported the remaining eight kilometres between Burnie and Heybridge by road or by the building of a pipeline.

Detailed costing of the alternative methods of transporting acid in Tasmania occurs in Appendix IV. The cost in 1988-89 is estimated at $1.8 million.

Pavement damage

The cost of increased construction and maintenance resulting from increased road traffic is difficult to assess precisely. The cost of pavement damage imposed by extra trucks on Tasmanian roads depends upon the volume of traffic, the existing condition of the roads and factors such as climate.

In order to estimate the additional resources required for road maintenance and construction in the event of rail closure, the BTE commissioned Nicholas Clark and Associates to survey the affected parts of the Tasmanian road network and present cost estimates.

The main results of the survey are detailed in Appendix VIII. It is estimated that the additional damage caused by the extra trucks would involve additional maintenance expenditure of around $1.9 million per annum in the early years of rail closure, but falling away to very small amounts in later years. Higher estimates of additional road maintenance expenditure are tested in the sensitivity analysis.

EVALUATION RESULTS

First and second year estimates of the economic value of benefits and cost are summarised in Table 4.2.

The evaluation was undertaken assuming that Tasrail would cease operations on 30 June 1988.

Results of the evaluation are summarised in Table 4.3 which incorporates discount rates of 4, 7 and 10 per cent. The evaluations are all based on the medium traffic estimates for rail and road.

TABLE 4.2 ECONOMIC VALUATION OF BENEFITS AND COSTS OF RAIL CLOSURE IN 1988-89 AND 1989-90[a]
($ million)

Benefits/costs	*1988-89*	*1989-90*
Benefits		
Release of capital resources	24.3	0.0
Saving of future capital resources	6.4	5.0
Saving of rail operating costs	25.4	24.6
Rail accidents avoided	0.6	0.6
Costs		
Capital expenditure by road hauliers[b]	43.7	0.0
Future investment by road hauliers	0.0	3.0[c]
Road vehicle operating costs	22.2	20.9
Road accidents incurred	0.7	0.7
Shipper costs[b]	5.0	0.0
Cost of transporting acid	1.8	2.0
Pavement damage	1.9	1.9

a. 1986-87 prices. Medium scenario.
b. Assumed to be incurred in 1987-88.
c. Average amount over the 20-year period.

Source BTE estimates.

The economic evaluation is presented both in terms of net present value and the benefit-cost ratio. The results for two of the three discount rates indicate that the net present value is marginally positive.

It should be noted that the evaluation results are based on a number of estimates and are thus subject to a degree of error. However, the fact that all the benefit-cost ratios for the three discount rates are of the same order of magnitude and very close to unity indicates that it would take a relatively large change in the estimates of benefits, or costs, to clearly justify the closure or retention of Tasrail. Alternatively, the social net benefits of closure identified in Chapter 6 would have to be relatively large to significantly influence the assessment.

TABLE 4.3 ECONOMIC EVALUATION OF RAIL CLOSURE, MEDIUM TRAFFIC FORECAST

($ million)[a]

	Discount rate		
Benefits/Costs	*4 per cent*	*7 per cent*	*10 per cent*
Benefits			
Capital resources released	23.4	22.7	22.1
Future capital savings	45.3	37.0	31.0
Rail operating cost savings	312.2	244.9	198.1
Rail accidents avoided	9.1	7.1	5.7
Residual benefits	157.3	69.5	32.1
Total	547.3	381.2	289.0
Costs			
Capital expenditure by road hauliers	73.2	66.2	60.9
Road vehicle operating costs	247.8	195.1	158.4
Road accidents incurred	8.3	6.5	5.2
Shipper costs	5.0	5.0	5.0
Acid transport costs	29.3	22.6	18.0
Pavement damage cost	12.5	10.9	9.6
Residual costs	158.5	70.0	32.3
Total	534.6	376.3	289.4
Net present value ($m)	12.7	5.0	-0.4
Benefit-cost ratio	1.02	1.01	1.00

a. Discounted to 1988-89.

Source BTE estimates.

The economic analysis assumes that all the benefits and costs count equally regardless of to whom they accrue or by whom they are paid. The quantitative outcomes shown in Table 4.3 thus carry no distributional significance, and only indicate whether there will be gains or losses to the community as a whole. The impact of rail closure on particular groups in society is discussed as part of the financial and social analyses in the following chapters.

In addition, the economic analysis does not include any secondary benefits and costs that might occur due to closure of the railway. Secondary effects arise from changes in income and expenditure in the rail and road transport industries being passed on to other sectors of the community. It was estimated that these effects balance out to a large extent and in any case are only small in the context of the size of the Australian economy.

SENSITIVITY ANALYSIS

Economic evaluations are based on a large number of assumptions. The purpose of sensitivity analysis is to test the impact on the outcome of the economic appraisal when changes are made to certain key assumptions. Appraisals are then undertaken on the basis of a series of upper and lower bounds.

The economic evaluation of Tasrail closure was repeated using the following alternative assumptions:

- lower and higher volumes of overall traffic
- higher levels of road maintenance costs
- lower efficiency improvements for the railway
- alternative shadow price of Tasrail labour.

In view of the uncertainty over the growth of the alternative freight tasks, the economic evaluation was repeated using the low and high traffic forecasts described in Chapter 3. Under the high forecast there is a significant improvement in the case for maintaining the railway, and the reverse applies to the low forecast.

Pavement damage is a significant cost element in the economic appraisal. However, estimates are complicated by many factors and there is disagreement on the damage attributable to different weight categories of vehicles. For the purpose of the sensitivity analysis, it was assumed that the costs calculated in Appendix VIII were doubled. The result slightly favours retention of the railway.

The productivity improvements for Tasrail utilised in the economic evaluation are the same as those targeted by Australian National in its corporate planning. In the sensitivity analysis, no productivity changes beyond the reduction in staff levels are assumed. In this case, the argument for closing the railway is significantly strengthened.

The shadow price for Tasrail labour used in the economic evaluation

was derived in Appendix V. Alternative values were also derived in the appendix by varying the method of determining the economic cost of labour.

The results of the sensitivity analysis are shown in Table 4.4.

SUMMARY

The economic consequences of rail closure were estimated by comparing the benefits and costs of closure over a 20-year period, discounted to 1988-89. The economic evaluation suggests that the benefit of closure are marginally greater than the costs. Under the different assumptions tested in the sensitivity analysis, the economic assessment of the railway moves in favour of retention with high traffic forecasts or high pavement damage costs but moves in the opposite direction if traffic levels or productivity levels are low.

TABLE 4.4 ECONOMIC EVALUATION USING ALTERNATIVE ASSUMPTIONS[a]

Alternative assumption	*Net present value*[b] *($m)*	*Benefit/ cost ratio*
Traffic forecasts		
High	-95.1	0.82
Low	20.6	1.06
Pavement damage		
High estimate[c]	-6.2	0.98
Tasrail productivity		
Low estimate[c]	29.1	1.08
Shadow price of Tasrail labour		
Low estimate[c]	-55.6	0.85

a. All evaluations are calculated at 7 per cent discount rate.
b. 1988-89 prices.
c. Medium traffic forecast.

Source BTE estimates.

CHAPTER 5 FINANCIAL ASSESSMENT OF RAIL CLOSURE

The financial consequences of rail closure relate to the changes in income, revenue and expenditure that would occur for various groups and organisations in the community. In the event of Tasrail closure some groups would, as a result, improve their net financial position while others would lose in financial terms. In contrast to the economic evaluation in Chapter 4, it is not possible to ascertain a single net benefit or loss to society at large in the financial analysis. Rather, the financial consequences of rail closure are presented in terms of a series of gains and losses to various groups within society. In this way the distribution of benefits and costs can be analysed and the major gainers and losers identified. The financial assessment was undertaken in terms of observed prices. All revenues and expenditures are expressed in 1986-87 price levels.

The individual groups and interested parties that would be financially affected by Tasrail closure, and which are discussed in detail below, are classified under the following major headings:

- rail transport industry
- road transport industry
- Commonwealth Government
- State Government
- Tasrail customers
- others.

In some cases there are sub-groups within the above categories. For example, Tasrail employees are discussed as part of the rail transport industry.

The estimated changes in the net financial position of the identified groups are presented below for the first three years of rail closure. The amount denoted for each of the three years is the change in relation to the situation in each year if the railway had stayed open.

RAIL TRANSPORT INDUSTRY

The financial consequences of closure for the rail transport industry can be considered under two headings: Australian National and Tasrail employees.

Australian National

For the purposes of the financial assessment it was assumed that all the financial gains and losses flowing from the closure of the railway would impact on Australian National (AN). Consequently, it is not necessary to consider Tasrail as a separate entity in this context.

On closure of the railway there would be two kinds of financial impact upon AN. First there would be changes in financial flows due to the halt in the actual railway operations. Second, there would be various costs and savings associated with the disposal of resources used in operating the railway.

In the absence of the railway AN would lose all the revenue it could have expected to obtain from traffic carried between 1988-89 and 2007-08. At the same time AN would save the working expenditure required to carry the traffic in the same period.

Revenue estimates for Tasrail, based on traffic forecasts, are detailed in Appendix XI. The operating costs associated with the forecast traffic were calculated on the basis of the methods explained in Appendix III. Details of Tasrail's projected revenue and costs, and the accompanying deficit projections, are shown in Table 5.1.[1]

The deficit is expected to fall from $10 million in 1988-89 to around $3 million a year in the 1990s. For the low traffic scenario, the deficit is forecast to reach about $6 million, while under the high traffic scenario, a profit is forecast.

For the purposes of this analysis, it is assumed that the financial deficit is fully funded by way of subsidy from the Commonwealth Government. Under current subsidy arrangements, where a three year contract has been negotiated, it is possible for AN to make a profit or loss on the subsidy if the target deficit is not achieved. However this is disregarded in the analysis.

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1. The deficit projections differ from AN's own forecasts in Tasrail Corporate Plan No. 2. This is primarily due to the slightly higher task levels and different composition assumed by AN which results in higher revenue forecasts.

TABLE 5.1 REVENUE, COST AND DEFICIT PROJECTIONS, TASRAIL, 1988-89 TO 2007-08[ab]

($m)

Year	Expenditure avoided	Revenue forgone[c]	Deficit[d]
1988-89	37.7	27.7	-10.0
1992-93	31.6	26.4	-5.1
1997-98	29.6	25.4	-4.1
2002-03	29.9	26.7	-3.2
2007-08	30.1	27.2	-2.9

a. 1986-87 prices.
b. Medium growth scenario.
c. Includes revenue of $0.4 million not derived from the carriage of freight.
d. These numbers are prepared on a standard accounting basis, and actual subsidy payments may vary slightly from the deficit.

Source BTE estimates.

If the railways were to be closed all Tasrail employees would be paid off from 30 June 1988 and would receive payout of all leave entitlements at that time. In addition, employees are likely to be eligible to receive compensation under the provisions outlined in Appendix V. Redundancy compensation varies according to a number of factors but is mainly based on length of service as an employee.

On the basis of current AN voluntary redundancy schemes it is estimated that the cost to AN of redundancy payments and leave and other entitlements in 1988-89 would be around $13.6 million.

It is assumed that Tasrail's senior managerial and technical staff would be relocated to work on AN's mainland operations. The cost of moving the staff and their families is estimated at $100 000.

AN would benefit financially from the scrap or resale value of rolling stock, plant and equipment and permanent way assets. In addition, all land used by AN in Tasmania would be available for sale at market value. Values of these assets are detailed in Appendix III and in total are estimated to realise $24 million in 1988-89.

AN would also gain through the savings in investment it would undertake if Tasrail remained open. In Chapter 4 it was assumed that

funds would be put aside for investment in efficiency improvements over the appraisal period, although funding from the Commonwealth Government may also be sought for this purpose. These funds are additional to the internally generated funds (from depreciation and other non-cash items) that are included in the deficit calculations.

Table 5.2 summarises the financial consequences for AN if Tasrail's operations ceased in 1988. The figures indicate a gain to AN of around $15 million in the first year of closure, but falling away to a level represented by the savings made by avoiding future investment in subsequent years.

Tasrail employees

In the event of rail closure in 1988, around 870 Tasrail employees would be made redundant, although around 220 of this number would in any case leave Tasrail over the next 4 years, given expected rates of attrition. The future earning implications for Tasrail employees as a group would vary according to whether they found alternative employment, remained unemployed or chose to retire from the workforce.

The employment prospects for the Tasrail workforce are discussed in Appendix V. The expected future private incomes of Tasrail employees are determined in the first instance by deriving estimates of workers in the various occupational groups finding new work, remaining

TABLE 5.2 FINANCIAL IMPACT OF RAIL CLOSURE: AUSTRALIAN NATIONAL, 1988-89 TO 1990-91[a]

($m)

	1988-89	*1989-90*	*1990-91*
Saving of deficit[b]	+10.0	+8.1	+6.6
Loss of subsidy	-10.0	-8.1	-6.6
Redundancy payments	-13.6	0.0	0.0
Senior staff relocation	-0.1	0.0	0.0
Sale of railway assets	+24.3	0.0	0.0
Saving of future investment[c]	+3.9	+2.5	+2.5
Total	+14.5	+2.5	+2.5

a. 1986-87 prices.
b. Medium growth scenario.
c. Excludes investment funded from depreciation.

Source BTE estimates.

unemployed or retiring from the workforce, and second by the financial compensation received for those employed, unemployed and retired. Average wages in Tasmania for relevant occupations and the level of unemployment benefits were utilised to determine alternative earnings potential.

The incomes of Tasrail workers following closure would also be affected by involuntary retirement benefits and other severance payments. These are also discussed in Appendix V.

All permanent Tasrail employees would receive involuntary retirement payments on the termination of their employment, which would include past superannuation contributions of those employees in the Commonwealth and State Superannuation schemes. In addition, temporary staff engaged before 1978 would receive benefits based on length of service. The total amount for all employees is estimated at around $26 million. It is assumed that all workers elect a lump sum payment and that this is invested at an annual interest rate of 10 per cent. Consequently, retirement benefits are included as part of the income changes following closure.

In addition to these retirement benefits, redundancy compensation payments similar to AN's Voluntary Redundancy Incentive Scheme (VRIS) would be expected to apply in the event of closure. This scheme provides a lump sum equivalent to two weeks pay for each year of service up to 26 years. Lump sum redundancy payments to Tasrail workers, made on the basis of this scheme would result in an estimated $12.7 million (or $14 600 per employee) being paid out in 1988-89.

Table 5.3 summarises the financial consequences of rail closure for Tasrail employees in June 1988. The gain in income in the first year of closure is a result of the AN lump sum redundancy payment. In the second and third years, Tasrail employees are $2.1 million worse off as a result of closure.

ROAD TRANSPORT INDUSTRY

The financial effects of Tasrail closure on the road transport industry are considered from the point of view of the road transport operators and those directly employed in the trucking operations. The impact of closure on workers in the road construction industry is also briefly discussed.

Road transport operators

The financial operations of the road hauliers required to carry Tasrail's freight can be divided into capital expenditure and current net income.

TABLE 5.3 FINANCIAL IMPACT OF RAIL CLOSURE: TASRAIL WORKFORCE[a]
($m)

	1988-89	*1989-90*	*1990-91*
Income			
Wages[b]	-10.1	-7.9	-7.9
Unemployment benefits[c]	0.0	+3.2	+3.2
Involuntary retirement benefits[d]	+2.6	+2.6	+2.6
Redundancy payments	+12.7	0.0	0.0
Leave, other entitlements	+0.9	0.0	0.0
Total income	+6.1	-2.1	-2.1

a. 1986-87 prices.
b. Adapted from Tables V.5, V.8.
c. Adapted from Table V.6.
d. Adapted from Tables V.5, V.8. Lump sum invested at 10 per cent per annum.

Source BTE estimates.

In Appendix VI it is estimated that road hauliers would have to purchase 237 prime movers and 379 trailers to carry Tasrail's freight task under the medium scenario in 1988-89, at a total financial cost of around $50 million. New infrastructure (depots, other buildings, handling facilities and equipment) estimated by industry sources to amount to $2 million would be required to cope with the additional freight task.

Estimates of the additional annual income likely to be earned by road transport operators are derived in Appendix VI. Gross turnover per articulated vehicle in 1988-89 is estimated to average around $160 000, but will vary depending on the type of freight carried. The additional gross turnover of all road transport operators in 1988-89 would total around $38 million.[2]

2. The road transport industry in Tasmania is highly competitive and profits are expected to be confined to an average return on Capital plus, for owner-drivers, an average reward for their labour. The actual amount of profits will depend upon the extent of leasing, hire purchase and direct investment in the industry.

Road transport employees

The overall level of earnings for the employees of road transport operators largely depends on the number of hours worked and their rates of pay per hour.

The road operating costs in Appendix VI were derived under certain assumptions regarding the amount of labour required to handle the new freight task in the absence of the railway. Discussions with road industry sources and information obtained from surveys of trucking operations enabled the Bureau to estimate the additional labour resources needed and the wages likely to be received by the different occupational groups.

The 465 additional employees required in 1988-89 are made up of truck drivers, mechanics, fork lift operators, dispatchers and other employees. Some of this group would have been previously unemployed, while a further number may come from the ranks of the Tasrail employees. The estimated wages accruing to the new group of employees totals around $11 million in 1988-89. This figure includes owner-drivers.

Road construction employees

In Appendix VIII additional pavement damage caused by the transfer of Tasrail's freight task to road transport is estimated to result in additional road maintenance expenditure of around $1.9 million in the first few years after rail closure.

This level of expenditure could be expected to include around 55 per cent for the labour component, or $1.0 million.[3] Taking account of on-costs, the extra wages paid to road construction workers would be around $800 000 per annum. The extra employment created would number around 40 workers.

Table 5.4 shows the financial changes in the road transport industry following rail closure.

COMMONWEALTH GOVERNMENT

The closure of Tasrail would lead to widespread financial consequences for the Commonwealth Government, many of which are difficult to calculate in a precise manner. For this reason financial changes affecting the Commonwealth Government will sometimes be estimated within a certain range.

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3. See BTE (1987e).

TABLE 5.4 FINANCIAL IMPACT OF RAIL CLOSURE: ROAD TRANSPORT INDUSTRY[a], 1988-89 TO 1990-91

($m)

Operators/employees	*1988-89*	*1989-90*	*1990-91*
Road transport operators			
New investment	-52.0	0.0	0.0
Change in turnover	+37.9	+36.9	+35.9
Road transport employees[b]			
Additional wages[c]	10.2	9.9	9.6
Road construction employees			
Additional wages[c]	+0.8	+0.8	+0.8

a. 1986-87 prices.
b. Includes owner-drivers.
c. Actual income changes of the new employees are impossible to calculate due to lack of information on their existing employment status and income levels.

Source BTE estimates.

The financial consequences of rail closure can be discussed in terms of likely changes in revenue and expenditure.

Revenue consequences

Taxes paid by Tasrail

Australian National has in the past been generally exempted from both Commonwealth and State taxes. However, since May 1987 it has been required to pay excise and customs duties on materials.

The major tax liability for AN is in the form of excise and customs duties on fuel. Assuming a constant rate of taxation, Federal and State revenue estimates were calculated for each year. In 1988-89, the Commonwealth would have received about $2.1 million in taxes on Tasrail's fuel consumption.

Charges for road users

The additional number of road vehicles required to carry Tasrail's freight task would benefit the Commonwealth Government through specific charges and taxes on road users, although a portion of the revenue raised would be hypothecated to roads expenditure.

The main items are:

- continuation of the arrangements established under the Australian Bicentennial Road Development (ABRD) program which is financed by a surcharge of 2 cents per litre on motor spirit and diesel;
- Australian Land Transport Program (ALTP) which is financed by a share of motor spirit and diesel excise (currently 3.964 cents per litre[4]; and
- excise and customs duties on petroleum currently set at 17 cents per litre, which are paid into consolidated revenue.

On the basis of the additional road freight task detailed in Appendix VI and corresponding fuel consumption, the Commonwealth Government would receive an extra $4.6 million in 1988-89, of which $1.2 million would be directly redistributed in road building funds.

Customs duties and sales taxes are also levied on new vehicles and parts imported into Australia. Trucks are generally assembled in Australia from mainly imported components. Some of these items attract no duty while others have a duty ranging up to 30 per cent. Discussions with industry sources indicate that the average rate of sales tax and duty combined on new prime movers and trailers accounts for around 16.5 per cent of final price. Sales tax on tyres and other parts also accounts for around 16.5 per cent of price.

Assuming the road transport industry purchases 237 new prime movers and 379 new trailers in 1988-89, the revenue to the Commonwealth Government would be around $8.2 million.

Taxes and duties in subsequent years would be determined by the assumed road freight task and road transport replacement expenditure as outlined in Appendix VI.

Personal and retail taxes

Changes in employment and income levels in Tasmania, as a consequence of rail closure, would affect the revenue collected by the Commonwealth in the form of income taxes and sales taxes on consumer items.

The change in taxation revenue following rail closure is chiefly determined by the change in incomes for Tasrail employees, road transport employees and employees in other industries linked to the

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4. The amount is variable according to changes in the Consumer Price Index.

fortunes of the two transport modes. Estimates of income changes in the transport industries, combined with the secondary income changes in other industries, suggest only a negligible impact on Commonwealth revenue.

Expenditure consequences

Subsidy to Tasrail

The current Commonwealth Government subsidy would no longer be required in the event of rail closure. The estimated savings to the Commonwealth Government in the first three years after closure are detailed in Table 5.5.

Involuntary retirement benefits

Retirement benefits paid to retrenched Tasrail employees are discussed in Appendix V.

Involuntary retirement payments are prescribed by the involuntary retirement provisions of relevant Commonwealth and State legislation. Permanent staff are covered by either the *Commonwealth Superannuation Act* 1976 or the *State Retirement Benefits Act* 1982 (Tasmania). In both schemes retrenched employees receive benefits to the value of 3.5 times their accumulated superannuation contributions.

It is assumed that the Commonwealth Government would meet the cost of these benefits for members of both the Commonwealth and State Superannuation schemes. The estimated total cost to the Commonwealth is 2.5 times the accumulated contributions, or around $16.7 million.

Unemployment benefits

Unemployment benefits are the financial responsibility of the Commonwealth Government. The assessment of employment prospects for the Tasrail workforce (see Appendix V) includes an estimate of the numbers likely to be unemployed in 1988-89 and in subsequent years. It is estimated that none of the retrenched Tasrail employees would be entitled to unemployment benefits in the first year of closure due to redundancy payments being greater than the maximum incomes allowed.

In the road transport industry it is assumed that all of the new employees required immediately following rail closure would have been previously unemployed.

The net effect of changes in employment in rail and road transport following rail closure is estimated to result in a saving in the payment of unemployment benefits of $3.7 million in 1988-89. In subsequent years former Tasrail employees without employment will be

eligible to claim unemployment benefits. Consequently, there will be a net cost to the Commonwealth Government.

Retraining and relocation costs
It is estimated that between 30 to 50 per cent of the Tasrail workforce who find alternative employment will require some retraining, but this is assumed to be of an on-the-job nature, at the expense of the new employers.

The Commonwealth Government's Adult Training Program provides training opportunities for the long-term unemployed (unemployed for at least six out of the past nine months). Around 5 to 10 per cent of Tasrail employees still unemployed after 1988-89 might seek assitance from this program.

In addition, the Commonwealth Government's Relocation Assistance Scheme (RAS) reimburses unemployed applicants who are prepared to relocate, for such expenses as fares, removal costs, legal fees and rental costs. However RAS is a very small scheme, assisting less than two thousand persons per annum nationwide.

The cost to the Commonwealth Government of retraining and relocation assistance to former Tasrail employees in 1988-89 is likely to be less than $50 000.

Overall impact

Table 5.5 summarises the various financial consequences of rail closure for the Commonwealth Government. The net result of closure would be a substantial positive impact on the Commonwealth budget.

The above analysis is based on the medium freight task for Tasrail. Under the high and low traffic scenarios, the Commonwealth subsidy to Tasrail would vary significantly. Smaller effects would also occur in the taxes paid by Tasrail and the charges imposed on road users. In effect, the Commonwealth position would be neutral under the high traffic scenario after 1989-90.

STATE GOVERNMENT

The impact of Tasrail closure on the Tasmanian State Government's budget can also be considered in terms of revenue and expenditure implications.

Revenue consequences

Charges for road users
The State Government would increase its general receipts through the additional charges and taxes levied on the road transport industry.

TABLE 5.5 FINANCIAL IMPACT OF RAIL CLOSURE: COMMONWEALTH GOVERNMENT[a], 1988-89 TO 1990-91

($m)

Revenue/expenditure changes	*1988-89*	*1989-90*	*1990-91*
Taxes paid by Tasrail	-2.1	-1.9	-1.8
Charges for road users			
ABRD	+0.4	+0.3	+0.3
ALTP	+0.8	+0.8	+0.7
Petroleum excise and duties	+3.4	+3.2	+3.1
Other duties and taxes[b]	+8.2	+0.6	+0.6
Subsidy to Tasrail	+10.0	+8.1	+6.6
Involuntary retirement benefits	-16.7	0.0	0.0
Unemployment benefits	+3.7	-3.2	-3.2
Total	+7.7	+7.9	+6.3

a. 1986-87 prices.
b. Primarily sales tax and import duties.
\- Rounded to zero.

Source BTE estimates.

Various charges are imposed on articulated vehicles by the State Government. A fleet of 237 new prime movers and 379 new trailers in 1988-89 will generate revenue in the order of $1.8 million. Stamp duty is the largest item amongst these charges. However the charges are for the most part only applicable to new vehicles and would consequently only be repeated in the years when trucks are replaced.

The State Government imposes a fuel franchise fee on petroleum sales at a rate of 3.13 cents per litre. On the basis of the road transport required to carry Tasrail's freight, it was calculated that an additional 19.7 million litres of fuel would be sold in 1988-89. This would increase revenue from the fuel franchise fee by $615 000 in 1988-89.

5. Stamp duties would however be collected by the State Government on a change of vehicle ownership.

Rail protection fees, currently charged by the State Government to road hauliers in competition with Tasrail, would be abolished in the event of rail closure at a cost to the Government's revenue of around $160 000 in 1988-89 (see Appendix VII).

Road grants

The State Government receives specific purpose payments for roads through the ABRD and the ALTP. Tasmania's maximum share of program funds, as specified in the legislation, is 2.314 per cent of ABRD funds and 2.034 per cent of ALTP funds.

It is estimated that in 1988-89 the Commonwealth would receive an additional $395 000 from the ABRD Program and $790 000 from ALTP, due to the increased number of trucks on Tasmanian roads. Consequently, the Tasmanian Government's share would total just over $25 000.

State charges and taxes

State charges and taxes on general expenditure would be affected by rail closure in the same manner as Commonwealth taxes discussed above. A small reduction in revenue from State charges and taxes is estimated for 1988-89.[6]

Expenditure consequences

Road maintenance and construction

Under Tasmanian legislation the State Government has financial and administrative responsibility for the classified road network, comprising highways, main roads, secondary roads, tourist roads and developmental roads.

Road expenditure accounts for around 20 per cent of the State Government's works program. The Tasmanian Government receives specific purpose payments for roads from the Commonwealth including funds from the ABRD and ALTP. In addition the Tasmanian Government raises funds for road works from its fuel franchise fees, motor taxes, (including motor vehicle registration charges and drivers licence fees) and from borrowings. Total expenditure on roads in 1986-87 was $104 million.

It is assumed that the pavement damage caused by the additional heavy vehicle traffic would be addressed by the State Government in the form of increased expenditure on maintenance, rather than advanced reconstruction.

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6. State charges might, however, also be raised to offset road expenditure programs.

Road pavement strategies available to the Tasmanian Government are discussed in Appendix VIII. The maintenance strategy involves additional maintenance expenditure of $1.9 million per annum in the early years of rail closure falling away to very small amounts in later years.

Involuntary retirement benefits
In the event of rail closure, nearly 400 temporary workers employed by Tasrail would be eligible for redundancy benefits under the State's *Public Servants Retiring and Death Benefits Allowance Act* 1925 (Tasmania). In Appendix V it is estimated that this cost, ultimately borne by the Tasmanian Government, would be around $3 million.

Table 5.6 summarises the financial consequences of rail closure for the Tasmanian Government. Although the State Government would receive additional revenue from a number of sources, the impact of the additional expenditure on roads results is a significant net financial cost to the State Government over the 20-year period.

TASRAIL CUSTOMERS

The financial consequences for Tasrail customers can be considered under four main headings:

- change in the price of transport;
- financial effects of changes in service levels;
- costs of infrastructure and organisational changes; and
- effect on turnover.

The economic and financial effects of Tasrail closure on Tasrail customers are discussed in Appendix IX. The relatively higher freight rates generally forecast for road transport would result in a substantial rise in transport costs. In addition, the fact that some shippers have invested in rail specific loading/unloading infrastructure (for example, woodchip logs) would result in some financial losses if the railway were closed. As noted in Chapter 4 this has been assumed to be no more than $5 million. Changes in service levels and turnover are difficult to forecast with any certainty, although in the latter case the relative significance of the transport component in total shipper costs gives an indication of the likely effects of transport cost changes on unit prices and sales. The nature of most Tasrail traffic (bulk commodities) suggests that reliability rather than transit time itself would be important. The reliability of Tasrail services has been improved in recent years and is considered satisfactory by most customers. The increase in freight costs for Tasrail customers is estimated at $14.4 million in 1988-89.

TABLE 5.6 FINANCIAL IMPACT OF RAIL CLOSURE: STATE GOVERNMENT[a], 1988-89 TO 1990-91

($m)

Revenue/expenditure changes	*1988-89*	*1989-90*	*1990-91*
Charges for road users			
Motor taxation[b]	+1.8	+0.3	+0.3
Fuel franchise fees	+0.6	+0.6	+0.6
Rail protection fees	-0.2	-0.2	-0.2
Road grants	-	-	-
State charges and taxes	-	-	-
Road expenditure	-1.9	-1.9	-1.9
Involuntary retirement benefits	-2.9	0.0	0.0
Total	-2.6	-1.2	-1.2

a. 1986-87 prices.
b. Excludes third party insurance.
- Rounded to zero.

Source BTE estimates.

OTHER SECONDARY CONSEQUENCES

Large investments and disinvestments in the economy have expenditure and income effects in other industries outside those directly involved. The closure of Tasrail would have a detrimental effect on railway supply industries, while offsetting this would be the favourable consequences for trucking related industries.

Retailers in Tasmania may be unfavourably affected by loss of spending power by Tasrail employees in 1988-89, although this would be offset to a large extent by the additional spending from road transport operators and employees. In subsequent years it is anticipated that there will be little net change in retailers' turnover. The impact will vary depending on location and the relative importance of railway or road transport workers to the retail outlets' business.

The loss of income to the suppliers of railway materials (such as fuel, ballast and spare parts and equipment) is small in comparison to the additional requirements of the trucking industry. This is mainly due to the large investment in prime movers and trailers, although spare parts and fuel sales also figure prominently.

SUMMARY

The financial consequences of Tasrail closure are expected to vary between different groups in society and an overall assessment of gains and losses is not possible.

The groups to benefit financially from Tasrail closure are the Commonwealth Government and the road transport industry. However, because of the substantial amount of funds required for investment in 1988-89, road transport operators would only benefit in the longer term.

On the other side of the balance sheet, some of the costs of Tasrail closure would be borne by the State Government, essentially because of the additional road funding requirements. In the absence of other sources of funds, the Tasmanian Government would be obliged to either direct a greater share of its own revenue towards road funding, raise State taxes and charges, increase its borrowings or utilise some combination of all three options. Alternatively it could choose to accept a lower quality of roads in the medium-term.[7]

The overall financial impact of closure on Australian National would be favourable. AN would receive the proceeds obtained from the sales of assets, and avoid the need to raise future investment funds. The effect on Tasrail employees would necessarily be mixed depending on alternative employment prospects and retirement options. Overall it is estimated that the group as a whole would gain in the first year of closure as a result of redundancy benefits, but would be worse off in each subsequent year.

Tasrail customers would face significantly higher freight costs. The impact of rail closure on secondary industries would not be large, and would be counterbalancing but with the distribution of the financial gains and losses again being uneven.

7. This option is specifically excluded in the analysis above, as it is assumed that pavement damage will be rectified to maintain pre-rail closure conditions.

CHAPTER 6 SOCIAL AND ENVIRONMENTAL IMPACTS OF RAIL CLOSURE

The importance of social and environmental impacts in assessing costs and benefits of transport investments has been well recognised by the BTE (see BTE 1984b).

Closure of Tasrail would impact on the Tasmanian community in many ways. The following discussion centres on four areas: employment, income and welfare, the environment and impacts on other road users.

Perennial problems of quantification, valuation and inadequacy of data were also met in this study, as were the difficulties in balancing the social impacts between sectors of the community (for example, between Tasrail and the road freight industry), and in weighting the positive and negative social consequences. For these reasons it is not possible to draw an overall conclusion from the analysis.

EMPLOYMENT IMPACTS

The detailed analysis of employment impacts is undertaken in Appendix V, and is summarised in this chapter. As the analysis concerns the future behaviour of a disparate group of people, for whom only limited information is available, the numbers are necessarily approximate in nature.

AN is a major employer in Tasmania, with staff at Tasrail expected to number around 870 at the end of June 1988. AN has forecast further attrition, expecting staff numbers to level off at around 650 in 1991-92.[1]

Release of Tasrail workers onto the labour market will have significant social impacts. The economy of Tasmania is narrowly based

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1. No information is available on subsequent employment status, source or level of income of workers who have already separated from Tasrail. Hence, the 200 or so workers who are expected to leave Tasrail cannot readily be allocated to re-employed or unemployed groups.

TABLE 6.1 GROWTH IN MALE EMPLOYMENT: TASMANIA, 1977 TO 1987

	Number employed ('000)		
Years	*Full-time*	*Part-time*	*Total*
1977	na	na	112.2
1978	107.1	4.2	111.3
1979	108.2	3.7	111.9
1980	109.1	3.5	112.6
1981	106.7	5.0	111.7
1982	104.0	4.9	108.9
1983	101.4	5.9	107.3
1984	102.3	4.8	107.1
1985	106.7	5.7	112.4
1986	107.3	6.8	114.1
1987	106.0	7.0	113.0

na Not available.

Note Male employees account for 99 per cent of the Tasrail workforce.

Sources ABS (1985e, pers. comm. 1987).

and has generated few new jobs over the past ten years.[2] Table 6.1 shows that male employment in 1987 was only 800 more than in 1977. In recent years growth has been in part-time work. The labour market itself is highly segmented by region, gender, age, skill and attitudes.

Re-employment of Tasrail labour

Prospects

The primary finding of the analysis in Appendix V is that re-employment prospects for Tasrail employees are poor, with around half the workforce likely to obtain alternative employment.

The main reasons for such a bleak prospect are as follows:

- mismatched skills

2. Over 50 per cent of the workforce is employed in community services, wholesale and retail trade or manufacturing sectors.

TABLE 6.2 PROPORTION OF TOTAL EMPLOYEES BY ASCO MAJOR GROUP, TASRAIL AND TASMANIAN TOTAL WORKFORCES

(per cent)

Major group	*Tasrail*	*Tasmania*
Managers and administrators	1	11
Professionals	1	11
Para-professionals	3	6
Tradespersons	20	23
Clerks	11	7
Salespersons and personal service	0	10
Plant and machine operators, drivers	28	16
Labourers and related workers	37	16

Note Figures may not add to 100 due to rounding.

Sources ABS (1987b). BTE (1987a).

- older age profile
- poor general labour market situation.

Detailed discussion of these factors appears in Appendix V.

Table 6.2 shows clearly that the Tasrail workforce has a skill distribution in marked contrast to the Tasmanian workforce. The comparison uses the Australian Standard Classification of Occupations (ASCO) as developed by the ABS (1986a). Whilst two-thirds of Tasrail workers are in low skill occupations characterised by on-the-job training (that is plant and machine operators, drivers and labourers and related workers) only one-third of the overall workforce falls in the same categories.

Analysis in Appendix V involved assessment of re-employment prospects in relation to level of skill, age of worker and local labour market conditions. It is estimated that about half the workforce will find alternative employment within 12 months of closure.

Re-employment

Those workers who do gain re-employment will be the most competitive in the labour market - primarily younger than 40 years of age, skilled, qualified or prepared to retrain, located in the four major employment centres or prepared to relocate to other parts of Australia.

A small proportion of these workers may improve their situation in terms of increased earnings whilst others will take lower paying jobs to remain in the workforce. Curtain (1985), in a study of retrenched workers, concluded that nearly a third of those obtaining work took jobs with lower skill and pay levels.

The community does not regard work experience in the railways as highly as experience in many other industries. This may be a barrier to re-employment in Tasmania where personal recommendation is one of the primary means of obtaining work.[3]

Unemployment

Closure of Tasrail would be expected to leave significant numbers (around 450) of ex-Tasrail workers unemployed. Duration of unemployment and attachment to the workforce will vary over time and with individual circumstances.

In the first three months following closure it is expected that about 25 per cent of the Tasrail workforce would obtain alternative employment. Previous research (see Deery et al. 1986, Curtain 1985) highlights this period and the time immediately before redundancy as the most successful in terms of job search. After this time the probability of obtaining work declines markedly. A further 25 per cent would be expected to find work between three and 12 months after closure.

It is possible, therefore, that 75 per cent of ex-Tasrail workers will be unemployed for some part of the first year. Those still unemployed at the end of the first year would have almost no chance of obtaining work.

During this time individual workers would make decisions about their attachment to the workforce, based primarily on their age and financial benefits from retirement schemes and length of service entitlements (further detail in Appendix V). A proportion of workers are likely to withdraw from the workforce (in effect early retirement) at or soon after closure. AN's existing scheme for early retirement had a takeup of around 5 per cent of the workforce in 1985-86. A similar proportion of the workforce at June 1988 may elect this option. A further number may have no choice but to follow this option after a period of unsuccessful job searching. These people would re-enter the workforce if the labour market improved. A further 10

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3. Curtain (1986) and confirmed by personal communication with Tasmanian labour market sources.

per cent of the Tasrail workforce may withdraw from the workforce in this situation.

The remaining workers, some 30 to 40 per cent of the ex-Tasrail workforce, would be expected to form part of the pool of long-term unemployed males in Tasmania.

Employment prospects may be improved by a different retrenchment process. Curtain (1986) suggests the need for a lengthy period of advance notice (six months). During this time he recommends a pre-retrenchment assistance package based at the workplace and involving group support in learning job search skills.

Employment effects in other industries

Offsetting the job loss in the rail industry would be job creation in the alternative modes handling the rail freight task.

BTE estimates suggest an additional 465 full-time jobs would be created in the road freight industry in Tasmania (drivers, mechanics, fuel operators and so forth). Some of these new jobs may be filled by ex-Tasrail workers. However the nature of the industry - small fleet sizes, reputation as family operations and size of the capital investment necessary to establish self employment - and limited overlap of skills suggests that few former Tasrail employees would gain employment in the road transport industry. Industry sources believe a large proportion of the increased demand for workers will be filled by skilled or trained workers already in the unemployed pool.

Although Launceston is the focal point for rail employment there is no evidence of a similar concentration of trucking operations in this region. The 500 ex-Tasrail workers located in the Launceston area will therefore have no competitive advantage over others in the unemployment pool.

A range of secondary employment consequences is likely to follow closure of Tasrail. Some will be negative (for example, amongst railway suppliers), some positive (for example, trucking related industries, road maintenance and construction) and some mixed (for example, retailers, State and Commonwealth Government administration). The magnitude of such impacts is likely to be small and largely counter-balancing.

Employment prospects with Tasrail

This section addresses employment issues for the Tasrail workforce without closure. The Tasrail workforce is expected to number around

870 at the end of June 1988. AN has forecast further attrition, levelling off at around 650 in 1991. The target rate of attrition is indicated in Table V.8 of Appendix V.

AN has committed itself to a program of voluntary attrition and redeployment. Early retirement incentives are offered, particularly to workers aged 55 years or more. The majority of separations from Tasrail since June 1986 have been under voluntary retirement schemes. Other reasons for separations are age retirement, ill health, resignation and redeployment. A voluntary redundancy incentive scheme was recently introduced.

This policy would be expected to alter the age composition of the total workforce, giving it a more youthful profile. The future skill composition of the workforce cannot be predicted with any certainty although the number of workers in lower skill groups (ASCO plant and machine operators and drivers, labourers and related workers) may decline faster than other groups.

On these estimates, one in four workers employed by Tasrail at June 1988 will not remain at Tasrail beyond 1992. It could be assumed that the majority of workers choosing separation assess their alternatives (work, retirement) positively.

Re-employment prospects would tend to be better than under the closure option, as competition from large numbers of retrenched workers would not exist. However workers in older age groups, especially aged 55 or more, would not be in great demand in the labour market. Similarly, workers without transferable skills would have difficulty finding re-employment.

INCOME AND WELFARE EFFECTS

The most obvious consequence of change in employment status will be income effects. Aggregate income effects are addressed in Chapter 5 and Appendix V. This section looks at income effects on a more disaggregated basis - how closure of Tasrail might affect individuals, families and communities.

A wide range of income effects can be expected but some indication of changes in financial status for individuals in broad groups is possible.

Unemployed workers

Unemployed workers would experience a marked reduction in disposable income when dependant on Commonwealth Government Unemployment Benefits

(UB). In the year following closure of Tasrail all workers would recieve redundancy payments, effectively precluding them from receiving UB. However, in subsequent years the proportion of ex-Tasrail workers relying on UB would increase.

The age distribution of the Tasrail workforce suggests that a large proportion of workers (possibly 50 per cent) would be heads of households with dependant children and therefore at greater risk of poverty. More than 50 per cent of Tasrail workers are in the age range 25-44 years (BTE 1987a).

The extent of such income effects is evident from Table 6.3 which compares Tasrail Average Weekly Earnings with Unemployment Benefit rates for specific categories of recipients. The Poverty Line (Institute of Applied Economic and Social Research 1987) is included as a further indicator of relative living standards.

Duration of unemployment is observed to vary with age. The mean duration of unemployment in Tasmania in June 1987 was 55.6 weeks with, for example, those aged 25-34 averaging 73.6 weeks in unemployment. In these circumstances erosion of savings and sale of assets may occur in some cases.

TABLE 6.3 CHANGE IN INCOME STATUS

(dollars)

Tasrail average weekly earnings	*Family income unit*	*Unemployment benefit rates*	*Poverty line*
	Single adult	104.75	116.10
383.82[a,b]	Couple	187.00	164.50
	Couple with 2 children	221.00	241.90

a. AWE averages for ASCO groups range from $769.05 to $336.47.
b. Income tax would reduce this amount by around 20 per cent.

Sources BTE (1987a). Department of Social Security (1987). Institute of Applied Economic and Social Research (1987).

Opportunities to earn additional income will be limited by the state of the regional economy and by regulations applicable to unemployment benefit recipients (any income in excess of $30 per week for single recipients and $50 per week for couples reduces the rate of benefit). Some recipients of unemployment benefits will have access to rental assistance, free health care and other fringe benefits. Growth in male employment in Tasmania has been in part-time work only, whilst growth in total employment has been in female work areas. This may indicate some opportunity for part-time work by ex-Tasrail workers to supplement unemployment benefits and for spouses of ex-Tasrail workers to supplement family incomes.[4]

Over time there would be a tendency for unemployment benefit recipients to transfer to more permanent welfare payments, particularly Invalid and Service Pensions, which may include higher fringe benefits. There may also be some flow into and out of Sickness Benefits.

Several small communities with limited local employment opportunites would be expected to experience a significant increase in the number of residents dependent on unemployment benefits (see Table 6.4). It would be unlikely that these workers would commute to work in larger centres or relocate their residences and as a result they are at high risk of becoming long-term unemployed.

Re-employed workers

The analysis suggests that around 400 Tasrail employees would be expected to obtain alternative employment. However, re-employment does not promise maintenance of workers' previous standard of living.

Workers not prepared to relocate or retrain may need to downgrade their skills to remain in the workforce, involving reduced earning capacity, fringe benefits and security of tenure. This scenario is particularly applicable to skilled workers with rail industry specific skills (such as train examiners, controllers, station masters, running gear repairmen). For example, a plant and machine operator earning $21 000 at Tasrail may accept a labouring job paying $19 000, the Tasmanian average for that classification (further detail in Table V.9).

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4. Tasmanian labour force participation by married females was 45.7 per cent in September 1987, compared with the Australian rate of 49.1 per cent (ABS, pers. comm.).

TABLE 6.4 LOCAL EFFECTS, SELECTED COMMUNITIES

Location	*Unemployment Benefit recipients*[a]	*Tasrail workers*
Conara Junction	13	33
Fingal	40	9
Oatlands/Parattah	122	17
Scottsdale/Lilydale/Herrick	322	34
Deloraine/Westbury	100	16
Wiltshire Junction	203	7
Wynyard	368	17
New Norfolk	529	18

a. As at August 1987.

Sources BTE (1987). Department of Social Security, Tasmania (pers. comm. 1987).

A number of programs are available at both the Comonwealth and State levels to assist unemployed workers to obtain new employment. These include:

- relocation assistance
- retraining
- wage subsidies.

Workers who relocate may encounter direct, out-of-pocket costs, for example, in the form of house removal costs and re-establishment costs. Although the Commonwealth Employment Service (CES) operates a Relocation Assistance Scheme (RAS) the usage rate has been very low (Bureau of Labour Market Research 1983b).

Those workers who elect to retrain under the Adult Training Program provisions of the Department of Employment, Education and Training (DEET) would receive an additional payment on top of UB (based on age $30 to $46.35 per week). Eligibility requirements (for example, duration of unemployment to be six to nine months), suitability of

ex-Tasrail workers and capacity constraints will limit the usefulness of this option.[5]

The DEET wage subsidy program aims to increase competitiveness of workers in the market. In addition, the Tasmanian Employment Program boosts the subsidy available to employers. Some ex-Tasrail workers can be expected to gain employment with this assistance.

Workers would lose non-transferable credits such as seniority, accumulated sick leave and long service leave. For example, re-employed workers will have to obtain a secure long-term job to qualify for new long service leave entitlements after ten years service.

Job creation

Opportunities created in trucking and trucking related industries following closure of Tasrail will be available to the unemployed pool of workers. It is likely that these jobs will be dispersed around Tasmania, involving smaller secondary impacts on local communities (that is in terms of increased demand for goods and services).

Average total weekly earnings for males in the Australian transport and communications industries stood at $429.00 in May 1986 (ABS 1986b). This would suggest that earning capacity is higher than that generated by Tasrail (averaging $383.82). Previously unemployed workers would witness a sharp rise in income (for example from single rate unemployment benefit of $104.75 per week) but these workers would most likely have been in the unemployed pool for only a short time.

Jobs would most probably be located at major freight origins and destinations and along the main routes. Analysis of freight origins and destinations in Appendix VI suggests that drivers, for example, would probably be concentrated in towns such as Railton, Wiltshire Junction, Burnie, Scottsdale, Fingal, Risdon and Bridgewater. Smaller numbers would be likely to locate in Launceston, Devonport, Herrick and Boyer, for example.

Health and welfare effects

Change is commonly stressful and costly in personal terms, not only to the worker but also to spouses, children and extended family.

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5. Curtain (1986), in reviewing retrenchment studies from Sweden, USA and Australia, suggests that only a small proportion of retrenched workers actually undertake retraining. Perhaps 10 per cent of the Tasrail workforce would seek this assistance.

A typical Tasrail worker is aged 40, has more than ten years experience with the railway, has been trained on-the-job in manual skill areas, has a strong attachment to the local community[6] and would have expected to remain with Tasrail until retirement. Consequently he would have little experience of unemployment and few job search skills.

Unemployment and uncertainty about the future would be expected to induce stress in many of those made redundant and put them at increased risk of a range of personal and social problems. Jordan (1975), Henderson Report (1975) Mackay (1986) and others have all described the consequences of long-term unemployment. Increased risk of domestic violence, indebtedness, drug and alcohol dependency, crime, depression and physiological decline are corollaries of unemployment and can be expected to be exacerbated with length of unemployment.

On the other hand, many unemployed workers have the capacity to adjust to and cope with their unemployment, or benefit from the opportunity to reassess their careers. Those freely choosing early retirement would regard their situation positively.

Curtain (1985) surveyed retrenched workers attitudes to redundancy. He found most rated the experience as 'bad' regardless of their current employment status. His results also suggest that unemployed retrenched workers are more likely than voluntarily unemployed workers to continue looking for work, exposing themselves to more stress.

Community health and welfare agencies are not designed to address redundancy issues directly, but would, over time, be required to supply services (for example, cash relief, subsidised housing, sheltered accommodation, rehabilitation and counselling) to meet resultant problems.

There is strong support in the literature (Curtain 1985, Deery et al. 1986) and from labour market service providers for the preventative value of pre-redundancy counselling. The CES has traditionally been ascribed this role, but it has been suggested that the CES has returned a relatively poor performance (see Deery et al. 1986).

Workers finding employment within the road freight and related industries who have previously been unemployed can be expected to

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6. Confirmed in discussions between BTE and local government representatives and labour market agencies.

experience some improvement in general health and welfare. As short-term unemployed workers are the group with greatest opportunity of re-employment the overall improvement will not be large.

ENVIRONMENTAL IMPACTS

Noise and air pollution vary with the volume of traffic, measured by vehicle kilometres travelled (VKT). Their significance in the Tasmanian context is discussed in this section.

Some indication of the impact of transferring the freight task to road transport can be gained from Table 6.5 which compares the existing traffic volume and composition at particular locations with the projected increase in commercial traffic.

TABLE 6.5 TRAFFIC VOLUMES, SELECTED LOCATIONS

	Existing (1984)		*Projected*[a] *percentage increase in commercial vehicle AADT*
Location	*AADT*[b]	*Commercial vehicle AADT*	
New Norfolk	2 000	300	38
Pontville	5 000	900	25
Campbell Town	3 000	380	60
Perth	6 000	900	27
Fingal	2 000	420	27
Avoca	900	200	58
Launceston area			
Southern outlet	17 000	2 380	6
Lilydale	800	100	25
Scottsdale	1 000	200	24
Branxholme	500	100	27
Latrobe	4 000	600	15
Wynyard	2 000	400	21

a. For 1988-89, all scenarios, with closure of Tasrail.
b. Annual average daily traffic.

Sources BTE estimates. Department of Main Roads, Tasmania (1984).

Noise pollution

Road traffic noise represents the major and most pervasive source of community noise. It is a complex phenomenon determined by the interaction of flow, composition and speed variables with topographical and meteorological factors.

Rail noise, on the other hand, attracts very little attention in the community and then is generally discussed in relation to passenger comfort.

Given that traffic noise is discontinuous and that limited data is available for Tasmania, it is only possible to make very broad estimates of changes in noise levels and community responses following transfer of the rail freight task to road transport.

The additional volume of trucks may increase noise levels given the existing low levels of traffic throughout Tasmania. Consequent changes in the composition of the traffic flow are more significant as diesel-engined heavy commercial vehicles are the main source of traffic noise.

The situation in urban centres will vary with specific locations and time of day with additional trucks contributing to noise levels outside acceptable limits (that is extended exposure to noise in excess of 65 dB(A)).[7] Particular rural towns (such as Campbell Town, Fingal, New Norfolk) would also be subjected to increased noise.

Air pollution

Evaluation of air quality is of increasing global concern. Motor vehicle emissions are the primary source of air pollution. Whilst diesel-engined heavy duty vehicles make a relatively small contribution it is notable that railways contribute even less to total emissions (Australian Environment Council 1981).

Any increase in VKT would be expected to lead to some increase in pollutant levels. However, the impact in Tasmania, particularly in rural areas, is likely to be imperceptible.

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7. The Organisation for Economic Co-operation and Development recommendation for outdoor noise is described in the following terms: noise below 55dB(A)Leg is acceptable, noise in the range 55-65dB(A)Leg is uncomfortable and noise in excess of 65dB(A)Leg is regarded as unacceptable (Department of Transport and Communications pers. comm. 1987).

Overall impact

In most instances the same communities are being exposed to both road and rail traffic. Additional road-induced environmental impacts following closure of Tasrail would be expected to exceed those imposed by Tasrail itself.

Although these impacts are small in magnitude at current freight task levels community reaction and demands for protective measures may well be of a higher order, though not necessarily consistent across locations. Some alleviation would be expected from planned roadworks, particularly from bypasses on the Bass Highway.

Campbell Town is an interesting case in point. Tolerance for higher noise levels (and possible increased safety risks) may be seen by residents as a trade-off in maintaining a commercial advantage as the only town on the Midland Highway.

IMPACTS ON OTHER ROAD USERS

Safety impacts are discussed in Appendix X. Comparisons are made between rail and road accidents in Tasmania, and an assessment is made of the net impact following transfer of the freight task to road transport in the event of closure of Tasrail.

The analysis suggests that the community might be at a higher risk of injury but at a lower risk of fatalities immediately following closure. Continuation of current trends in road accidents would suggest that the incidence of casualty accidents would decline in the long-term.

Competition between road users for available space gives rise to the possibility of congestion. Additional heavy vehicle traffic in the existing flow will impact on other motorists, cyclists and pedestrians.

Travel time is the accepted method of measuring severity of congestion. BTE (1984a) assessed operational characteristics of the Australian road system including travel time and comfort and convenience. The Tasmanian travel time data indicated substantial decreases in travel times between 1969 and 1980 on selected national highways and rural routes despite increases in traffic (VKT).

Department of Main Roads, Tasmania data and observations by officers of the BTE confirm that Tasmania has low daily traffic counts in comparison to many mainland roads. However this does not remove the possibility of congestion at local sites (for example the bridge over the Derwent River at Bridgewater).

Recognition of local impacts is reflected in existing plans by the Tasmanian Department of Main Roads to construct dual carriageways and bypasses along the major freight transport routes. Table 6.6 shows a selection of projects addressing these issues.

General levels of comfort and convenience, in addition to congestion, are believed to be of special significance to tourists. The importance of tourism to the Tasmanian economy requires comment on this aspect. A survey of recommended tourist itineraries suggests that most tourists travel in a circular direction around the island, with comparatively little use of the Hobart-Launceston link which will carry a large proportion of the additional road freight. Competition for road space in other instances (for example, Bass Highway west of Launceston) is already being addressed by road improvements, or can be overcome by choice of an alternate route. Elsewhere competition is unlikely to be intense (for example, Esk Main Road).

Previous assessments of comfort and convenience (BTE 1984a) for motorists in Tasmania (measured by length of road by surface type/by seal width/ by AADT) concluded that Tasmania compares favourably with mainland States, having, in broad terms, a high proportion of sealed roads of good width and low traffic volumes.

Difficulty in overtaking or passing heavy vehicles is unlikely to present problems on the Midland and Bass Highways but may be a problem on narrower roads such as Frankford, Railton, Esk Main Roads and Boyer Secondary Road. On a typical Launceston-Hobart trip a motorist might encounter 20 extra heavy vehicles travelling in the opposite direction and perhaps one or two travelling in the same direction.

Some additional loss of amenity may accrue to other road users from hazards produced by heavy vehicles, namely flying debris (particularly from log trucks) and water spray (Tasmania generally having in excess of 500mm of rain per annum), restricting vision and causing distractions.

Impacts on pedestrians as road users is a difficult issue to address. However at several locations (Campbell Town, Scottsdale, Fingal,New Norfolk) the highway severs the town (typically ribbon developments) and additional traffic can only reduce the amenity of pedestrians crossing the highway. School children and the elderly are most likely to be affected. Pedestrian crossings exist in some locations but not at Campbell Town.

Some indication of community dislocation can be obtained from

TABLE 6.6 SELECTED ROAD PROJECTS, TASMANIA

Route	*Section*	*Comment*
Bass Highway	Prospect Bypass	Extension of Launceston Southern Outlet - dual carriageway
	Westbury to Deloraine	Realignment, bypass of Exton for safety reasons
	Deloraine Bypass	
	Burnie Expressway	Completed 1986
	Don Hill to Forth River	Realignment
	Ulverstone to Penguin	Carriageway duplication and interchange improvements
Midland Highway	Perth Bypass	Options prepared
	Junction with Lyell Highway at Granton	Redesign to reduce waiting time
	Launceston Southern Outlet Road	Improved access to city from Bass and Midland Highways
Tasman Highway	Waverley to Nunamara	Upgrading completed
Lyell Highway	New Norfolk to Fenton Main Road Junction	Upgrading
Bridport Main Road	Outskirts of Scottsdale	Upgrading for safety reasons
Lilydale Main Road	Underwood to Lilydale	Upgrading under ABRD Program

Source Department of Main Roads (1986).

comparison of traffic volumes before and after closure of Tasrail at particular locations (Table 6.5).

SUMMARY

Social impacts of negative and positive values and varying magnitudes result from closure of Tasrail. By their instrinsic nature they cannot be totalled to achieve a precise net impact.

In the broader sense, 870 jobs will be lost and 465 gained - a net loss of 405 jobs. This is offset by the fact that Tasrail employment is expected to reduce by 220 over the period to 1991-92. The distribution of unemployment duration in the community will be altered: unemployed ex-Tasrail workers are more likely to be long-term unemployed and new vacancies in the road freight industry will draw on the more recently unemployed pool.

Social pressures will ensue from redundancy, unemployment, loss of income and social status for ex-Tasrail workers and other groups in the community who are dependent (though to a much lesser extent) on Tasrail. At the same time, employment generated in the road freight industry and related sectors may reduce social tensions for those previously unemployed.

In the areas of environmental impacts and road user amenity the consequences of closure are generally negative. Although small in overall magnitude, significant local effects are possible.

CHAPTER 7 CONCLUDING REMARKS

The purpose of this chapter is to summarise the findings of the earlier chapters, and put them in context. The chapter also discusses some of the other threats and opportunities that may effect the future of Tasrail.

FINANCIAL PERFORMANCE OF TASRAIL

The ten-year period since 1977-78, when Australian National took over Tasmanian Railways, has been marked by a consistent improvement in financial performance. This has been a gradual, long-term process, but when viewed over the full period the results are impressive. The main performance indicators include

- a 75 per cent increase in freight task;
- a reduction in staff levels of nearly 50 per cent;
- a consequent improvement in labour productivity of around 220 per cent; and
- a reduction of the operating loss by 54 per cent in real terms.

This improvement has been brought about as a result of co-operation between management, unions, customers and State and Commonwealth Governments. However, in spite of this improvement, Tasrail still recorded a deficit of over $15 million in 1986-87.

The Bureau agrees with the AN assessment that there is scope for further reductions in the level of subsidy. The main factors in achieving a further reduction are:

- an increase in the freight task over the next two years, although this is likely to be followed by lower task levels through the 1990s;
- planned increases in real freight rates over the next ten years for most commodities;

- staff reductions, to a staff level of about 650 in four years time; and
- new capital investment to improve productivity.

These improvements are not inevitable, but will require a concerted effort on the part of management, unions, customers and Governments to ensure that they are realised. If these efforts are successful, the Bureau estimates that the subsidy level could be reduced to under $5 million, in real terms, over the next five years. If general economic conditions are more favourable, then a better result may be possible.

As part of their corporate planning, AN has set the objective of eliminating the subsidy and achieving a financial break even situation within ten years. However, the Bureau considers that further productivity increases or real freight rate increases (beyond those already planned) will be required for this objective to be realised. By the mid-1990s the task is expected to level off, while productivity improvements and real freight rate increases would be more difficult to obtain. In their absence, the operating loss is expected to remain persistently between $3 million and $4 million a year.

Threats and opportunities

The financial results outlined above are based on the medium traffic forecast, together with the realisation of Tasrail's current plans for freight rate and productivity improvements. However, there are a number of possible circumstances that may result in a markedly better or worse result.

Among the negative circumstances, or threats, are:

- any significant downturn in the freight task, as shown in the low traffic forecast; and
- any significant improvement in the competitiveness of the road transport industry.

The financial situation would also be worsened by:

- rejection of the priority goal of improving efficiency by management, unions, customers or State and Commonwealth Governments; and
- new investments that do not meet stringent cost-benefit tests.

The low traffic forecast indicates that the level of subsidy could stabilise at around $6 million a year in the 1990s. Reasons for a further possible decline in the task are identified in Chapter 3, although these are rated as unlikely to occur. They include the

sourcing of coal from the mainland, rather than Tasmania; a reduction in logging for environmental reasons; and the transfer of acid shipment from rail to sea. As a rough rule of thumb, the subsidy would increase in the short-term by about $800 000 for every 100 000 tonnes of freight not carried. Thus the loss of one of these cargoes would push the subsidy up, severely affecting the long-term financial viability of Tasrail.

Improvements in trucking industry competitiveness could include the abolition of the Tasmanian rail protection scheme (without replacement by a specific road vehicle damage charging system), further increases in maximum vehicle weight limits, or widespread use of double-trailer articulated vehicles. Developments in trucking are likely to have an effect in terms of downward pressure on freight rates, resulting in reduced revenue for Tasrail and a corresponding increase in the subsidy.

The opportunities, or positive circumstances that may affect Tasrail include:

- achievement of the high traffic forecast including the construction of the Wesley Vale pulp mill and the carriage of interstate cargo between Hobart and northern ports;
- Huon Forest Products not proceeding with the logging of the Southern Concession, avoiding the loss of around 180 000 tonnes of log traffic from 1989-90; and
- any deterioration in the competitiveness of the road transport industry; for example:
  - a sharp rise in fuel prices
  - the introduction of a road vehicle charging system that fully recovers the road damage costs incurred by heavy trucks.

Under the high traffic forecast, which includes optimistic future scenarios for all Tasrail commodities, Tasrail would be expected to operate profitably in the 1990s, and require no subsidies.

Thus the elimination of the subsidy is possible under certain favourable circumstances within the next ten years. However, the Bureau's analysis suggests that the subsidy is likely to stabilise in the mid-1990s at the modest level of $3 to $4 million a year. There will inevitably be some fluctuation in this level from year to year, due to changes in tonnages, input prices, freight rate levels and minor productivity gains. However, these fluctuations appear unlikely to combine to produce a result that is better than the Bureau's assessment. At the medium task scenario, higher levels of real

freight rates or productivity are required to enable financial break-even to be achieved.

ECONOMIC CONSEQUENCES

The expectation of a continuing need to fund the operating deficit of Tasrail may make the closure option an attractive possibility for the authority providing the funding. However, a continuing deficit does not, by itself, mean that Australia as a whole may be better off by closing the railway. This is particularly the case if for one reason or another, financial costs do not fully reflect the economic value of the resources employed by the railway, or by the alternative modes used to undertake the rail task in its absence.

The economic analysis in Chapter 4, indicates that, at the medium forecast traffic level, closure of the railway would generate a small economic benefit for Australia. However, the sensitivity analysis, and the margins of error inherent in the economic analysis are sufficient to indicate that this result is not conclusive. It would be more accurate to interpret the results as showing that there is little difference to the national economic welfare whether the railway is closed or remains open.

There are a number of circumstances which would result in a less equivocal conclusion. They are essentially the same circumstances that would result in higher or lower levels of subsidy as covered in the earlier part of this chapter.

On the basis of the economic analysis, there is a clear national gain from closure if:

- the rail traffic level drops well below the low forecast level;
- unions, customers and governments do not co-operate with Tasrail management plans to improve efficiency and productivity;
- significant new capital expenditure is undertaken on a basis that is not fully justified; and
- productivity in the road transport industry improves by a quantum leap.

Similarly, the case for maintaining the railway on economic grounds is improved if tonnages reach the high forecast level, or if the relative competitiveness of the railway improves compared to that of the road transport industry, for example, by achieving further significant productivity increases.

DISTRIBUTION OF BENEFITS AND COSTS

The Terms of Reference for this study require the Bureau to pay particular attention to identifying those who would gain and those who would lose following the closure of the rail system. While the economic analysis shows that the impact of closure is almost neutral from a national viewpoint, this conclusion conceals the fact that closure would affect different groups of people in different ways. The financial, social and environmental analysis in Chapters 5 and 6 permits the gainers and losers to be identified, and in some cases the extent of the gain and loss to be quantified.

If the Tasrail network were to be closed the main potential beneficiaries are listed below:

- The Commonwealth Government would be able to avoid the annual operating subsidy payment. The financial costs incurred at the time of closure would be almost entirely offset by the revenue derived from sale of Tasrail assets (particularly land). There would be an increase in the payment of unemployment and other benefits as the railway releases more staff onto the labour market than the road transport industry employs, but this is offset by the reduced subsidy and increases in direct and indirect tax payments made by the road transport industry. Clearly the less successful the railway, the higher will be the subsidy, and the greater the budgetary benefit to the Commonwealth Government of closure. This benefit would take effect through a positive impact on the Commonwealth Government budgetary position although the size of the benefit would be very small in the context of the total Federal Budget (less than 0.01 per cent). The gain to the Commonwealth Government is national in nature.

- The Tasmanian road transport industry, and its suppliers and employees, would be the major beneficiaries of rail closure. Turnover in the industry would increase by around $35 million a year and employment by 465 people (about 25 per cent on both measures). The turnover of firms supplying the road transport industry, such as truck manufacturers and retailers, fuel retailers, vehicle repairers and tyre suppliers, would also be increased and this would in turn lead to higher employment and possible greater profits for such firms. The nature of this gain is largely regional to Tasmania, concentrated in the Hobart-Launceston-Burnie corridor, but likely to provide some benefit to areas such as Scottsdale, Fingal and New Norfolk if truck operators locate in those towns. Part of the nature of the gain is national as the truck manufacturing/assembly industry is

located in various States in Australia, and insofar as trucks or truck parts are imported, some of the beneficiaries are located overseas.

- The Tasmanian road construction industry also gains, because of the extra road maintenance activity resulting from road damage caused by additional trucks. However this gain, which is regional in nature, and concentrated outside the main Tasmanian cities, is relatively small. It would be equivalent to no more than 2 per cent of total expenditure on road construction and maintenance in Tasmania, and probably involving no more than 50 jobs in the industry over the first four years following closure.

The losers from the closure of the railway are individuals or groups who suffer a reduction in income or environmental and social amenity, or extra costs as a result of the closure. They include:

- The Tasrail employees made redundant as a consequence of closure. Around 850 jobs would be involved as at June 1988, although 200 of those employees would have been expected to resign, retire or take voluntary redundancy over the next four years even if the railway remained in operation. Overall, the income level for these workers is estimated to fall by around 15 per cent. About half could expect to obtain alternative full-time employment within 12 months of closure, and these people (usually those in the younger age groups and with transferable skills) may actually be better off - gaining the benefit of redundancy payments in addition to earning incomes of similar or possibly higher levels outside Tasrail. However, there is also a group of employees (usually older and unskilled) who will have no option but to rely on unemployment and other benefits, and who would, therefore, face falls of 30-70 per cent in the level of their income. These people, numbering about 300, would be the worst affected by closure of Tasrail. The nature of this loss is regional, and concentrated in Launceston, although other centres of Tasrail employment such as Parattah/Oatlands and Campbell Town/Conara Junction are also likely to be severely affected.

- The railway industry (excluding the employees) would also face losses. AN, which would lose about 12 per cent of its turnover, would face a narrower base over which to spread its corporate overheads.[1] AN has also provided considerable surplus rolling stock, track and equipment to Tasrail at minimal cost, and they

1. A further possibility is that AN may suffer some costs from industrial disruption on the mainland resulting from the closure.

may lose the value (probably little more than scrap value in most cases) of those surplus supplies. Otherwise, the financial impact on AN is essentially neutral, as the Tasrail operating deficit has been funded, and is assumed to continue to be funded, by the Commonwealth Government. If funding were to be arranged on a contract basis, as in the 1984 to 1987 period, AN would forego the possibility of generating a surplus after receiving the agreed annual subsidy payment if it could perform better than expected. However, as AN is owned by the Commonwealth Government, the ultimate benefit of any such surplus comes back to the Federal Government. Tasrail suppliers would also lose business, estimated at around $5 million a year (the largest item being diesel fuel). This may reduce profits, and lead to reduced staff levels for these suppliers. The nature of this impact could be regarded as national insofar as AN and its mainland suppliers are concerned, but as regional in respect of Tasmanian suppliers.

- The State Government gains revenue from the trucking industry, and pays out higher costs for road maintenance. Overall it is a marginal loser from Tasrail closure as the road maintenance expense outweighs the revenue gain from additional trucks. The State Government may also face some extra expenditure on redundancy payments, on employment adjustment programs and to alleviate some of the social consequences of closure. As these costs would ultimately have to be funded by Tasmanian taxpayers through State taxes, the impact is regional in nature. There appears to be no gain or loss to the State through the Grants Commission.

- Tasrail shippers are likely to be worse off as a group, as most of them would be expected to face higher transport costs for the use of alternative modes. In some cases there would be an offsetting gain from the elimination of double-handling and from improved quality of service (more flexibility, shorter transit times, greater frequency of delivery). It was not feasible to precisely value these offsetting benefits in this study, but it is likely that they would be lower than the freight rate penalty that shippers would suffer.

- The Tasmanian motorist is likely to be marginally worse off if the railway is closed. Motorists would have to cope with more trucks in the traffic stream, which can be expected to lead to added difficulties in passing heavy vheicles, notably in wet weather. There would also be increased exposure to the risk of traffic accidents involving heavy trucks, although this is offset almost entirely by the elimination of level-crossing accidents. This

impact should not be over-emphasised, as Tasmanian roads are generally lightly trafficked and are built to high standards in many cases. The current reconstruction program is expected, for example, to build much of the Bass Highway as a dual carriageway to eliminate local congestion problems. To most Tasmanian motorists, the effect of railway closure would be imperceptible in their everyday motoring. The effect on motoring conditions is regional in nature.

- The final negative impact is that of noise and vibration on residents adjacent to roads used by trucks. There would be a clear increase in truck traffic at various locations in the Tasmanian road network, and consequent increases in these environmental effects. However, because current traffic levels are low, and even with additional trucks, traffic levels would still be relatively low, this impact is not assessed as significant. It might also be offset to some degree by increased business opportunities for road-side businesses in servicing the needs of truck traffic. This impact would be manifested in a fall in house prices, but such a fall is not expected to be significant. The impact is regional in nature.

This discussion covers the significant gains and losses from Tasrail closure that were identified by the Bureau. There are also minor secondary effects that might result from closure. For example, the pattern of retail trade might change slightly in Tasmania to reflect the reduced spending power of former Tasrail workers, and the increased spending power in the road transport industry. However, these effects are regarded as being either of little significance and/or offset by counterbalancing effects.

It should be emphasised that the distributional effects summarised above cannot be added together to obtain any sort of 'net' loss or gain. The gains and losses are not measured in consistent values, they are offset in some cases but not in others, and they represent effects that occur at different times.

An overall assessment of the impact of the closure of Tasrail would take account of the social, environmental and where appropriate, the distributional consequences, in addition to the economic effects.

ALTERNATIVE SCENARIOS

As noted in Chapter 1, the analysis in this report is based on two scenarios:

- continuation of the operation of the railway with the objective of

maximising efficiency and productivity in its operation, generally in accordance with current AN planning; and

- closure of the railway in July 1988, and the carriage of the full rail task by road transport (except for sulphuric acid carried by sea).

This section discusses a number of other scenarios that were not analysed as part of this study, but which might be usefully considered.

State Government operation

Faced with the prospective withdrawal of Commonwealth funding, it is possible that the Tasmanian State government might choose to take up funding the railway to prevent its closure. If this were the case, and provided the State Government instituted similar policies for the operation of Tasrail to those followed by the Commonwealth Government, then the economic analysis would essentially be unchanged. That is, although the decision on closure would then lie with the State Government rather than the Commonwealth, the economic costs and benefits would be the same from the national viewpoint.

However, the direct financial interests of the two levels of government would be reversed, if the State Government were to consider the possibility of closure. If the Commonwealth Government no longer funded the operating deficit of the railway, it would be a marginal loser from closure. For the State Government, the subsidy to Tasrail may be a continuing drain on State resources, although at least part of the subsidy would be recovered through the Grants Commission, which includes rail system losses in its calculation of the shares for each State in overall tax sharing arrangements.[2] To the extent that the subsidy is not funded through the Grants Commission, the State Government would have to either increase State taxes or reduce expenditure elsewhere to meet the cost of maintaining Tasrail in the absence of Commonwealth funding.

Private operation

Another possibility in the absence of both State and Commonwealth funding, is the operation of the railway by private enterprise. There is no evidence to suggest that private enterprise would be interested in operating the whole of the existing network. However, individual

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2. If the total pool of funds for distribution to the States remained constant, any increase in payments to Tasmania would be equally offset by reduced payments to other States.

companies may be interested in operating sections of the line for specific commodities. Candidates for this form of private operation might include:

- Tioxide, on the eight-kilometre link between Burnie and Heybridge for the carriage of sulphuric acid;
- Goliath Cement, on the 25-kilometre link from Railton to Devonport for the carriage of bulk cement; and
- possibly a larger network for feeding woodchip logs into Long Reach, or coal from Fingal to customers in the north west and the south.

The incentive for private operation would be expected to arise from a concern with the environmental impact of large numbers of trucks on specific road links, and the possibility that rail transport, for some commodities on specific routes, may be lower cost than road transport.

Private enterprise would, in effect, be selectively operating the most useful and viable parts of the network, on a basis that would be expected to give priority to efficiency and cost minimisation.

There is a precedent for private operation of rail lines in Tasmania in the form of the Emu Bay Railway (which carries mineral concentrates from mines on the west coast to Burnie). Thus there is some infrastructure and expertise available in the State that might be able to assist in overcoming the many difficulties that might face a new private rail operator.

Timing of closure

The earlier analysis in this study is based on the proposition of closure in mid-1988, at the end of the existing three-year funding arrangement for Tasrail. Given the indeterminate nature of the results of the economic analysis, it might be considered appropriate to defer any final decision on closure until a later date. As noted earlier in this chapter the progress of Tasrail in meeting its targets will be clear within the next four or five years.

The important trends that would need to be monitored over this period include:

- improvements in productivity and the related reduction in staff numbers;
- the increase in real freight rates to enhance revenue levels;
- the increase in tonnage levels forecast in this study; and

- the decline in subsidy levels in real terms that should follow from the three preceeding factors.

The rationale for delaying the decision rests on the argument that it is much easier to justify, in economic terms, the retention of the railway if it operates in a highly efficient and productive manner. Because of its history and the constraints it operates under, Tasrail has not yet reached this high level of efficiency. However, Tasrail management has adopted the appropriate goals and is in the process of working towards them. It could be argued that it should be given every chance to acheive them before a final decision is made.

Conversely, if productivity improvements are prevented from occurring, or if cargo tonnages are about to enter a downward trend, these factors will strengthen the case for closure.

SUMMARY OF FINDINGS

This study has considered the economic, financial and social consequences of closing the Tasrail network in 1988-89. The major findings of the study are as follows:

- the Tasrail subsidy can be expected to reduce from its present level of $15 million to somewhere in the range of $3 to $4 million a year (in real terms), if real freight rate increases, staff reductions and task increases are achieved;
- under the same conditions, Tasrail can be kept open, or closed with little effect on the national economic welfare;
- if efficiency improvements are not assigned the highest priority, then the case for closure is much stronger;
- the main beneficiaries of closure are the Tasmanian road transport industry and the Commonwealth Government;
- the primary beneficiaries of keeping the railway open are the Tasrail employees, Tasrail's customers and the State Government; and
- whereas the financial gains from closure are both regional and national in nature, the benefits of keeping the railway open are almost entirely confined within the State of Tasmania.

The study also shows that the financial and operational performance of Tasrail has improved markedly under AN management. It emphasises the importance of continuing to improve productivity and increase real freight rates. If this is achieved and the freight task increases towards the high forecast the case for retaining the railway is much stronger.

APPENDIX I TERMS OF REFERENCE

The Bureau was supplied with the following Terms of Reference for this study by the former Minister for Transport the Honourable Peter Morris MHR.

> The government has agreed that the Bureau of Transport Economics should undertake a comprehensive study into the effects of closure of AN's Tasmanian rail system.
>
> Therefore, I direct the Bureau to undertake a comprehensive economic and social assessment of the costs and benefits of closure of the Tasmanian rail system. In particular the study should identify the financial and economic costs and benefits of closure to AN, the Federal and State Governments and the Tasmanian community.
>
> The Bureau should pay particular attention to identifying those who would gain and those who would lose following the closure of the system, and should determine whether these gains and losses are national or regional in nature.
>
> As part of its study the Bureau is to assess how freight currently carried by the railway would be handled in the event of closure.
>
> The Bureau is to report by 31 December 1987.

APPENDIX II ECONOMIC ACTIVITY AND TRANSPORT IN TASMANIA

The State of Tasmania has an area of 68 331 square kilometres (0.9 per cent of the total area of Australia) and at June 1986 had a population of 436 353, representing 3 per cent of the Australian total (ABS 1987a). Compared to other Australian States, Tasmania's population is relatively decentralised, as shown in Table II.1. Only 40 per cent of the population live in the State capital, Hobart, whereas for most other States at least 60 per cent live in the largest city.

Growth of the Tasmanian population since 1976 has been at an average annual growth rate of 0.83 per cent compared with the Australian average rate of 1.79 per cent per annum for the same period. The lower growth rate reflects emigration to other States, largely by the 19 to 34 year age group.

LABOUR AND EMPLOYMENT TRENDS

Table II.2 shows that at May 1987 the labour force in Tasmania

TABLE II.1 DISTRIBUTION OF POPULATION IN TASMANIA AT JUNE 1986

Region	*Population*	*Proportion of total population (per cent)*
Greater Hobart Area	175 082	40
Launceston Area	91 132	21
Burnie and Devonport	74 584	17
Other towns and rural areas	95 555	22
Total	436 353	100

Source ABS (1987a).

TABLE II.2 EMPLOYMENT TRENDS IN TASMANIA, 1983 TO 1987

Year	*Employed*	*Unemployed*	*Labour force*	*Unemployment rate*
		('000)		*(per cent)*
1983	164.9	18.9	183.8	10.3
1984	166.5	21.1	187.6	11.2
1985	177.3	16.7	194.0	8.6
1986	184.4	16.4	200.8	8.2
1987	183.9	18.3	202.1	9.0

Source ABS (1985e, pers. comm. 1987).

totalled 202 100. This was made up of 113 000 males and 70 900 females. Unemployment peaked in 1984 at 11.2 per cent of the Tasmanian work force and at May 1987 was 9.0 per cent.

A significant increase in the number of employed females is apparent for the years 1986 and 1987 while the years 1985 to 1987 show an improvement in the number of employed males after a slump during the period 1982 to 1984.

Average wages

At November 1986, the average weekly earnings in Tasmania were $363.90. This is approximately $17 below the national average figure which was $380.60, but $11 above South Australia, which has the lowest figure.

TASMANIAN INDUSTRY

A measure of the size of the total State economy is Gross Domestic Product (GDP) at factor cost.1 Tasmania's GDP at factor cost for the year 1983-84 was $3.8 billion. This is 2.3 per cent of the total Australian GDP of $169 billion for the same year (ABS 1987e). Later

1. This is a measure of output where the value of goods and services produced is measured by the amount that is paid to the factors of production - labour, land, capital and enterprise - in order to produce that level of output.

figures for the State's GDP are not available. Figure II.1 shows the location of the major companies and industry areas.

Manufacturing

At June 1985, 880 manufacturing establishments operated in Tasmania employing 25 000 workers equivalent to 14 per cent of employment. Three industry groups (food and beverages; wood, wood products and furniture; and fabricated metal products) accounted for 60 per cent of these establishments.

The manufacturing sector in Tasmania is dominated by small firms. Only 6 per cent of the 880 have a workforce of 100 or more. The decentralised nature of the population is also reflected in the manufacturing industry.

The major companies in the manufacturing sector in Tasmania are summarised in Table II.3.

Mining

The Tasmanian mining industry employed 4000 workers in 1984-85. Mine production for the year was valued at $292 million. Of this, 85 per cent was from metallic minerals, 8 per cent construction materials, 4 per cent coal and 3 per cent other non-metallic minerals. (ABS 1985a).

The major mining region in Tasmania is the West Coast where minerals are mined at:

- Queenstown - copper
- Zeehan - tin
- Rosebery - copper, lead and zinc
- Savage River - tin, copper and iron.

Other important locations are at Gladstone and Derby in the north-east of the State, where tin is mined, and the Fingal Valley in the east, where coal is mined.

In terms of quantity extracted, Table II.4 shows that iron-ore is the largest metallic mineral produced in Tasmania, followed by zinc and copper. Tasmania's iron ore production at 2.3 million tonnes represents 2.5 per cent of Australian production. Tin (7000 tonnes) and Tungsten (2000 tonnes) represent 51 per cent of tin and 96 per cent of tungsten produced in Australia in total.

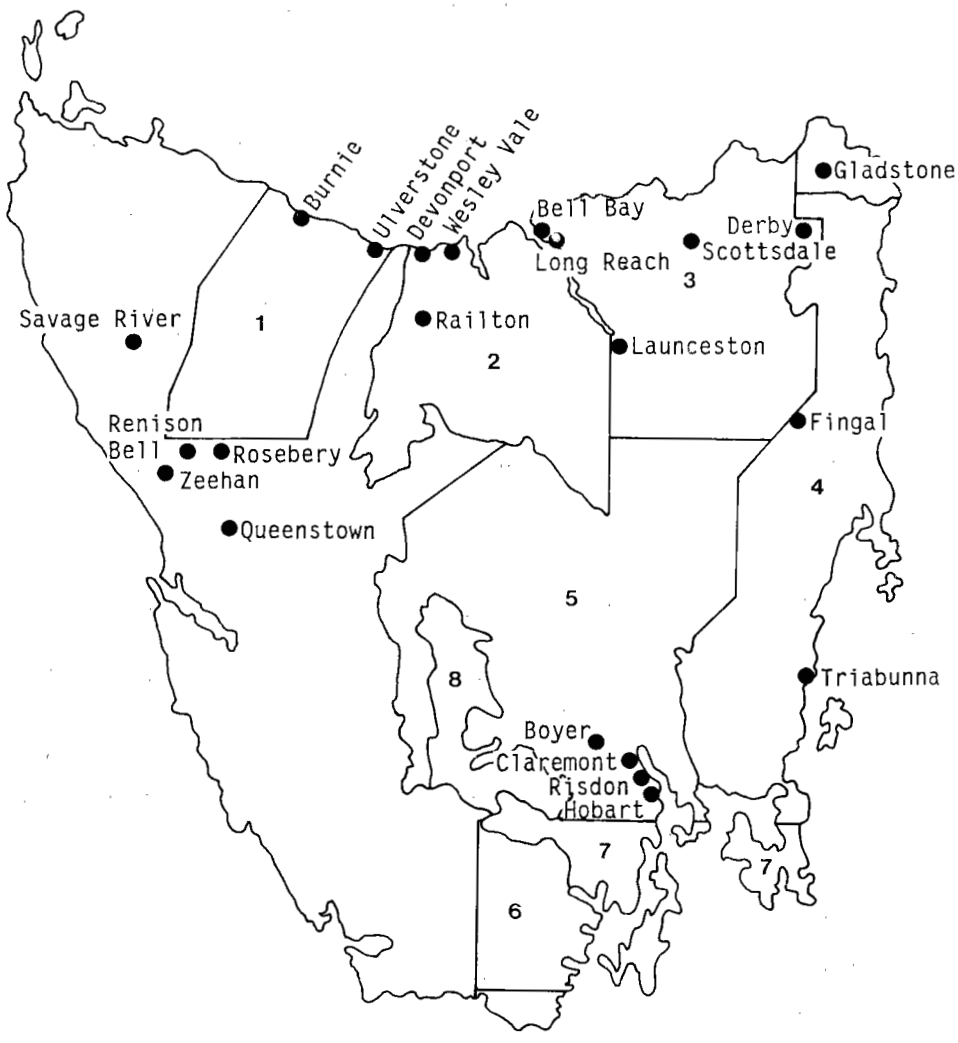

Figure II.1 Tasmanian industry and company locations

TABLE II.3 MAJOR MANUFACTURING COMPANIES IN TASMANIA

Company	*Product*	*Location*	*Comment*
Cadbury Schweppes Australia Ltd	Cocoa and confectionery	Claremont	The largest factory of its type in Australia, employing 700 workers
Associated Pulp and Paper Mills (APPM)	Fine printing and writing papers	Burnie Wesely Vale Long Reach Triabunna	APPM is Australia's largest manufacturer of these products. The Burnie plant has an annual capacity of 130 000 tonnes of pulp and Wesely Vale has an annual capacity of 65 000 tonnes of paper
Tioxide Australia Pty Ltd	Titanium pigments	Burnie	The major manufacturer and supplier to the Australian market of this product with an annual output capacity of 32 000 tonnes
Goliath Portland Cement Co. Ltd	Cement	Railton	A major producer of cement in Australia supplying to the mainland market and Papua New Guinea. Its output capacity is 750 000 tonnes per annum
Edgell - Birdseye Division of Petersville Industries Ltd	Frozen and canned vegetables	Devonport Ulverstone Scottsdale	Tasmania's major processor of this product, has an annual output capacity of 207 000 tonnes

TABLE II.3 (Cont.) MAJOR MANUFACTURING COMPANIES IN TASMANIA

Company	*Product*	*Location*	*Comment*
Comalco Aluminium (Bell Bay) Ltd	Aluminium	Bell Bay	Aluminium smelter and refinery with an annual capacity of 117 000 tonnes of metal
Electrolytic Zinc Company of Australia Ltd	Zinc and zinc alloys, Cadmium Sulphuric acid Superphosphate Aluminium sulphate	Risdon	Has an annual capacity of 218 000 tonnes of zinc
Pioneer Silicon Industries Ltd	Silicon	Electrona	Australia's only silicon smelter, commenced operation in July 1987. Annual capacity is around 10 000 tonnes
Australian Newsprint Mills Ltd (ANM)	Newsprint	Boyer	ANM is Australia's major producer of newsprint. The plant has an annual capacity of 220 000 tonnes

Source ABS (1986d).

TABLE II.4 QUANTITY OF MINERALS PRODUCED, 1984-85

Mineral	*Quantity ('000 tonnes)*
Metallic minerals	
Iron-ore pellets	2 258
Zinc concentrate	165
Copper concentrate	86
Lead concentrate	37
Lead-copper concentrate	28
Tin concentrate	7
Tungsten concentrate	2
Tin-copper concentrate	1
Fuel minerals	
Black coal - bituminous	297
Construction materials	
Crushed and broken stone	2 224
Gravel	1 020
Sand	564
Other non-metallic (excluding fuel) minerals	
Limestone	802
Silica	37
Dolomite	15

Source ABS (1985b).

Agriculture

At March 1985 approximately 2.2 million hectares of land or 31.6 per cent of the total area of Tasmania was used for agriculture. This area is mainly confined to the north and east of the island.

The gross value of agricultural commodities for Tasmania during 1984-85 was $382 million. This consisted of livestock products (35.4 per cent), crops (34.5 per cent) and livestock slaughterings and other disposals (30.1 per cent) (ABS 1985c). In value terms, the major livestock production is cattle, while the major crops produced are vegetables and fruit.

Approximately 5700 commercial farm establishments employing 13 000 workers operated in Tasmania in 1985. A high proportion of these were small holdings. Fifty per cent of the farms were under 100 hectares

and 85 per cent under 300 hectares. Only 8 per cent exceeded 1000 hectares.

Forestry

Forest with commercial potential covers 47 per cent of the total area of Tasmania. Of this area, 13 per cent is formally reserved by the Forestry Commission. Timber supplies are drawn from Crown Forest concessions, other Crown land, private land and sawmill waste. Crown concession entitlements apply only to Crown Land and State Forest within the boundaries of the designated concession areas (BTE 1987b). The concession area boundaries are shown in Figure II.1.

Difficulties were experienced in obtaining recent data distinguishing the value of forestry in Tasmania from the manufacturing industries to which forestry provides the raw material for production. To provide some indication of the size of the State's forest industry, log usage in 1985-86 in sawmills, plywood mills and chipping, grinding and flaking of wood[2] amounted to 4.5 million cubic metres (ABS 1987f).

Power supply

Tasmania's electricity is supplied by the Hydro Electric Commission. The Commission generates approximately eight billion kilowatt-hours of power per annum of which 70 per cent is used by the industrial sector (ABS 1986d). The Commission undertakes major capital works projects related to the supply of electricity and is in the process of expanding its traditional role as a dam and road builder, to encompass other non-Hydro capital works projects. The Commission employs approximately 4500 workers throughout the State, approximately 2.5 per cent of the total employed workforce.

Tertiary sector

The industries included in the tertiary sector are: the wholesale and retail trade; transport and storage; finance, property and business services; community services; and recreation and personal services. At August 1985, in aggregate, this sector employed 100 000 workers, 57 per cent of the total employment in the State. Community services is the largest single industry, employing some 20 per cent of Tasmania's total workforce (ABS 1986d).

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2. Chipping, grinding and flaking of wood is the first stage in manufacturing woodpulp and paper.

TRANSPORT INFRASTRUCTURE

Tasmania's transport infrastructure comprises elements of all modes. While sea and air are both used for interstate freight movements, intrastate transport is mostly carried out by the road and rail modes. Sea and air freight are only used in special or emergency circumstances for intrastate movements. The major seaports, airports, highways and the rail network are illustrated in Figure II.2.

Sea freight

Tasmania has four major general cargo seaports, located at Hobart, Launceston (Bell Bay), Devonport and Burnie. In addition to these, there is a minor general cargo port at Stanley and two special purpose ports, at Triabunna and Port Latta. Hobart, Launceston, Devonport and Burnie are all served by regular interstate general cargo services and are also served by the Tasrail network. The Triabunna port was built for the export of woodchips and is not connected by the railway network. This necessitates the transportation of logs to Triabunna by road where they are chipped and loaded for export. Port Latta is used solely for the export of iron-ore in pellet form.

Table II.5 shows the nature and volume of cargo handled by the major ports for the year 1985-86. Launceston is the major port in terms of total cargo handled, while Hobart recorded the largest throughput of interstate cargo.

TABLE II.5 VOLUME OF CARGO HANDLED AT TASMANIAN PORTS, 1985-86
('000 tonnes[a])

Port	*Overseas*	*Inter-State*	*Intra-State*	*Total*
Hobart[b]	1 151	1 587	230	2 968
Launceston	2 176	1 346	17	3 539
Devonport	19	890	1	910
Burnie	345	819	240	1 404
Port Latta	1 692	75	-	1 767
Stanley	12	5	15	32
All ports	5 395	4 722	503	10 620

a. Reported in mass tonnes with the exception of Hobart which was converted to mass tonnes by the Department of Transport.
b. Includes cargo handled at the Triabunna port.

Source Department of Transport (1987).

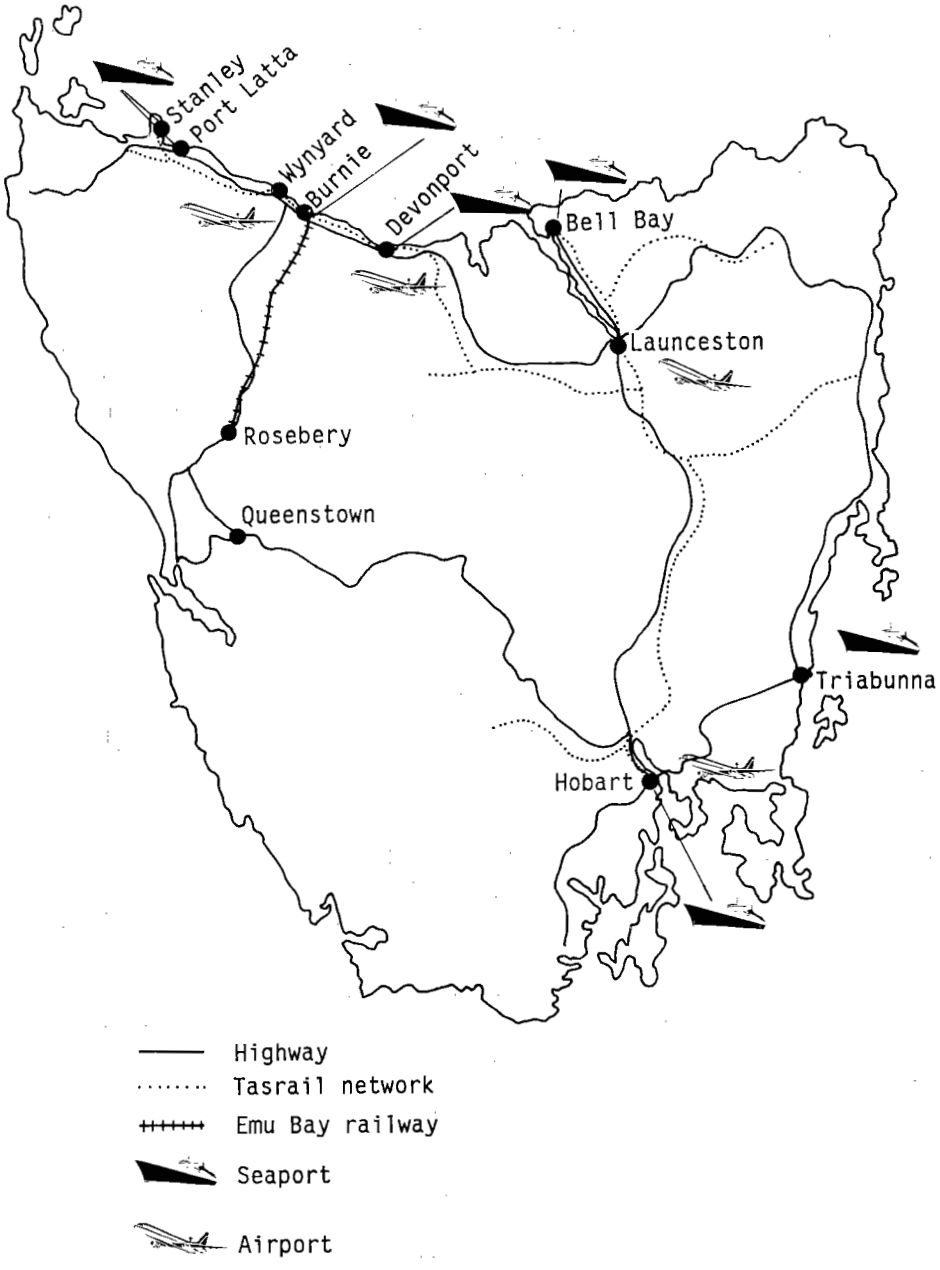

Figure II.2 Tasmania's highway and railway networks and locations of seaports and airports

Air freight

Tasmania has four interstate airports, Hobart in the south and Launceston, Devonport and Wynyard in the north. Scheduled air freight services to and from Tasmania are provided by Ansett Air Freight, IPEC, Australian Airlines and a number of other companies operating on a charter basis (Inter-State Commission 1985).

Freight carried intrastate by domestic and commuter flights for the year ended 30 June 1985 totalled 1310 tonnes (Department of Aviation pers. comm.). Of this total, commuter flights carried 354 tonnes, mainly between the main island and King and Flinders Islands.

Road freight

The classified road network in Tasmania consists of 3700 kilometres of road, of which 3400 kilometres is sealed. (Department of Main Roads 1986). The two major highways over which general freight is moved are the Midland Highway and the Bass Highway which connect Hobart, Launceston, Devonport and Burnie. These highways are part of the National Highway system.

The road freight task for Tasmanian registered trucks for the twelve months ended 30 September 1985 was 1600 million tonne-kilometres.[3] A total of 5510 trucks operated during the year and carried 26 million tonnes of freight (ABS 1985d).

A survey of trucking operations carried out by the BTE in early 1984 and covering the financial year 1982-83, revealed that 660 firms in Tasmania operated trucks for hire and reward. From the survey it was estimated that 1600 full-time jobs were associated with Tasmania's hire and reward trucking operations for the year (BTE 1986).

Rail

The Australian National rail network in Tasmania consists of 840 route kilometres of track. The main route connects the northern seaboard ports of Stanley, Burnie, Devonport and Launceston (Bell Bay) with the southern port of Hobart, and approximately parallels the Midland and Bass highways. In addition to this a private line of 134 kilometres owned by the Emu Bay Railway runs from Rosebery on the west coast to Burnie.

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3. This includes rigid trucks of four tonnes tare weight and over and all articulated trucks, operating as ancillary carriers or for hire and reward.

For 1987, Tasrail carried 2.2 million tonnes of freight (430 million tonne-kilometres). The traffic consists of eight major commodities of which woodchip logs is the most important. Other significant commodities carried and their respective quantities and contribution to the task are shown in Table II.6.

TABLE II.6 COMMODITIES CARRIED BY TASRAIL, 1986-87

Commodity	*Tonnes ('000)*	*Proportion of total traffic (per cent)*	*Tonne kilometres ('000)*	*Proportion of total traffic (per cent)*
Woodchip logs	871	39	190 882	44
Coal	365	17	82 314	19
Cement	301	14	15 605	4
Containers	297	13	51 965	12
Sulphuric acid	117	5	20 572	5
Pulpwood logs	98	4	22 355	5
Timber and sawlogs	60	3	12 460	3
Fertiliser	57	3	20 596	5
Other[a]	49	2	12 124	3
Total	2 215	100	428 873	100

a. Includes minerals, woodwaste, LCL, limestone and dolomite and other goods not elsewhere included.

Note Figures may not add to totals due to rounding.

Source Australian National (pers. comm. 1987).

APPENDIX III TASRAIL RESOURCES AND OPERATIONS

This appendix describes the current resources utilised by Tasrail in the form of assets and labour, a valuation of assets, costing of Tasrail's operations and future operational strategies.

TASRAIL RESOURCES

The resources used by Tasrail are land, rolling stock, plant and equipment, and labour.

Land

Tasrail owns approximately 1736 hectares of land throughout Tasmania of which 1680 hectares is reserved for the track. The railway reserve is generally 20 metres wide along the 840 kilometre length of track owned by Tasrail.

Other major land holdings are:

- Launceston - 33 hectares;
- Hobart - 9 hectares;
- Devonport - 9 hectares; and
- Burnie - 5 hectares.

Rolling stock

At June 1987, Tasrail's operational locomotive fleet totalled 41. Included in the total are 5 of 16 locomotives purchased from Queensland Railways. The remaining 11 should all be received by mid-1988, by which time the fleet will total 52. The average age of the fleet is 20 years and the expected life is 30 years.

The current rolling stock fleet consists of around 900 wagons of which one-third are log wagons, thus reflecting the importance of woodchip and pulpwood logs to Tasrail.

During recent years, Tasrail has undertaken extensive upgrading of its rolling stock. In the past, operational problems arose through incompatible braking and coupling systems on its wagons. Conversion of wagons from vacuum to air braking systems and to centre couplings has taken place and the conversion of the entire fleet is expected to be complete by the end of 1987-88. This will both improve safety and allow operating economies.

Plant and equipment

The major items of plant and equipment owned by Tasrail are:

- rail and sleepers - the 840 kilometre network of track requires 68 000 tonnes of rail and 1.1 million sleepers. It is estimated that around 900 000 sleepers would be retrievable for alternative use. About 45 per cent of the retrievable sleepers are steel and the remainder timber;
- signals and communication equipment - it is difficult to quantify this equipment due to the diversity of its components;
- containers - 145;
- motor vehicles - the current fleet comprises 77 vehicles;
- workshop and maintenance machinery includes items such as:
  - lathes, drills, grinding and milling machines
  - cranes
  - steamcleaners
  - track tamping machines
  - carpenter's shop machinery
- other miscellaneous equipment such as computers, office machinery etc.

Labour

The labour force employed at June 1987 was 917. By June 1988 it is expected to be 869. The labour force is covered in detail in Appendix VI.

VALUATION OF ASSETS

The method of valuation of Tasrail's assets varies according to the resale nature of the item. A description of the method used for each of the item groups follows, and Table III.1 gives the valuations attached to each group.

TABLE III.1 TASRAIL ASSETS AND VALUES[a]

Item	*Number of units salvageable*	*Unit price ($)*	*Value ($'000)*
Land			
Hobart (9 Ha)		na	5 000
Launceston (33 Ha)		na	2 975
Devonport (9 Ha)		na	825
Burnie (5 Ha)		na	760
Other centres		na	2 455
Total			12 015
Locomotives[b]			
Scrap	39[c]	70 per t	205
Resale	22	125 000	3 100
Wagons	900[d]	70 per t	945
Rail	68 000t	50 per t	3 400
Sleepers			
Steel	422 000	2.50	1 055
Timber	500 000	0	0
Signals and Communication equipment		Book value	950
Containers	145	700	101
Motor vehicles	77	Book value	600
Machinery and other miscellaneous equipment		Book value	1 900
Total			24 271

a. Values are the net amounts received by Tasrail after deduction of expenses incurred during disposal of assets.
b. Includes the 16 purchased from Queensland Railways.
c. Total weight of scrapped locomotives is approximately 2925 tonnes.
d. It was assumed that most wagons would be scrapped however some specialised wagons would be sold to the mainland. The total weight of scrapped wagons is approximately 13 000 tonnes.
na Not available.

Sources Australian National (pers. comm. 1987). Australian Valuation Office (pers. comm. 1987). Industry sources.

Land

The Australian Valuation Office has provided a valuation of Tasrail's property, comprising land holdings and improvements. The property in the four major centres, namely Hobart, Launceston, Devonport and Burnie, and property elsewhere in Tasmania was valued at current market prices. In most cases, the best alternative land use was determined to be industrial with both heavy and light industry as possibilities in most centres.

It was considered that the majority of the railway corridors, or reserves, would be of little additional value and would have only limited alternative use:

- Most reserves pass through low value agricultural and bush areas and are long, narrow strips which would be unattractive to adjoining owners.
- The cost of survey, title creation and disposal would generally exceed sale prices when purchasers could be found.
- The cleaning up of ballast and fence lines would add to disposal costs.

Only some corridors within urban areas were noted to have some value exceeding disposal costs and were included where possible in property values.

The total market value of AN land and improvements within Tasmania is estimated at $12.0 million.

Rolling stock

Discussions with industry sources indicate that most of Tasrail's rolling stock would have no alternative use and would be sold for scrap value. The exception might be the ZA class, the recent ZB class locomotive acquisitions from Queensland Railways and some special purpose wagons, which could be possibly sold on overseas markets. Accordingly, these locomotives and wagons are valued at book value while the remaining locomotives and wagons are valued at the scrap value of their steel.

Plant and equipment

Containers, rail and sleepers were assessed at their market value[1] which was determined in discussions with relevant industry sources.

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1. The market value for rail and sleepers includes allowance for lifting and transporting to a Tasmanian port.

Other machinery and assets were assessed at their book value.

COSTING OF TASRAIL OPERATIONS

The Bureau considered various approaches to the problem of calculating the costs of Tasrail operations in a way that properly reflects the task changes, the productivity improvements and the operational changes that may occur over the next twenty years. Access was provided to AN's 'RAILCOST' railway operations and costing model[2], calibrated with data for Tasrail for 1985-86. However, while the model provided considerable insight into Tasrail operations and the impact of operational changes, it proved unsuitable for the aggregate-level forecasts that the study required.

The approach adopted by the Bureau is similar to that used by AN itself in its corporate planning activities. Four broad cost headings were identified, and appropriate costing procedures formulated for each cost element, to calculate both financial and economic costs for the resources involved.

The cost elements are fuel, materials and general expenses, labour costs, and capital costs. All costs are expressed at 1986-87 price levels, and no allowance has been made for any real increases or decreases in the price levels of individual resources.

Fuel

The RAILCOST model suggests that fuel can be regarded as a cost that varies directly with the rail task (expressed in net tonne-kilometres). In 1986-87 Tasrail spent $4.0 million on fuel to move a task of 430 million net tonne-kilometres, a financial cost of 0.93 cents per net tonne-kilometre. Accordingly, fuel costs have been calculated on the basis of this parameter in the financial analysis. Using cost data from AN, the tax element has been calculated at about 50 per cent of the financial cost, resulting in an economic cost of 0.47 cents per net tonne-kilometre.

Materials and general expenses

This cost heading contains both fixed and variable elements, according to the RAILCOST model. For analysis purposes, the fixed element has

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2. The RAILCOST model comprises an interconnected series of programs designed to model the rail network for the purpose of costing changes in the physical output, freight carried or operating procedures of the network.

been set at $2.0 million per annum, and the variable element at 0.90 cents per net tonne-kilometre. This formulation is broadly similar to that suggested by the RAILCOST model, and reconciles with Tasrail's actual expenditure of $5.9 million in 1986-87. As Tasrail does not pay sales tax on its general supplies, the financial cost was adopted as a reasonable estimate of the economic cost of the resources covered by this heading.

Labour costs

As formulated in the RAILCOST model, around 70 per cent of labour costs are regarded as variable with the freight task and about 30 per cent as fixed. While this formulation is appropriate for the costing/pricing tasks that RAILCOST is designed to perform, it does not reflect the practical reality of how Tasrail is likely to be operated over the next twenty years.

Tasrail management has set a target of reducing the Tasrail workforce from its present level of about 900 to a level of 650 over the next four years. Given the capital resources available to Tasrail, and constraints imposed by the physical characteristics of the system, a workforce of 650 is regarded as reasonable to handle a task of 450 million net tonne-kilometres. Task fluctuations around this level would be unlikely to require any significant increase or decrease in workforce level, and would be expected to be accommodated by working more or less overtime, by increasing or decreasing train lengths, and by similar operational strategies.

In the case of the low freight task scenario, where tonnages are significantly below the medium case, there would be considerable pressure to reduce workforce levels below 650. No data was available to indicate the appropriate workforce size, but for the purposes of this analysis, it was assumed that the workforce would be reduced by a further 50 to 600.

Similarly, for the high scenario it was assumed that a workforce of 700 would be sufficient to handle a freight task that grows to 702 million net tonne-kilometres by 2007-08. This would represent a large increase in productivity. Under the medium scenario, a staff of 650 suggests a productivity level of 700 000 net tonne-kilometres per employee, but under the high scenario this improves to as much as one million net tonne-kilometres. By way of comparison, AN's mainland operations achieved a productivity level of 1.02 million net tonne-kilometres in 1986-87, with a ten-year target level of 1.8 million net tonne-kilometres per employee.

It is acknowledged that these staff levels have not been specified on a detailed or precise basis and can only be regarded as indicative of actual workforce requirements. They provide, however, a basis for assessing the impact of the high and low freight task scenarios at a broad level.

The staff levels are multiplied by an average cost per employee to obtain total labour cost. This average cost is derived in Appendix V and amounts to $25 500 in financial terms including on-costs. The approach used to calculate economic cost of labour is also explained in Appendix V.

Capital costs

In the financial analysis, capital costs comprise depreciation and interest expenditure. Tasrail has indicated its future capital investment plans in its corporate plan, and they are covered in a later section of this Appendix. As new investments are made it would be expected that depreciation and interest (if funded by borrowings) would increase. At the same time, because AN adopts the historic cost accounting convention and the Bureau's analysis is undertaken in real terms, the real value of depreciation and interest charges (which are fixed in nominal terms) would be expected to decrease. For purposes of the analysis, these two impacts are assumed to be fully offsetting, so that financial capital costs remain constant in real terms. This simplifying assumption may introduce minor inaccuracies into the financial analysis, but should not distort the overall conclusions.

In 1986-87, Tasrail recorded a depreciation charge of $1.93 million, and an interest cost of $4.29 million. These costs are used in the financial analysis.

For the purposes of the economic analysis, the relevant capital costs are those represented by the new investment made by Tasrail in each year. The costs used in this analysis are those supplied by Tasrail in its Corporate Plan No. 2, including investments funded by internally generated funds, and converted to 1986-87 costs.[3] These new investments are estimated to amount to $6.4 million in 1988-89.

Productivity

The new investments and changes in working practices that AN is

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3. As the Corporate Plan does not incorporate specific provision for the rebuilding of the Launceston workshops, it is also excluded from this analysis.

planning to introduced over the next ten years are expected to result in improvements in productivity, leading to falling real costs. Improvements in labour productivity are already taken into account by reducing the size of the labour force from 917 at June 1987 to 650 by June 1991. Further productivity improvements are expected in the use of other resources, and these are reflected in the Tasrail Corporate Plan by the inclusion of a 1 per cent per annum efficiency improvement. A similar approach is followed in the Bureau's analysis.

Application of costing approach

The costs for Tasrail operations were calculated in the manner outlined above. The resulting financial costs were $37 million in 1988-89 for the medium scenario, declining to $30 million by 2007-08. This decline reflects both reduced task levels from the 1988-89 peak, and the impact of productivity improvements. These costs were used in conjunction with forecast revenue levels to calculate financial results and operating subsidy requirements.

TASRAIL PERFORMANCE MEASURES

The various performance measures for Tasrail in terms of productivity and financial results for the period 1977-78 to 1986-87 are presented in Tables III.2 and III.3. Data from these tables were used in the figures in Chapter 2.

TABLE III.2 STAFF AND FREIGHT DATA, 1977-78 TO 1986-87

Year ending June	*Number of staff*	*Freight task ('000 ntk)*	*Aggregate tonnage ('000 tonnes)*	*Employee productivity ('000 ntk employee)*
1978	1 686	245 817	1 604	145.8
1979	1 526	284 506	1 850	186.4
1980	1 422	383 164	2 142	269.5
1981	1 351	419 502	2 324	310.5
1982	1 307	374 986	2 129	286.9
1983	1 230	380 976	2 032	309.7
1984	1 144	412 273	2 199	360.4
1985	1 072	402 650	2 213	375.6
1986	962	401 945	2 182	417.8
1987	918	428 873	2 215	467.2

Source Australian National (pers. comm. 1987).

TABLE III.3 TASRAIL FINANCIAL DETAILS, 1977-78 TO 1986-87

Year ending June	Total nominal costs	Total real costs[a]	Total nominal revenue	Total real revenue[a]	Deficit - nominal	Deficit - real[a]	Cost/ntk		Revenue/ntk	
	($ million)						($ nominal)	($ real)[a]	($ nominal)	($ real)[a]
1978	24.83	52.83	8.90	18.94	-15.93	-33.89	0.101	0.215	0.036	0.077
1979	24.55	48.52	9.70	19.17	-14.85	-29.34	0.086	0.170	0.034	0.067
1980	25.45	45.20	12.48	22.17	-12.97	-23.04	0.066	0.117	0.033	0.059
1981	29.61	47.60	14.22	22.86	-15.39	-24.74	0.071	0.114	0.034	0.055
1982	31.42	45.80	14.03	20.45	-17.39	-25.35	0.084	0.122	0.037	0.054
1983	35.15	46.31	15.04	19.82	-20.11	-26.50	0.092	0.121	0.039	0.051
1984	35.42	43.46	15.65	19.20	-19.77	-24.26	0.086	0.105	0.041	0.047
1985	36.78	42.47	16.88	19.49	-19.90	-22.98	0.091	0.105	0.042	0.048
1986	39.47	42.62	18.30	19.76	-21.17	-22.86	0.098	0.106	0.046	0.050
1987	37.87	37.87	22.35	22.35	-15.52	-15.52	0.087	0.087	0.052	0.052

a. The price deflator used was the ABS price deflator for expenditure on gross domestic product.

Source Australian National (pers. comm. 1987).

FUTURE OPERATIONAL STRATEGIES

Operational strategies involve planning the combinations of inputs which will allow the railway to meet the traffic task and to be operated as efficiently as possible.

The major elements of such strategies are:

- future investment in plant and equipment
- labour productivity and staff levels.

Investments

The major items in Tasrail's investment plan for 1987-88 are:

- A one spot workshop at a cost of $2 million. The workshop is designed to handle light to medium repairs, which account for 90 per cent of the current repair work carried out. Only 20 per cent of the labour currently used for such repairs will be required and the turnaround time for wagons under repair is expected to be four hours, compared to the current average of three days.
- Conversion of wagons to air brakes and centre couplings is expected to be completed by the end of 1987-88 ($3.5 million).
- Sixteen locomotives have been puchased from the Queensland Railways at a cost of $2.2 million. The first five locomotives were received by September 1987 with the remainder to be received at the rate of one per month throughout the year.
- An efficient train control communication system is to be implemented. Provision of $2.2 million has been made for the communication system upgrade.
- A continuation of the track rehabilitation program at a cost of $1.6 million in 1987-88.
- A $1.1 million Mobile Flash Butt welder is to be purchased for the welding of track.

Major investment plans for beyond 1987-88 are:

- A proposal for new workshops to replace the current Launceston workshops at Invermay Road has been forwarded. The proposal, at a cost of $14 million, involves demolititon of most of the existing workshops and rebuilding on the same site.
- By the end of 1988-89, track rehabilitation work is expected to be complete. All track should then be of a good standard.
- Replacement of 200 timber bridges with steel and concrete is planned. This will reduce bridge maintenance by half while

providing a 100-year life against the current 20-year life of a wooden bridge. At the same time, bridge capacity will be increased to meet the planned increase in wagon capacity to 18 tonnes per axle. It is expected that the bridges can be brought from the mainland with the transport component being the only cost.

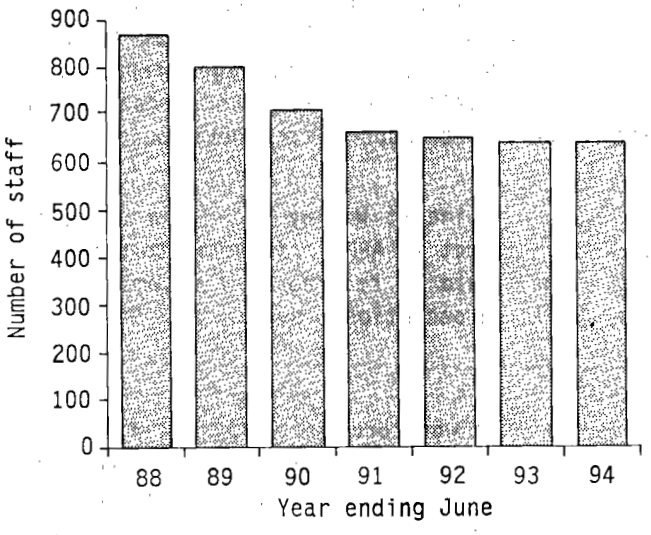
- The construction of a spur line at Wesley Vale at a current cost of $10 to 12 million is subject to APPM's decision to build a pulp mill there. A decision should be reached in the coming year and the spur, if built, would be operational by the mid-1990s.

Staff reductions

At June 1987, Tasrail employed a workforce of 918. The planned staff level is 650 and it is expected that this will be achieved through voluntary attrition by 1993-94. The planned staff levels for each year, 1987-88 to 1993-94, are shown in Figure III.1. The average rate of attrition in Australian National's forecasts is 5 per cent.

In 1987-88, Tasrail aims to increase productivity, measured in terms of net-tonne kilometres per employee, to 0.614 million from an estimated 0.499 million in 1986-87. In addition, Tasrail plans to increase staff mobility by the use of multi-skilling. This is currently being done by the retraining and redeployment of staff. The major area where multi-skilling is being introduced is in the trade occupations where demarcation areas are being broken down so that, for example, wagon repairers also work on boilermaking and fitting.

A further measure to increase staff productivity is the transition from three-man to two-man crewing of trains.



Source Australian National (1987).

Figure III.1 Tasrail forecasted workforce, 1987-88 to 1993-94

APPENDIX IV OPTIONS FOR THE TRANSPORT OF ACID

The purpose of this appendix is to evaluate various options for transporting sulphuric acid in Tasmania in the absence of the railway.

Sulphuric acid is produced by EZ at Risdon, near Hobart. The major Tasmanian consumer of sulphuric acid is Tioxide Australia located at Heybridge, near Burnie.[1]

Tasrail's sulphuric acid forecast freight task in 1988-89 is shown in Table IV.1. The major part of the rail task is the direct movement from Risdon to Heybridge. Tioxide also receives acid by rail from Burnie, following its carriage by sea to Burnie on the *Zincmaster* (a multi-purpose vessel) owned by the TNT group.

TABLE IV.1 SULPHURIC ACID CARRIED BY TASRAIL, 1988-89[a]

Origin	*Destination*	*Distance (km)*	*Tonnes ('000)*	*Tonne-kilometres ('000)*
Hobart	Heybridge	348	90	31 320
Burnie	Heybridge	8	65	520

a. Medium scenario.

Source BTE estimates.

In the event of rail closure the Bureau's assessment is that all other commodities currently carried by Tasrail would be transferred to road transport. However, it is likely that all of the sulphuric acid

1. A small amount of acid is also sold to ANM at Boyer.

requirements for Tioxide would be carried by ship from Hobart to Burnie.

The reasons for this assessment are:

- the use of sea transport for around half of Tioxide's current acid requirements;
- concerns about the hazardous nature of the product; and
- calculations suggesting that sea transport would have a considerable cost advantage over road transport.

There would appear to be only two options for transporting the acid the remaining 8 kilometres from Burnie to Heybridge in the event of Tasrail closure:

- pipeline
- road.

In the remainder of this appendix, the costs are calculated for the carriage of Tasrail's forecast acid task by sea from Hobart to Burnie, and then for each of the two alternative options between Burnie and Heybridge.[2]

Shipping costs from Hobart to Burnie

The *Zincmaster* currently carries around 65 000 tonnes of sulphuric acid per annum between Hobart and Burnie, fully utilising its capacity, given its current sailing schedules. The *Zincmaster* is due for replacement in the early 1990s but industry sources indicate that the carriage of acid would receive the same priority on any new vessel commissioned. For the purposes of this analysis, it is assumed that the *Zincmaster* and its replacement vessel will continue to carry around 65 000 tonnes of acid per annum.

In 1988-89 this would leave a residual of around 90 000 tonnes to be taken by sea from Hobart to Burnie. In considering the shipping options an important factor to take into account is the capacity of the acid storage tanks at the Burnie wharf. The 16 000 tonne maximum capacity of these tanks restrict the size of individual shipments of acid. This, coupled with the 14 sailings per annum by the *Zincmaster*, would limit the size and frequency of individual shipments of a second vessel.

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2. A further option could exist in the form of the commencement of a private railway or by Tioxide engaging Emu Bay Railways to carry the acid. The possibility of a continuing railway option is not, however, considered to be very high.

Discussions with industry sources suggest that a local vessel could conceivably handle the required acid task, depending on its commitments elsewhere. Estimates made by the Department of Transport and Communications indicate that the financial cost of carrying the acid task on a local vessel would range between $10 to $15 per tonne, depending upon the degree of utilisation of the vessel in other tasks. Information supplied by the industry, on the other hand, suggests financial rates could be around $18 per tonne. This cost estimate is supported by application of the BTESHIP model (BTE 1987f) to the sea transport task.

The total cost, in 1988-89 of carrying Tioxide's sulphuric acid requirement by sea from Hobart to Burnie is therefore taken to be around $1.6 million. Resource costs are estimated at $1.4 million. These figures exclude the 65 000 tonnes carried by the *Zincmaster*.

Transport costs from Burnie to Heybridge

Pipeline

The costs involved in the pipeline option can be divided into capital costs and operating costs.

Capital costs comprise construction and installation of the pipeline, pump mechanisms and leak detection equipment. In estimating construction and installation costs, discussions were held with a number of government authorities and industry sources. It was assumed that the pipeline would be made of steel and lined with polytetrafluoroethylene, have a 15 centimetre diameter and be laid about one metre below ground level. This pipeline would provide sufficient capacity for carrying several hundred thousand tonnes per annum.

The trenching and laying costs can vary significantly with the type and nature of terrain and it was not possible to undertake a detailed survey of the proposed route of the pipeline. In addition, the cost of the pipeline can be dramatically inflated depending upon the degree of sophistication of leak detection equipment. It was pointed out to the study team that the risk to the public of an 8 kilometre pipeline carrying sulphuric acid would be likely to require very careful and regular monitoring of the pipeline operations.[3]

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3. Environmental problems might cause authorities to examine carefully the construction of such a pipeline, although it appears there would be technical solutions to most of the environmental concerns.

The total capital costs were estimated to range from around $0.3 million to $1.5 million. The annual cost of servicing the capital component would thus be in the range of $50 000 to $225 000, depending upon construction costs. The minimum estimate was calculated on the basis of minimal leak detection facilities and 'average' terrain, while the high estimate assumed very elaborate precautions and testing equipment for leaks and a more difficult terrain.

The operating costs of the pipeline would generally be modest although they could fluctuate substantially, depending upon the type of leak detection mechanisms and the degree of maintenance required. Advice from industry sources suggests an 8 kilometre pipeline carrying 155 000 tonnes per annum might result in operating costs ranging between $10 000 and $50 000 per annum.

For purposes of analysis, the upper bounds of construction and operating costs were adopted; on the grounds that the sophisticated, expensive options would be required to alleviate environmental concerns.

Road transport

The major premise of this appendix is that acid would not be carried over long distances by road. However, on the assumption that acid is carried by sea to Burnie, it is feasible that the remaining 8 kilometres to Heybridge could be handled by road transport.

Tioxide's acid usage in 1988-89 averages around 425 tonnes per day (155 000 tonnes per annum). It would therefore require a 22 tonne capacity tanker to make 19 round trips per day between Burnie and Heybridge. Allowing for loading and unloading and time on the road, two tankers working for 16 hours per day would be capable of handling the road transport task.

The capital cost of a new acid tanker would range between $200 000 and $240 000 (net of taxes). Industry sources advise that the tankers could be expected to depreciate at the same rate as prime movers carrying general freight over the 20-year appraisal period.

The operating costs of the trucks were estimated using the same principles developed in Appendix VI, taking into account expenditure on such items as labour, fuel, insurance and registration.

The road transport option in 1988-89 could be expected to cost around $295 000 in financial terms or $270 000 on a resource cost basis, including capital costs.

Total cost from Hobart to Heybridge

Table IV.2 shows the estimated costs of shipping sulphuric acid from Hobart to Heybridge in the absence of the railway. In 1988-89, the low estimate of the pipeline option is well below the road transport option. However, it is likely that a more sophisticated leak detection system would be required thus raising pipeline costs beyond $0.5 million over the 20-year period.

The high estimate of the pipeline option is comparable to the estimated cost of road transport. In view of the stringent leak detection requirements likely to be enforced, it is assumed that the pipeline costs, in practice, would be close to this upper bound.

TABLE IV.2 COST OF TRANSPORTING SULPHURIC ACID BY ALTERNATIVE MODES[a], 1988-89
($ million)

Costs	*Financial cost*	*Resource cost*
Ship costs	1.6	1.4
Land costs		
Pipeline	0.1-0.3	0.5-0.3
Road transport	0.3	0.3

a. 1986-87 prices.

Source BTE estimates.

For the purposes of the cost benefit analysis in Chapter 4 and the cost of rail closure to shippers presented in Chapter 5, it is assumed that ship costs per annum would be $1.4 million in resource terms and $1.6 million in financial terms. The land component is assumed to be $0.3 million per annum.[4]

4. The actual figures vary slightly over individual years of the 20-year appraisal period as the forecast sulphuric acid freight task fluctuates.

APPENDIX V LABOUR COSTS, INCOMES AND EMPLOYMENT OPPORTUNITIES

This appendix discusses the economic and financial consequences of employment changes for two groups of employees - Tasrail workers and road transport industry employees. In each case calculations are made to determine resource costs and future income streams (with Tasrail operating and closed).

EMPLOYMENT OPPORTUNITIES FOR TASRAIL EMPLOYEES

Closure of Tasrail on June 30 1988 would lead to around 870 employees being made redundant. Transfer of the freight task to other modes (primarily road) would require an additional 465 workers in that sector of the economy.

Employment prospects elsewhere in the Tasmanian economy are the vital element in calculating both resource costs and future income for the Tasrail workforce. Following closure a proportion of these workers will find alternative full-time employment, some will elect to retire early, some will become discouraged and withdraw from the workforce, and others may become long-term unemployed although still actively seeking work.

The methodology used to estimate the numbers of ex-Tasrail workers in each outcome is discussed below. As the analysis concerns the future behaviour of a disparate group of people, for whom limited information is available, the numbers are necessarily approximate in nature.

Structure of the Tasrail workforce

Basic data is contained in BTE Reference Paper No. 131 which provides a detailed analysis of the Tasrail workforce at June 30 1986. The actual number employed at June 30 1987 was 917. Tasrail's Corporate Plan No. 2 estimates the workforce at 869 at June 30 1988; a projected attrition rate of around 5 per cent in 1987-88.

The occupational classification used in this analysis is the Australian Standard Classification of Occupations (ASCO). This is a

skill-based classification which has been developed as a national standard for classifying occupations. Table V.1 shows the actual distribution of the Tasrail workforce in June 1986 and the estimated distribution in June 1988. Some redistribution between ASCO groups is evident.

Re-employment prospects for Tasrail workforce

Previous research indicates that level of skill, age of worker, length of service and local labour market conditions are the primary identifiable variables affecting post redundancy employment (see Deery et al. 1986, Curtain (1985) and Jenkins & Montmarquette 1979). Discussions with labour market agencies in Tasmania confirmed the relevance of these factors locally.

In assessing re-employment prospects for Tasrail employees, the age variable is considered first. Age is assessed in relation to each ASCO group and these groups are then further assessed for industry-specific skills. Finally, demand for workers in specific groups is assessed in relation to the labour market.

Age

The Tasrail workforce was cross classified by ASCO skill group and

TABLE V.1 TASRAIL STAFFING STRUCTURE, 1986 AND 1988

ASCO major group	*Number of employees June 1986*	*Estimated number of employees June 1988*
Managers and administrators	5	5
Professionals	13	13
Para-professionals	25	23
Tradespersons	190	179
Clerks	110	95
Plant and machine operators and drivers	270	241
Labourers and related workers	349	313
Total	962	869

Note ASCO Major Group, Salespersons and personal service workers is not applicable to the Tasrail workforce.

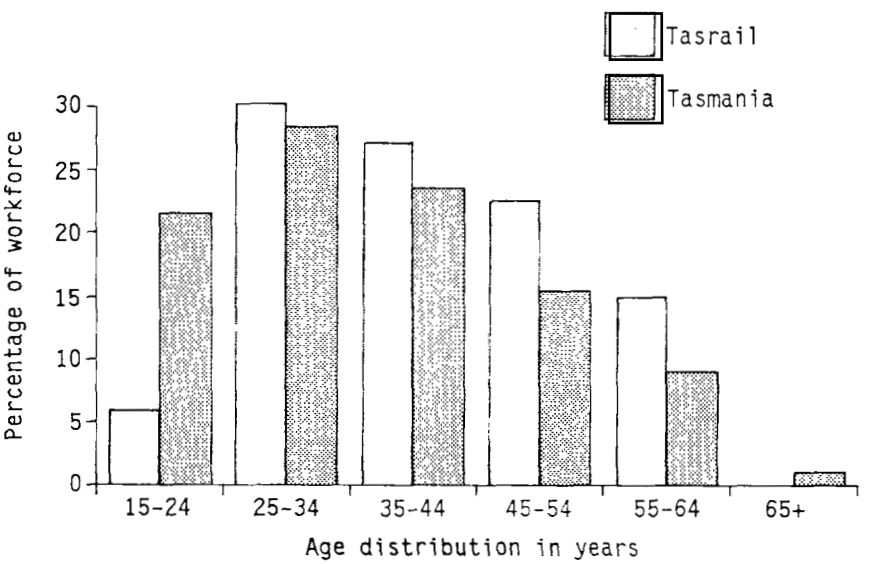
Sources BTE (1987a). BTE estimates.

age. In general terms age is a positive attribute for gaining employment in ASCO groups requiring higher education and professional experience, and a negative attribute in ASCO groups involving manual work and on-the-job training.

The age distribution of the Tasrail workforce varies from the Tasmanian workforce, as evident in Figure V.1, in that Tasrail has relatively few younger workers (6 per cent aged under 25 years compared with 22 per cent) and more older workers (38 per cent over 45 years compared with 26 per cent).

In terms of post redundancy re-employment prospects, older workers (those aged 45 to 65 years) are likely to have the greatest difficulty. Within this age group workers with higher level skills would be in more demand than unskilled workers.

Declining labour force participation rates with increasing age give some indication of this pattern of demand. For example, male labour force participation in Tasmania in the age group 55 to 64 years, fell 20 percentage points between 1976 and 1987.



Source BTE (1987), ABS (1985, pers. comm. 1987)

Figure V.1 Age distribution of the Tasrail workforce and the Tasmanian male workforce

Employers' use of age as a selection criterion is commented on by the Bureau of Labour Market Research (1983a). The report suggests that age is used as a proxy for other worker characteristics such as adaptability, mobility, physical and mental capacity, expected length of employment and educational qualifications.

Deery et al. (1986) and Curtain (1985) both rate age as an important variable. Curtain's survey of retrenched workers revealed significant differences in employment prospects between different age groups. Workers aged 55 to 64 years had only a 16 per cent chance of being in paid employment. Those aged 45 to 54 had a 48 per cent chance while the younger group (aged 19-44) had the highest chance of re-employment at 62 per cent.

During discussions with local labour market agencies there was considerable concern for the re-employment prospects of workers in the 40 to 45 year age group, in addition to the poor prospects for those over 45.

In the light of this information, it is estimated that around 35 per cent of the Tasrail workforce in June 1988 would have little likelihood of obtaining alternative employment.

Skills

The remaining 65 per cent of Tasrail employees that have good employment prospects on the basis of age may, however, be further disadvantaged because they possess industry-specific skills.

Comparison of skills required by Tasrail with skills required in the Tasmanian economy in general reveals a basic mismatch. Two-thirds of Tasrail workers are employed in the lowest skill ASCO groups (plant and machine operators, drivers and labourers and related workers) characterised by lower formal education and on-the-job training. In Tasmania, on the other hand, only one-third of the workforce is employed in the same unskilled occupations.

This comparison may suggest a high component of industry-specific skills within Tasrail and high levels of competition for the relatively few jobs within that sector of the labour market.

Further, employment patterns in Tasmania show that the growth sectors have been community services, finance, business and property services whilst employment in manufacturing, construction and mining has contracted (ABS 1986). This pattern signifies both a contraction in the demand for male labour and an obvious mismatch with the skills of the Tasrail workforce (where only 16 per cent of workers have managerial, professional or clerical skills).

Tasrail employees in higher skill groups (managers and administrators, professionals, para-professionals and tradespersons) are likely to possess skills that are readily transferable to other sectors of the economy. However, examination of the specific tasks undertaken by Tasrail workers in the remaining groups indicates that some hold jobs specific to railways that are not readily transferable to other sectors of the economy. In total it is estimated that around one quarter of workers in these groups will have little chance of re-employment.

This adjustment reduces the re-employable workforce by a further 12 per cent.

Labour market conditions

The overall state of the labour market is used as a proxy to indicate the local demand for labour. The unemployment rate in Tasmania in recent years has been higher than for Australia, averaging 1 percentage point higher over the period August 1986 to May 1987.

Tasmanian unemployment rates are not available by ASCO. However, Australian unemployment rates for each ASCO classification are available for the period August 1986 to May 1987 (ABS 1987). Accordingly, estimates of Tasmanian unemployment rates were derived by weighting the average rate for each classification for Tasmania on the basis of the relationship between the overall Australian and Tasmanian unemployment rates over the same period. Table V.2 lists the Australian and Tasmanian weighted averages for each ASCO classification.

These unemployment rates can be used as a proxy for demand for each group of retrenched workers and indicate that a further 4 per cent of workers have little or no prospect of re-employment.

Factors not taken into account include commuting patterns and willingness to relocate. Incorporation of these factors would most probably increase the number of workers with poor re-employment prospects.

The above analysis permits the prediction of the number of workers likely to be re-employed and the number likely to remain permanently unemployed (either actively seeking work or withdrawn from the labour force). Table V.3 details this outcome.

Following closure of Tasrail, 429 or 49 per cent of workers will have a good chance of obtaining alternative employment within the next 12 months. Workers with higher level skills and/or younger than 45 years

TABLE V.2 AVERAGE UNEMPLOYMENT RATES BY ASCO CLASSIFICATION, AUGUST 1986 TO MAY 1987

(per cent)

ASCO major group	*Australian rate*	*Weighted Tasmanian rate*
Manager and administrators, Professionals and Para-professionals	1.8	2.0
Tradespersons	4.8	5.2
Clerks	3.1	3.3
Plant and machine operators and drivers	5.7	6.2
Labourers and related workers	9.4	10.2

Note The release of Tasrail workers onto the labour market would affect some of these rates.

Sources ABS (1987). BTE estimates.

TABLE V.3 POST REDUNDANCY EMPLOYMENT PROSPECTS OF TASRAIL WORKFORCE[a]

	Number of employees		
ASCO major group	*Estimated June 1988*	*Likely to be re-employed*	*Likely to be unemployed*
Managers and administrators, Professionals and Para-professionals	41	31	10
Tradespersons	179	115	64
Clerks	95	43	52
Plant and machine operators and drivers	241	127	114
Labourers and related workers	313	113	200
Total	869	429	440

a. Within twelve months of closure.

Source BTE estimates.

of age will have the best prospects for re-employment. For instance, workers in the managerial and professional groups will have little difficulty finding employment (and may well be redeployed within AN) whilst workers in the labourers and related workers group (for example, fettlers and gangers) will have the least prospect of re-employment.

Unemployed workers will, over time, vary in their attachment to the workforce. Individual decisions will be based primarily on age and financial status. It is estimated that some 15 per cent of the total workforce will elect 'early retirement' within the first 12 months. All of the 'retirees' are included in the number unemployed, as shown in Table V.3.

This methodology for assessing re-employment prospects utilises a disaggregated approach, considering workers by age and skill and taking into account general employment prospects. It is believed to be a sensible and practical approach to a difficult and complex problem.

FINANCIAL CONSEQUENCES FOR TASRAIL EMPLOYEES

The income of Tasrail workers following closure of Tasrail is dependant upon future employment status and redundancy payments. It is assumed that the overall status predicted after 12 months is stable. All calculations are in 1986-87 prices with no allowance for taxation.

Redundancy package

Redundancy payments are prescribed by the involuntary retirement provisions of relevant Commonwealth and State legislation. Permanent staff are covered by either the Commonwealth *Superannuation Act 1976* or the State *Retirement Benefits Act* 1982 (Tasmania). Temporary staff have an entitlement under the State *Public Servants Retiring and Death Benefit Allowance Act* 1925 (Tasmania) if engaged before 1978. Information provided by AN indicates around 45 per cent of workers are covered by the first two Acts, a similar proportion by the State scheme for temporary staff, and about 10 per cent are without specific coverage.

AN recently introduced a Voluntary Redundancy Incentive Scheme (VRIS). This scheme offers a gratuity payment in addition to superannuation benefits to occupants of positions that are declared surplus by management. In the event of closure a similar scheme may be applicable. In essence, the scheme provides an additional lump sum, equivalent to two weeks pay for each year of service up to a maximum of 52 weeks.

Involuntary retirement benefits

To calculate the value of involuntary retirement payments, entitlements were based on the average length of service (estimated at 20 years) and average salary ($19 000 per annum). In order to allow for changes in contributions over time, it was assumed that the interest rate on contributions equalled the nominal rate of salary increase over the period of service. Results are detailed in Table V.4.

On a per worker basis the lump sum payouts average $66 500, $53 200 and $7300 respectively for the three schemes.

In the analysis it is assumed that all workers elect a lump sum payment and, further, that this is invested with an annual interest rate of 10 per cent. This may represent an oversimplification of the real alternatives but provides a basis for comparing income streams over time. Any error is unlikely to be significant.

TABLE V.4 LUMP SUM INVOLUNTARY RETIREMENT BENEFITS

Act	*Benefit*[a]	*Employees covered*		*Total cost*
		Number	*Per cent*	*($)*
Superannuation Act 1976[b]	3.5 x accummulated basic contributions	122	14	8 113 000
Retirement Benefits Act 1982[c]	3.5 x contribution to 40 year scheme	287	33	15 268 400
Public Servants Retiring and Death Benefits Allowance Act 1925	1 weeks pay per year of service to maximum 48 weeks	391	45	2 854 300
No cover		69	8	0

a. Underestimates total - no account for accummulated supplementary or excess contributions.
b. Contribution rate 5 per cent of salary.
c. Contribution rate to 40-year scheme 5.5 or 2.75 per cent averaged to 4 per cent.

Source BTE estimates.

AN redundancy benefits

Redundancy payments made on the basis of the current AN voluntary redundancy scheme would involve payments as follows:

- 869 averaging 40 weeks pay at $19 000 per annum = $12 701 000 (or around $14 600 per worker).

This amount is regarded as a form of income maintenance, a means by which redundant workers can maintain their standard of living whilst adjusting to changed status in the workforce, and is assumed for the purpose of this analysis to be spent in the first 12 months following closure.[1]

Income streams of Tasrail workforce with closure

Two income groups are readily distinguishable among ex-Tasrail workers:

- re-employed workers
- unemployed workers.

The income generated following closure of Tasrail can then be compared with the income that would be generated if Tasrail continued to operate.

Re-employed workers

The 429 former Tasrail workers who find alternative employment will receive income in the form of wages, involuntary retirement benefits and AN's redundancy benefits. The income streams for the first two years after closure are shown in Table V.5.

Wages are valued at the Tasmanian average for each ASCO group and weighted on the basis of the skill distribution in Table V.3. A deduction of 10 per cent is made to allow for employment at lower skill levels, or de-skilling of the workforce. In 1988-89, allowance is made for a period of unemployment on the basis of 50 per cent of those likely to be re-employed finding jobs immediately and the remainder experiencing six months unemployment.

Involuntary retirement benefits are valued by taking the lump sums estimated in Table V.4 and assuming the whole amount is invested with

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1. Curtain (1985) surveyed the use made of redundancy payments and concluded that younger people were more inclined to use this money for living expenses and repaying debts. Older workers were more inclined to invest, pay off mortgages, undertake household renovations and so on.

TABLE V.5 INCOME STREAMS FOR RE-EMPLOYED TASRAIL WORKERS[a], 1988-89 AND 1989-90

(dollars)

Source of income	*1988-1989*	*1989-1990*
Wages	6 440 000	8 580 000
Involuntary retirement benefits	1 295 330	1 295 330
AN redundancy benefits	6 263 400	0
Total	13 998 730	9 875 330
Average per person	32 631	23 019

a. See text for explanation.

Source BTE estimates.

an annual return of 10 per cent. Redundancy benefits are payable by AN and are valued at $14 600 per person.

Unemployed workers

This group numbers 440 in total and includes both those workers who remain in the workforce actively seeking work and those who technically withdraw from the labour force. The timing of the decision to withdraw will vary between workers, with some choosing to withdraw immediately following closure of Tasrail (early retirement) and others maintaining attachment to the workforce for varying periods of time.

These decisions will be based on a variety of factors, primarily age and superannuation based redundancy payments. For example, workers aged 55 plus and in receipt of the Commonwealth superannuation lump sum settlement (averaging $66 500) may choose early retirement. A similarly aged worker without any cover is more likely to continue job searching.

All ex-Tasrail workers will receive income support during the first year, determined by years of service. The range of payments will be wide (from less than one year's service to more than 40). In order to simplify the analysis it is assumed that all ex-Tasrail workers remain actively in the workforce until normal retirement age (65 years).

The income streams for the first two years after closure are shown in Table V.6.

TABLE V.6 INCOME STREAMS FOR UNEMPLOYED TASRAIL WORKERS[a], 1988-89 AND 1989-80

(dollars)

Source of income	*1988-1989*	*1989-1990*
Involuntary retirement benefits	1 328 240	1 328 240
AN redundancy benefits	6 424 000	0
Unemployment benefits	0	3 161 925
Total	7 752 240	4 490 165
Average per person	17 618	10 205

a. See text for explanation.

Source BTE estimates.

Valuation of involuntary retirement benefits and AN redundancy payments is the same for both re-employed and unemployed groups of ex-Tasrail workers.

Unemployment Benefit (UB) entitlements vary with income and dependants. In 1988-89 all ex-Tasrail workers are deemed ineligible for UB due to income from redundancy payments. From 1989-1990 it is assumed that income from involuntary retirement benefits is the only source of income and that 50 per cent of the unemployed group are single adults, and the remainder married with one child.

The aggregated income streams for the two groups of Tasrail workers are shown in Table V.7. It is assumed that employment status at the end of 1988-89 is maintained throughout the appraisal period.

Income streams for Tasrail workforce without closure

If Tasrail continues to operate beyond 1988, the earnings of the Tasrail workforce will decrease as the number of staff required to operate the railway is reduced. The expected number of Tasrail employees over the next few years is shown in Table V.8, based on Tasrail's Corporate Plan No. 2. The corresponding earnings for the workforce are shown in the second column.

The analysis assumes that the number of employees remains fixed at 650 from 1991 onwards and ignores any alternative income earned by former Tasrail employees who leave the workforce between 1988 and 1991.

TABLE V.7 INCOME STREAMS FOR TASRAIL WORKERS IMMEDIATELY PRECEDING AND FOLLOWING CLOSURE, 1989 TO 1992
(dollars)

Year ending June	*Income group*		*Total earnings*
	Employed workers	*Unemployed workers*	
1989	16 511 000	0	16 511 000
1990	13 998 730	7 752 240	21 750 970
1991	9 875 330	4 490 165	14 365 495
1992	9 875 330	4 490 165	14 365 495

Note All figures are gross of tax.

Source BTE estimates.

TABLE V.8 INCOME STREAMS FOR TASRAIL WORKERS WITHOUT CLOSURE, 1988 TO 1991
(dollars)

Year ending June	*Number of employees*	*Total earnings*
1988	870	16 530 000
1989	800	15 200 000
1990	700	13 300 000
1991	650	12 350 000

Note Total earnings are not directly comparable with Table V.7 due to differing assumptions.

Sources Australian National (1987). BTE estimates.

Disaggregated income streams by skill

The foregoing analysis allows several general statements. Younger workers and those with higher level skills would have the highest probability of re-employment; older workers with lower level skills would have the lowest probability of re-employment. Conversely, older workers would probably have an income advantage over younger workers due to redundancy payments being based on years of service and years of participation in contributory schemes.

Table V.9 demonstrates the differentials between earnings in Tasrail and elsewhere in the Tasmanian economy for each ASCO group.

Inspection of Table V.9 reveals a variation between earning capacity of different ASCO groups in Tasrail and in Tasmania generally. Whilst the Tasmanian rate for managers, professionals and clerks is below the Tasrail average rate the Tasmanian rate for all other groups is in excess of the Tasrail rate. On the surface it would appear that most workers who obtain another job at the same skill level would gain in terms of earnings. A number of other factors determine the net effect, including non-transferable benefits such as long service leave.

Just as important, however, is the degree of downward skill shift. This is particularly relevant to the large number of workers previously in the plant and and machine operators and drivers group, and may also affect tradespersons and clerks. Curtain (1985) and Deery et al. (1986) observed this effect in their longitudinal studies of retrenched workers. Curtain suggested that up to a third of re-employed workers experienced this shift. In this analysis the Tasmanian overall average earnings are deflated by 10 per cent to accommodate the de-skilling phenomenon.

ECONOMIC COST OF TASRAIL LABOUR

The economic cost of labour is the cost to society of using labour in a particular task and is usually calculated by reference to its resource cost. Value in current use and opportunity cost are used as alternative approaches to the valuation of resources.

The wages paid to Tasrail workers and associated on-costs may be used to value the economic cost of their labour only if they reflect the true resource cost to society. If it is considered that wages do not properly reflect real resource costs, then appropriate adjustments should be made for inclusion in the economic evaluation.

In the case of Tasrail, the financial costs of employing labour are assessed to be inappropriate for use in the economic evaluation because of the nature of AN's employment policy, which prohibits the retrenchment of surplus labour. In these circumstances it can no longer be assumed that wages plus on-costs reflect the Tasrail workers' real economic value to the nation, as in some cases they will bear little relation to a workers contribution to output.

The value to society of Tasrail's workforce is distorted from financial costs because the labour is employed under circumstances

where 'market imperfections' (no retrenchments) do not permit AN to employ the optimum labour force required to efficiently operate the railway.

A shadow price of labour is used to adjust the financial costs to correct this distortion. The target staff level of around 650 by 1991-92, identified in Tasrail Corporate Plan No. 2, is assumed to be the optimum workforce required to operate an efficient railway. Consequently, for each year of operation that the Tasrail workforce is in excess of this optimum level, the excess numbers employed are regarded as surplus and their associated costs are subtracted from financial costs to derive economic costs.

For example, in 1988-89 it is estimated that 25 per cent of Tasrail labour expenditure (that is, 869 less 650) is allocated to workers that make little contribution to railway output. Therefore it is appropriate to calculate the economic cost of labour at a shadow price of 0.75.

In Table V.10, the same exercise is repeated for each year until the optimum staff level of 650 is attained in 1991. The staff levels for each year are based on the targets identified by AN in Tasrail Corporate Plan No. 2. After 1991-92, the economic cost of Tasrail labour is assumed to equal its financial cost.

TABLE V.9 AVERAGE EARNINGS BEFORE AND AFTER CLOSURE BY ASCO GROUPS

ASCO major group	*Number of employees*	*Tasrail income ($)*	*Number of employees*	*Tasmanian income ($)*
Managers and administrators, Professionals and Para-professionals	41	29 418	31	27 648
Tradespersons	179	19 840	115	20 935
Clerks	95	22 196	43	21 408
Plant and machine operators and drivers	241	20 856	127	23 280
Labourers and related workers	313	17 496	113	19 183

Note Comparison is in 1986 prices.

Sources ABS (1986). BTE (1987).

TABLE V.10 SHADOW PRICES OF TASRAIL LABOUR, 1989 TO 1992

Year ending June	*Estimated Tasrail staff level*	*Shadow price*[a]
1989	870	0.75
1990	800	0.81
1991	700	0.93
1992	650	1.00

a. Optimum staff level (650) as a proportion of estimated staff level.

Sources Australian National (1987). BTE estimates.

If labour resources were fully employed in the Australian economy the Tasrail labour released each year might be redeployed and make a positive contribution to the nation's output. However, in view of the unemployment currently existing in Australia, the Tasrail labour released is assessed as having no additional economic benefit to society.

The shadow prices in Table V.10 were used in Chapter 4 in adjusting Tasrail's financial costs to resource costs.

Alternative shadow price of Tasrail labour

An alternative method of estimating the economic cost of labour relates to the employment opportunities that might be available to Tasrail workers in the event of closure. This is the opportunity cost method of resource valuation.

In conditions of unemployment, the next best alternative use for Tasrail employees depends primarily on the prospects of obtaining work elsewhere if they are made redundant. An estimate of the economic cost of retaining Tasrail employees in their current employment can thus be measured by their prospective earnings in alternative employment if Tasrail was closed.

The opportunity cost of re-employed Tasrail workers is equivalent to their earnings in alternative jobs plus associated on-costs. Thus the total labour cost of re-employed workers is valued at the average wage for Tasmanian males (ABS 1987) plus average on-costs. It is assumed that workers are re-employed in the same ASCO classifications although it is recognised that some downgrading of skills may be necessary to

remain in the workforce. The opportunity cost of those who become unemployed is regarded as zero, as there is no alternative output they can produce.

In 1988-89, the opportunity cost of re-employed labour (429 workers earning $20 000 per annum plus $7000 on-costs) is $11.6 million. The ratio of this opportunity cost to the total financial cost of labour employed by Tasrail in 1988-89 generates the shadow price for labour.

On the basis of 869 workers being employed by Tasrail in 1988-89, total labour costs for Tasrail are estimated at $22.3 million. Consequently, the shadow price of Tasrail labour in that year is $11.6 million divided by $22.3 million, or 0.52.

In Table V.11 shadow prices for Tasrail labour are calculated for each year until 1991-92, by comparing the opportunity cost of $11.6 million with estimated financial costs (based on the target staff levels identified in Tasrail Corporate Plan No. 2).

After 1991-92, total labour costs remain at $16.7 million as the optimum staff level is attained. Consequently, the shadow price of Tasrail labour remains at 0.69 for the remainder of the appraisal period.

The shadow prices in Table V.11 are used to derive alternative values for labour in the sensitivity analysis contained in Chapter 4.

TABLE V.11 ALTERNATIVE SHADOW PRICES OF TASRAIL LABOUR, 1989 TO 1992

Year ending June	*Estimated Tasrail financial labour costs*	*Shadow price*[a]
1989	22.3	0.52
1990	20.5	0.57
1991	18.0	0.64
1992	16.7	0.69

a. Alternative earnings of Tasrail workforce ($11.6 million) as a proportion of Tasrail labour costs.

Sources Australian National (1987). BTE estimates.

ROAD TRANSPORT EMPLOYEES

Transfer of the rail freight task to the trucking industry is estimated to involve the creation of 465 jobs in 1988-89 (see Appendix VI). Lack of detailed information about the individuals who will take up these jobs limits analysis in this section in comparison to the foregoing analysis of the Tasrail workforce which was based on a profile of the workforce. Table V.12 outlines the occupational structure of the additional road transport employees over the 20-year appraisal period.

Financial effects

Workers employed in the expanded road freight industry are assumed to earn the average wage for the particular ASCO group in which they are employed. It is assumed that Tasmanian average weekly earnings (AWE) ($22 000) reflects the market wage for the pattern of skills required.

Additional income generated in the expanded road freight industry in each year following closure of Tasrail is estimated by multiplying the number of employees by AWE. In 1988-89 this totals $10.2 million. The income stream will vary as the labour force requirements of the industry change, as indicated in Table V.12.

Economic costs

As in the case of Tasrail it is necessary to estimate the economic costs of the labour resources employed in the expanded road freight industry.

TABLE V.12 ROAD TRANSPORT EMPLOYEES, 1988-89 TO 2007-08
(Number of employees)

Group	*1988-89*	*1992-93*	*1997-98*	*2002-03*	*2007-08*
Owner-drivers	105	81	71	76	77
Company drivers	174	163	154	160	164
Other labour	186	163	150	157	161
Total	465	407	375	393	402

Source Adapted, from Table VI.2.

In the case of Tasrail, AN's employment policies make it inappropriate for the financial costs of employing labour to be used in the economic evaluation. In contrast, the road transport industry operates on a purely commercial basis and is judged to be highly competitive. In this situation labour will only be employed if it can be productively utilised by road transport operators and make a contribution towards profits.

Consequently, it is considered that the economic cost of labour in the road transport industry is likely to reasonably approximate its value in use. Total financial costs of the additional workers (wages plus on-costs, estimated at 35 per cent of wages) would not therefore require any adjustment.

In 1988-89 the total economic cost of labour resources employed in the road transport industry would be $13.8 million.

APPENDIX VI TRUCKING OPERATIONS, COSTS AND REVENUES

Alternative modes of transportation will be required to convey Tasrail's freight task if the railways in Tasmania were to close. The purpose of this appendix is to estimate the impact of rail closure on the road freight industry in Tasmania.

A brief description of the current road freight industry in Tasmania is included in Appendix II.

TRUCKING STRATEGIES

Trucks and labour required to service the additional freight that would be generated on Tasrail's closure are based on the medium forecast levels. A freight task of 410 million net tonne-kilometres would initially transfer to road in 1988-89. This would gradually fall off to 324 million net tonne-kilometres in 1997-98, before improving to 343 million net tonne-kilometres by 2007-08. The freight task excludes sulphuric acid which is considered separately in Appendix IV.

Table VI.1 summarises the freight forecasts between 1988-89 and 2007-08 for high, medium and low scenarios. Included in this table are the net tonne-kilometres associated with the medium forecasts.

To derive truck and manpower requirements the following operational assumptions were made:

- All of the additional freight task would be handled by six-axle articulated trucks with a tare weight of approximately 14 tonnes, gross combination mass of 34 to 38 tonnes and a payload of up to 26 tonnes. These trucks would all be purchased new.
- The new freight task would be carried both by owner drivers and trucking firms/contractors. The latter would make use of salaried drivers to carry out their operations.

TABLE VI.1 FORECAST ROAD TRAFFIC, 1988-89 TO 2007-08[a]
('000)

Forecasts	*1988-89*	*1992-93*	*1997-98*	*2002-03*	*2007-08*
Tonnes					
High	2 612	3 128	3 611	3 740	3 815
Medium	2 456	2 214	2 158	2 246	2 282
Low	2 345	1 948	1 716	1 688	1 664
Net tonne-kilometres					
Medium (million)	410	352	324	339	343

a. Forecasts exclude acid.

Source BTE estimates.

- No allowance has been made for 'down time' of trucks in this analysis. Industry sources have indicated that there is currently a 10 per cent spare capacity in the trucking industry and it has been assumed that this spare capacity would be utilised when the trucks devoted to the new freight task are undergoing repairs and maintenance.
- All trucks except those utilised for container cartage have no backload. With container freight, however, the backload factor varies from 0 per cent to 75 per cent depending on the origin and destination of the containers.
- Prime movers would require replacement every eight years and trailers after 12 years. For every prime mover utilised there would be 1.6 trailers (BTE 1987c).
- The rail protection levy would be abolished in the absence of the railways.

RESOURCE REQUIREMENTS OF TRUCKING OPERATIONS

Vehicles

An estimated 237 prime movers combined with 379 trailers would be needed to carry the freight task of Tasrail in 1988-89. A summary of trucks, trailers and the manpower needed to service the freight task between 1988-89 and 2007-08 is provided in Table VI.2. The truck fleet declines with the fall off in the freight task up to 1997-98 before increasing again.

TABLE VI.2 TRUCK AND MANPOWER REQUIREMENTS AND ASSOCIATED COSTS FOR CONVEYING FORECAST FREIGHT TASK

Item	*1988-89*	*1992-93*	*1997-98*	*2002-03*	*2007-08*
Number of trucks	237	204	186	196	201
Number of trailers	379	326	298	314	322
Number of employees					
Owner drivers	105	81	71	76	77
Company drivers	174	163	154	160	164
Other labour	186	163	150	157	161
Total costs ($ million)[a]	37.9	32.8	29.9	31.5	32.0

a. Includes all fixed and variable costs directly related to road transport. Includes drivers' labour costs, but no other labour costs.

Source BTE estimates.

The number of vehicles required to convey Tasrail's medium forecast tonnage was derived for each commodity by its origin-destination flows. Assumptions were made regarding truck payloads, the use of owner drivers, speed of the vehicle, possible round trips per day, and days and weeks worked per year, in order to derive annual tonnage that could be carried per truck for the different commodities on the various origin-destination runs. Based on information from industry sources it has been assumed that approximately 50 per cent of all log and clay traffic and 30 per cent of the remaining freight would be conveyed by owner drivers. In general, owner drivers would be expected to move more tonnage per truck than company drivers as they usually work longer hours, approximating 60 hours per week. The total number of trucks required was determined by dividing the forecast tonnage for each commodity by the estimated annual tonnage conveyed on each truck.

Labour

Owner drivers and company drivers

It is anticipated that an additional 105 owner drivers would gain employment on Tasrail's closure in 1988-89. This figure was estimated taking account of the assumption above relating to freight cartage by owner drivers. In addition, it has been assumed that there would only be one owner driver per truck. The number of owner drivers gaining employment from 1992-93 onwards drops off rapidly with the forecast decline in log traffic.

The number of company drivers needed is based on this group of drivers working the equivalent of 2000 hours per annum for 48 weeks of the year (around 42 hours per week). Hence to arrive at the number of company drivers required, the total annual hours worked by all company operated trucks was totalled and divided by 2000. Although company driver numbers decrease with falling freight task levels, their decline is not as significant as owner drivers.

Other

In addition to drivers, employment would also be created in areas which service the trucking industry. This includes mechanics, clerical staff, forklift drivers, and other support service staff engaged in fuel sales and tyre supplies. In the BTE's Survey of Trucking Operations 1982-83 (BTE 1986), the ratio of full time truck drivers to staff engaged in other functions in the road transport industry was approximately 1.5:1. Using this same ratio an extra 186 people would gain direct employment in the road transport industry as a result of Tasrail's closure in 1988-89.

VEHICLE OPERATING COSTS

Operating costs are comprised of fixed and variable costs. The composition of these costs is as follows:

- Fixed costs
  - capital (prime mover and trailer)
  - registration and insurance
  - administration
- Variable costs
  - fuel
  - tyres
  - repairs and maintenance
  - wages and overheads
  - loading and unloading.

All money amounts in this analysis are in 1986-87 prices.

Financial costs of truck operations

Only costs which feature in the truck operators' decisions are relevant in the examination of financial costs. This is comprised of fixed and variable costs.

Table VI.3 presents the specifications of a six-axle articulated truck used in this analysis.

Fixed costs

Capital assets

This covers the cost of the prime mover and trailer. The approach used in estimating capital costs involves a capital recovery formula. This requires assumptions to be made about the purchase price of the vehicle, interest rates, service life and the residual value, if any, of the vehicle. Different commodities may require different prime movers and trailers so the purchase price may vary from that provided in Table VI.3 which represents an average value. Based on the assumptions outlined in Table VI.3 and using a 15 per cent real interest rate, the annualised capital cost of a six-axle articulated truck totals $38 010.

Motor Tax, Registration and insurance

Intrastate registration charges in Tasmania for a prime mover and

TABLE VI.3 SPECIFICATIONS OF A SIX-AXLE ARTICULATED TRUCK

Item	*Prime mover*	*Trailer*
Vehicle		
Engine type	diesel	..
Tare mass (tonnes)	8.5	6
Age at purchase	0	0
Purchase price tax inclusive ($ 1987)	147 000	64 000[a]
Residual value (per cent)	20	0
Gross vehicle mass (tonnes)	33.3 - 38	..
Life of vehicle (years)	8	12
Average speed (kmh)	75	..
Tyres		
Cost, tax inclusive ($/tyre 1987 price)	435	435
Initial life (kms)	100 000	100 000
Retreading ($/tyre)	164	164
Retreading life (kms)	..	75 000
No. of retreadings	..	1

a. Assumes 1.6 trailers per truck with an estimated cost of $40 000 per trailer.
.. Not applicable.

Source BTE estimates.

trailer with a gross combination mass of 33.3 tonnes to 38 tonnes was approximately $276 in 1986-87. Average third party insurance was estimated at $201. In addition to third party insurance it is assumed that comprehensive insurance is also purchased. Studies such as BTE (1987d) and CANAC Consultants (1984) indicate that the cost of comprehensive insurance varies between 5 and 7 per cent of the vehicle's market value.

Assuming an average rate of 6 per cent of the market price of the vehicle, a depreciation rate of approximately 20 per cent (applied to the reducing balance) and a purchase price of $211 000, the average comprehensive insurance for an articulated truck was estimated at $6585 per annum.[1]

Administration

Administration costs estimates have been adapted from the CANAC Consultants(1984) study resulting in costs of $6060 per vehicle per year. In the case of owner drivers,it has been assumed that family members undertake a major portion of the administrative task while professional accounting services are obtained for tax return purposes. Accordingly,the administrative costs for owner drivers have been halved.

Variable costs

Fuel

Consumption of fuel by trucks will be influenced by such factors as engine capacity, load, age of the vehicle, speed and condition of roads over which the vehicle travels. Based on data provided by the CANAC Consultants in their study (1984) and the survey results of the BTE's Tasmanian Road Freight Transport study (1987c), fuel usage for a six-axle articulated truck has been estimated to average 50 litres per 100 kilometres. Industry sources indicate that the average bulk purchase price for diesel in Tasmania is 59 cents per litre. This results in a fuel cost of 29.5 cents per kilometre.

Tyres

Tyre life is primarily affected by road conditions. Estimates for tyre costs are based on BTE (1987c) assumptions as presented in Table VI.3 on tyre and retreading life. Tyre costs are estimated to total 8.5 cents per kilometre.

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1. Both the prime mover and trailer were depreciated over eight years even though the trailer is assumed to have a life of 12 years.

Repairs and maintenance

Vehicle maintenance costs vary significantly depending on the age of the vehicle, its usage and whether the repairs are undertaken by the driver or a hired mechanic. CANAC Consultants (1984) estimated repair and maintenance costs to be approximately $12 000 per vehicle per annum (1984 prices) or $14 780 in 1986-87 prices. This is equivalent to 10 cents per vehicle-kilometre assuming an average utilisation of 150 000 kilometres per annum. BTE (1987c) presented an average cost of 7.5 cents per kilometre but its relative variability is reasonably high (varying from 3 cents per kilometre to 20 cents per kilometre). Recent discussions with industry sources suggest a figure as low as 4 cents per kilometre could be appropriate.

In view of the wide range of figures presented above, it was decided to adopt a figure of 7.5 cents per kilometre to represent the average maintenance cost in this analysis.

Labour

A company driver's wage consists of the basic award wage plus overtime payments and other penalty payments,if any. The current wage rate of drivers in Tasmania is approximately $311 per week for a 38-hour week (based on the 1983 Transport Workers Award). This is equivalent to $8.19 per hour. In this analysis the total wage was derived on the basis of ordinary time and overtime earnings for appropriate hours to complete the task. In addition to the basic wage an allowance has to be made for other costs related to the employment of a company driver. These costs, generally classified as overheads or on-costs, include annual leave, public holidays, sick leave, payroll tax and superannuation. The overhead component of labour costs has been estimated to be 35 per cent of the wage rate (CANAC Consultants 1984, BTE 1987c). Based on the 1988-89 freight task the estimated annual cost of a company driver, including on-costs and overtime, totalled $29 730. This is equivalent to $619 per week or $14.86 per hour assuming 48 weeks or 2000 hours respectively are worked per year.

The cost of owner drivers is calculated in the same manner as for company drivers. However, the provision for overhead charges has been reduced to 10 per cent. This is because owner drivers would not be charging out for costs such as sick leave, payroll tax and public holidays. The 10 per cent on-cost is added on to the wage rate to cover personal insurance and superannuation. Based on the 1988-89 freight task the estimated hourly labour costs, including on-costs and overtime, for owner drivers averaged $11.80, with hours worked approximating 2744 annually. Yearly income of an owner driver totalled $32 390.

Loading and unloading costs

An allowance of one hour of labour time per trip has been made for loading and unloading charges. This allowance may be a little conservative given that in the current circumstances there are lengthy queues at some points where trucks are loaded/unloaded.

Summary of financial costs

Table VI.4 summarises the financial costs per kilometre associated with operating a six-axle articulated truck. The cost per kilometre associated with using a company driver and owner operator totals 99.3 cents and 93.2 cents respectively.

TABLE VI.4 AVERAGE FINANCIAL COSTS FOR OPERATING A SIX-AXLE ARTICULATED TRUCK[a]

(cents/km)

Cost item	*Employee driver*	*Owner driver*
Capital assets		
Prime mover	17.5	17.5
Trailer	7.9	7.9
Registration and Third Party	0.2	0.2
Insurance	4.4	4.4
Fuel[b]	29.5	29.5
Wages and overheads	19.8	15.7
Maintenance and repairs	7.5	7.5
Tyres	8.5	8.5
Administration	4.0	2.0
Total	99.3	93.2
Loading/unloading costs ($/trip)	14.82	11.80

a. It has been assumed that the average vehicle utilisation rate is 150 000 km per annum. However, it should be borne in mind that this utilisation could vary considerably depending on the origin and destination of a particular truck.
b. Assumes average consumption of 50L/100km.

Source BTE estimates.

Economic costs of trucking operations

The financial cost estimates presented in Table VI.4 were based on retail prices which included various taxes and transfer payments. Economic costs, on the other hand, represent the true cost to society of resources actually expended.

To estimate the economic costs, all taxes, subsidies and other charges, which represent a transfer of funds from one party to another, need to be deducted from the financial costs. In addition all 'external costs' which directly result from trucking operations such as pavement damage and accidents need to be included in the assessment of economic costs. These external costs are discussed separately in Appendices VIII and X.

Capital assets
The retail price of vehicles less taxes was used as an estimate of the resource cost of capital. As the truck market is competitive at both the new and second-hand levels, and trucks are a mobile asset readily usable elsewhere in the economy, this was regarded as an appropriate procedure.

Labour
As the road freight industry in Tasmania is competitive it is assumed that labour resources in this industry are only employed if they can be fully utilised. In this instance the resource cost of labour is estimated to approximate its financial cost.

Other
The taxes levied on fuel and tyres have been deducted from their respective retail prices to obtain their economic costs. Vehicle registration payments have been excluded as they represent the transfer of funds from the truck operators to the State Government. Although insurance costs are also transfer payments they have been included in the economic costs to reflect the property damage cost of accidents.

Table VI.5 summarises the economic costs per vehicle-kilometre.

REVENUE

With excess capacity, the road transport industry in Tasmania is competitive and as a consequence there is no room for high margins in the industry. In the estimation of turnover it has therefore been assumed that the revenue per tonne will be equivalent to the cost per tonne of conveying freight. As provision for a real return on capital of 15 per cent has been included in the estimation of financial costs,

this allows for an appropriate normal profit for each operator in this industry.

Table VI.6 summarises the estimated turnover per truck between 1988-89 and 2007-08.

TABLE VI.5 AVERAGE RESOURCE COSTS FOR OPERATING A SIX-AXLE ARTICULATED TRUCK[a]

(cents/km)

Cost item	*Employee driver*	*Owner driver*
Capital assets		
Prime mover	8.4	8.4
Trailer	3.0	3.0
Insurance	4.4	4.4
Fuel	18.1	18.1
Wages and overheads	19.8	15.7
Maintenance and repairs	6.6	6.6
Tyres	6.8	6.8
Administration	4.0	2.0
Total	71.1	65.0

a. Excludes pavement damage and the cost of accidents, which are considered separately in Appendix VIII and Appendix X respectively.

Source BTE estimates.

TABLE VI.6 ESTIMATED TURNOVER PER TRUCK, 1988-89 TO 2007-08

Year	*Dollars*
1988-89	159 900
1992-93	160 800
1997-98	160 700
2002-03	160 700
2007-08	159 200

Source BTE estimates.

APPENDIX VII RAIL PROTECTION FEES

The Tasmanian State Government rail protection policy, administered by the Tasmanian Transport Commission, provides for the payment of a rail protection levy by road transport operators when in competition with Tasrail for specified bulk traffics.

Formerly, rail protection fees were levied as out-of-area permit fees, payable if the vehicle travelled outside the traffic area for which it was licensed. For this purpose, Tasmania was divided into eight traffic areas. However, as a result of changes introduced in September 1987, rail protection fees are levied on a distance basis only, without reference to traffic areas. Despite this change, vehicles are still only permitted to carry freight either originating, terminating or passing through the traffic area for which the haulier is licensed. Provided this condition is satisfied, the payment of the rail protection levy enables road transport operators to compete for Tasrail traffic. While the original out-of-area permit scheme was primarily designed to ensure that bulk traffics were moved by rail within Tasmania, it was also intended to reduce unnecessary competition between licensed road transport operators.[1]

Goods subject to rail protection fees are:

- cement
- limestone
- fertiliser
- logs
- coal
- sulphuric acid.

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1. Aspects of the scheme relating to the regulation of the road transport industry are contained in BTE (1987c).

The prepayment of rail protection fees is required for all road journeys exceeding 50 kilometres for logs and 100 kilometres for all other commodities. Loads of less than 7 tonnes are excluded from the rail protection fee system.

In certain circumstances, road transport operators may be granted an exemption from the requirement to pay rail protection fees. Following consultation between Transport Tasmania and Tasrail, exemptions may be granted on an individual journey basis or more generally according to the following criteria:

- there is no rail service which could reasonably be used;
- rail cannot handle the goods because of lack of facilities or equipment;
- industrial disputation or derailments (for example) prevents rail from operating; or
- the goods are unsuited to carriage by rail (Transport Tasmania 1987).

The current rail protection fee is 1.4 cents per tonne-kilometre based on the gross vehicle mass for rigid vehicles or the gross combination mass for articulated vehicles. This fee has not been increased for over a decade. Consequently, the effective protection provided by the scheme to rail has declined substantially measured in real terms.

Table VII.1 provides details of the out-of-area permits issued and associated revenue collected in 1985-86.[2] While the scheme includes seven of the major bulk commodities handled by Tasrail, permits for the carriage of only four were issued in 1985-86. Moreover, 80 per cent of these related to the movement of superphosphate, which accounted for around 85 per cent of the revenue collected. Over the past few years the majority of the revenue collected under the scheme was related to superphosphate movements.

The significant use of out-of-area permits for the carriage of superphosphate appears to reflect the seasonal peaks associated with fertiliser demand. In the past, periodic rail capacity problems have prevented Tasrail meeting peak transport requirements.[3] This has

2. During 1985-86 and earlier years the Tasmanian rail protection policy was administered as the out-of-area permit scheme.
3. The operational efficiencies realised by both Tasrail and EZ resulting from the introduction of bulk fertiliser depots will probably largely avoid the capacity problems experienced in the past.

TABLE VII.1 OUT-OF-AREA PERMITS ISSUED AND REVENUE, 1985-86

Commodity	*Permits issued*	*Revenue ($'000)*
Lime and limestone products	22	4
Superphosphate	749	122
Timber	149	19
Logs	8	1
Total	928	146[a]

a. Includes adjustment for refunds of $860 in 1985-86

Source Transport Tasmania (1986).

necessitated the use of road transport to meet the backlog of unfilled orders. It is important to note that, following consultation with Tasrail, the Transport Commission has suspended the payment of permit fees during periods of severe capacity problems in the past.

Discussions held with major industry sources revealed that the rail protection scheme was not a significant determinant of modal choice for most Tasrail traffics. However, as anticipated real freight rate increases are achieved by Tasrail and rail freight rates increase relative to road transport rates, the rail protection levy will probably assume greater significance. Given that some traffic would probably be lost to road transport if the scheme were removed, Tasrail have identified the rescinding of the scheme as a major threat to their operations (Australian National 1987).

The position of the Tasmanian State Government regarding the scheme has been somewhat unclear in recent years. The scheme was informally part of the State-Commonwealth Tasrail transfer arrangement with the implication that the State would continue the scheme on the condition that the Commonwealth Government undertake to continue the rehabilitation of the railway. However, in their submission to the National Road Freight Industry Inquiry, Transport Tasmania indicated that 'it is the policy of the State Government to abolish the fees payable by road transport when in competition with rail' (Transport Tasmania 1984). More recently, it appears the State commitment to the

scheme has been re-affirmed provided the Commonwealth Government continues its commitment to rehabilitate the Tasmanian railways (*Hobart Mercury* 1985).

APPENDIX VIII ROAD PAVEMENT DAMAGE COSTS

One of the important costs generated by closure of the Tasrail system is the additional road pavement damage cost resulting from the heavy trucks that would undertake the rail task as the primary alternative mode. The Bureau employed Nicholas Clark and Associates, research consultants, to undertake a survey of relevant roads in Tasmania and to provide estimates of the road pavement damage costs resulting from additional truck traffic.

METHODOLOGY

The Bureau identified road links that it believed would substitute for rail links in the event of closure of the Tasrail network. These road links were largely parallel to the rail network, but in some cases shorter routes were chosen where they were available. The network of road links is specified in Table VIII.1 and shown in Figure VIII.1. It is conceivable that other roads, not in the table, may be affected but the impact is unlikely to be significant.

The rail task represented by the medium forecast was then assigned to these links on a commodity by commodity basis (except for the sulphuric acid traffic, assumed to move by sea and pipeline). Where specific information was available on changes of origin or destination, this was incorporated in the assignment process. Otherwise, the general pattern of flows derived from Tasrail records for 1984-85 and 1985-86 is assumed to be continued.

These freight flows were converted to additional heavy truck numbers, and then into extra equivalent standard axle loads (ESALs). The relationship used in this conversion involved the carriage of all freight on fully laden six-axle semi-trailer units, with an average payload of 22 tonnes. The additional loaded trucks calculated in this way are also shown in Table VIII.1 on an annual average daily basis.

As noted in Appendix VI, little back-loading would be expected, so that almost all full truck movements would be matched by an equal number of empty return trips. As empty truck trips are insignificant

TABLE VIII.1 ROAD LINKS CARRYING TASRAIL FREIGHT

Road links	*Length (km)*	*Estimated additional loaded trucks per day*[a]	*Estimated remaining service life in years*	*Damage cost category*[b]
Western Line				
Bass Highway				
Smithton to Stanley Highway	15	2	15-20	B
Stanley Highway to Burnie	72	42	10-20	B
Burnie to Devonport	48	98	15-20	A
Devonport to Port Sorell MR	6	100	15-20	A
Port Sorell MR to Elizabeth Town	35	47	20+	A
Elizabeth Town to Deloraine	8	64	20	B
Deloraine to Carrick	33	65	10-15	B
Carrick to Launceston	19	13	20+	A
Devonport-Railton-Deloraine				
Devonport to Mersey MR	4	44	15+	B
Mersey MR to Railton MR	5	44	5-10	C
Railton MR to Railton	13	44	5-10	B
Railton to Elizabeth Town	21	17	5-10	C
Devonport-Long Reach via Frankford MR				
Port Sorell MR to West Tamar Highway	60	53	5-10	C
Frankford MR to Batman Highway	11	53	5	C
West Tamar Highway to East Tamar Highway	12	53	10-15	B
Carrick-Perth				
Illawarra MR	16	52	10-15	B

TABLE VIII.1 (Cont.) ROAD LINKS CARRYING TASRAIL FREIGHT

Road links	*Length (km)*	*Estimated additional loaded trucks per day*[a]	*Estimated remaining service life in years*	*Damage cost category*[b]
Bell Bay Line				
East Tamar Highway				
Launceston to Batman Highway	34	55	20+	B
Batman Highway to Bridport MR	14	108	15	B
Bridport MR to Bell Bay MR	1	15	20	A
Bell Bay MR				
East Tamar Highway to Bell Bay	2	15	20+	A
North East Line				
Tasman Highway				
Near Herrick to Scottsdale	(24	13	15-20	B
	(21	13	5-10	C
Scottsdale to Nunamara	41	10	5-10	B
Nunamara to Launceston	20	10	15-20	B
Bridport MR				
Scottsdale to East Tamar Highway	69	14	10-15	B
Lilydale MR				
Blumont to Lilydale	29	13	5-10	C
Lilydale to East Tamar Highway	19	13	10-15	B
Southern Line				
Midland Highway				
Launceston to Perth	18	69	20+	A
Perth to Conara Junction	38	121	15-20	A

TABLE VIII.1 (Cont.) ROAD LINKS CARRYING TASRAIL FREIGHT

Road links	*Length (km)*	*Estimated additional loaded trucks per day*[a]	*Estimated remaining service life in years*	*Damage cost category*[b]
Conara Junction to Oatlands	60	113	20+	A
Oatlands to Bridgewater	62	107	15-20	B
Bridgewater to Granton	2	51	20+	A
Brooker Highway				
Granton to Hobart	21	44	15-20	A
Tunnack Main Road				
Oatlands to Parattah	7	7	10-15	C
Fingal Line				
Esk Main Road				
Fingal to Avoca	28	58	5	C
Avoca to Conara Junction	25	58	5-10	C
Derwent Valley Line				
Maydena subsidised Road				
Maydena to National Park	13	7	5-10	C
Fenton Main Road				
National Park to Lyell Highway	24	7	5	C
Lyell Highway				
Fenton MR to Granton	33	7	20+	B
Boyer Secondary Road				
Bridgewater to Boyer	11	57	10	B

a. Based on 1988-89 medium road task.
b. See text for explanation of damage cost categories.

Note MR denotes Main Road.

Source Derived from Nicholas Clark and Associates (1987 unpublished).

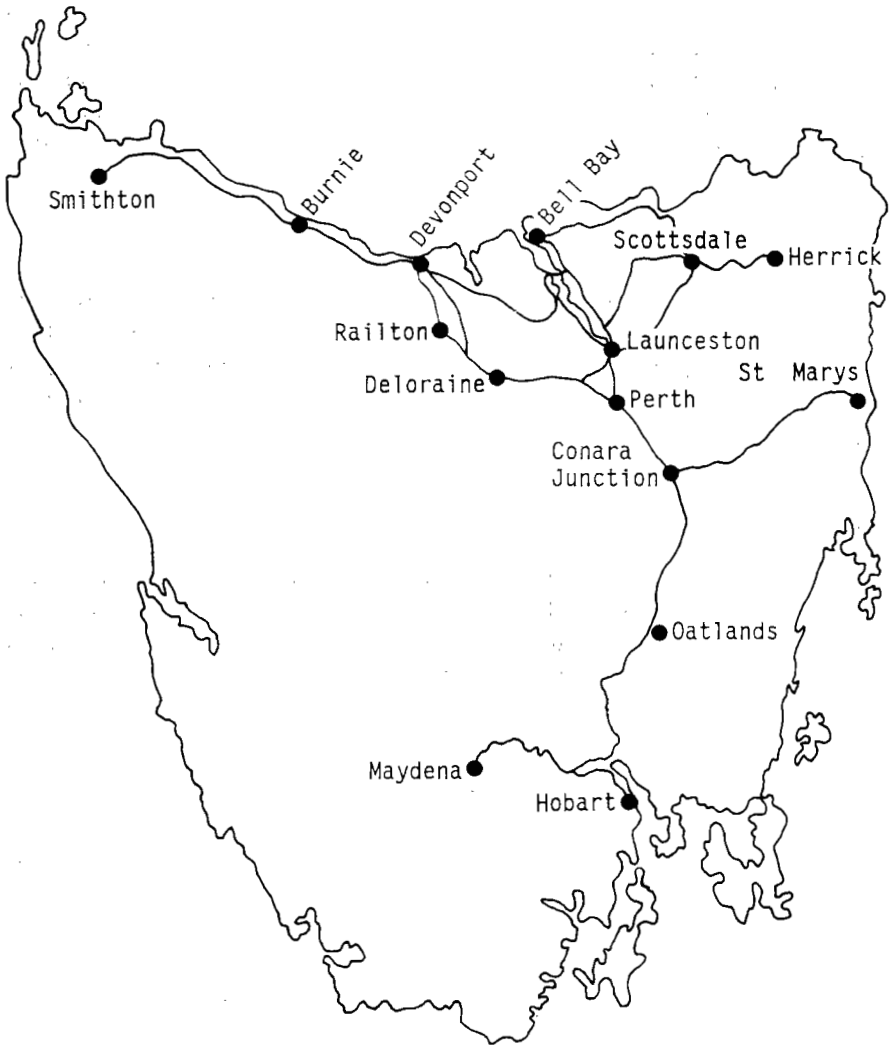

Figure VIII.1 Road links carrying Tasrail freight

in regard to road pavement damage, they have been excluded from Table VIII.1 and from the analysis in this appendix.

The additional truck traffic and ESAL counts were supplied to the research consultant. The consultant employed a team of highly experienced roading engineers and economists to assess the state of the specified road links, and the impact of the nominated additions to traffic levels. This assessment was based on the experience of the engineers, their knowledge of construction methods and materials,

information on pavement ages and existing traffic flows, and a detailed examination of all of the individual road links. Physical testing of pavements was not an option available to the Bureau or its consultants. However, the experience and knowledge of the panel of engineers was regarded as a reliable substitute for these more rigorous methods.

CONSULTANTS APPROACH

The panel of engineers pointed out that the actual behaviour of road pavements under additional heavy loads, particularly for older pavements, can be quite unpredictable. For this reason the results of the analysis are to be regarded as broad estimates rather than precise costs of maintenance and reconstruction.

For analytical purposes, the panel divided the identified road network into three groups. The groups were specified as:

- Group A - roads with no additional damage cost. Some 280 kilometres of the road network comprised roads for which the panel formed the view that no additional damage costs would be incurred, either through additional maintenance or by advancement of the need for reconstruction.
- Group B - roads where damage costs would most likely be limited to an increase in maintenance costs for the remaining life of the pavement proportional to the increase in heavy vehicle traffic. This category comprised some 470 kilometres. In a few cases, provision for additional maintenance, that is for more than the proportional increase, was recommended by the panel.
- Group C - roads where the need for reconstruction would be advanced. This category comprised some 250 kilometres.

Two options were suggested for Group C roads. One involved the immediate reconstruction of all Group C roads, up to ten years before reconstruction would normally have been scheduled. The alternative required very much higher levels of expenditure on maintenance over the remaining life of the road, to prevent complete failure of the pavement, followed by the reconstruction at the normal end of the remaining service life. Cost estimates were provided for both options.

The reasoning behind the consultants approach is outlined in the following quotation from the consultants report to the Bureau.

> We reviewed the relevant theory of road pavement design, including the relationship observed during the Economics of

Road Vehicle Limits (ERVL) Study. According to the theory, a newly constructed road pavement will have a life in ESALs which can be calculated by a mathematical formula. Briefly the logarithm of the number of repetitions of axle loads in ESALs that a pavement will withstand during its life is related to the depth of the pavement and the strength of the soil on which the pavement rests. The requirements of your brief are based on this theory.

We accept the basic theoretical position but we are unable to implement it fully in practice.

There were three reasons:

- First, we observed frequently that road pavements of some age were not exhibiting any signs of distress under existing traffic loads.

  Further investigations revealed that most of the roads were carrying such small numbers of heavy vehicles that it had to be taken that their future life was not likely to be affected by heavy traffic loadings whether or not the railway was closed. This observation has an important bearing on the methodology and conclusions of our study.

- Second, the remaining life in ESALs of the pavements we examined was subject to uncertainty in calculation (as would be expected). This uncertainty generally exceeded the number of additional ESALs for the remaining life of the pavements which would result from closure of the railway.

- Third, information on depth of pavement material and the load bearing capability of the soil under the pavement was rarely available; particularly for older roads which were the ones most likely to suffer major damage should the railway be closed.

We do not suggest that roads in Tasmania may be 'over designed'. We suggest that at low volumes of heavy traffic, say below 1500 ESALs a day, the number of ESAL repetitions is not the dominant consideration in pavement design and ultimately in pavement failure. Except in urban areas, the roads we examined were rarely carrying more than 1500 ESALs a day.

Practical considerations in road construction, including the need for new pavements to carry construction vehicles will cause pavements to have excess ESAL capacity over the usual design life of 20 years. The theoretical pavement depth will always be slightly exceeded for safety tolerances leading to additional capacity to carry ESALs because of the nature of the theoretical relationship between pavement depth and ESAL capacity. An additional half inch of pavement material will significantly increase ESAL capacity.

Pavement failure appeared to be occurring for reasons other than inadequate pavement thickness. Narrow pavements were failing mainly at the edges and on the shoulders (particularly where unsealed) and other failures were occurring at localised areas due to problems with materials quality or compaction.

We observed also that the Tasmanian Main Roads Department had clearly instituted competent programs of rehabilitation of pavements where pavement distress has become evident under existing heavy vehicle traffic. The overall condition of the roads we inspected was quite good.

The use of flexible hotmix overlays on old pavements, both to improve rideability and to strengthen the pavement overall is a notable feature of Tasmanian road practice. There has also been extensive use of pavement widening by 'slotting' adjacent to the existing pavement. These procedures arose from independent advice obtained by the Tasmanian government in the late 1950s. The procedures have been particularly successful, in part because most roads in Tasmania carry relatively low volumes of heavy vehicles (Nicholas Clark and Associates 1987 unpublished).

CONSULTANTS RESULTS

The results of the consultants analysis can be summarised in terms of the three categories of road identified:

- Group A - no additional maintenance or reconstruction cost.
- Group B - additional maintenance costs of about $600 000 per annum for the remaining service life of these roads.
- Group C - the advanced reconstruction option would require the expenditure of $44 to $63 million immediately; of this sum, 25 per cent should be considered as upgrading expenditure, for example,

for improved geometric standards, and consequently not classifiable as damage costs of additional heavy traffic. There would be no additional maintenance expenditure after reconstruction.

The high maintenance option would require additional maintenance expenditure of about $1.2 million per annum for the remaining service life of these roads.

With regard to the Group C roads, the consultants made the following point.

> What would happen in practice is that some roads would be reconstructed early as funds become available. Others would be the subject of special maintenance programs until severe pavement failure precipitated reconstruction. Neither method of estimation reflects the real world outcome, but both provide an indication of the economic costs (Nicholas Clark and Associates 1987 unpublished).

It should also be noted that, in the consultants' view, there would be no additional maintenance costs for roads after reconstruction. Thus, for each road, the additional maintenance costs terminate at the time of reconstruction.

Application of consultants results

For the economic analysis undertaken by the Bureau, the 'high maintenance' option for Group C roads was adopted. This option results in an annual maintenance cost of $1.9 million per annum in the early years after rail closure. The annual cost reduces as roads reach the end of their service lives and are reconstructed, until, by the twentieth year of the analysis, when almost all Group B and C roads have been reconstructed, the additional maintenance cost is close to zero.

An intrinsic assumption with this approach is that the State Government makes the necessary funds available for the maintenance work. Some additional funds would be generated by the additional trucks in the form of registration fees, stamp duties and fuel franchise fees (see Chapter 5), but there would still be a shortfall to be met from other sources.

The 'advanced reconstruction' option was also tested, but at the discount rates used in the analysis it was considered to be a less attractive option. There would also be considerable difficulties in funding the option in the short term, although in the medium term there would be a financial gain.

On the advice of the consultants, maintenance costs on Group B roads were treated as directly variable in relation to traffic levels for the high and low freight forecasts. However, the maintenance costs on Group C roads, by their nature, were treated as fixed for any significant increase in truck traffic.

The resultant costs, for the medium scenario, are shown in Table VIII.2 for a selection of years.

As part of the sensitivity testing undertaken in Chapter 4, the economic analysis was repeated on the assumption of the road pavement damage costs being twice the level indicated by the Bureau's consultants. This approach is regarded by the Bureau as appropriate in view of the level of uncertainty in calculating remaining service lives. The consultants drew particular attention to this problem in their report to the Bureau.

TABLE VIII.2 ROAD PAVEMENT DAMAGE COSTS[a], 1988-89 TO 2007-08
($ million)

Year	*B Category roads*	*C Category roads*	*Total*
1988-89	0.7	1.3	1.9
1992-93	0.7	0.9	1.6
1997-98	0.5	0.0	0.5
2002-03	0.2	0.0	0.2
2007-08	0.1	0.0	0.1

a. The consultants indicated that there were no pavement damage costs for A category roads.

Note Due to rounding figures may not add to total.

Source BTE estimates.

APPENDIX IX IMPACT OF RAIL CLOSURE ON TASRAIL CUSTOMERS

To consider the impact of Tasrail closure in 1988-89 on major rail users, the relative merits of rail and road transport were examined in terms of the following factors:

- the change in the aggregate price of transport faced by shippers;
- quality of service aspects;
- shipper handling arrangements and transport infrastructure; and
- the effects on shipper scale of operation.

Change in the price of transport

To examine the aggregate change in the price of transport faced by shippers, it was assumed that all existing tonnages carried over each origin-destination pair (with the exception of sulphuric acid), would be moved by road transport in the event of rail closure.[1] Data relating to the carriage of acid by sea in the event of rail closure was drawn from Appendix IV.

The estimated price of rail transport faced by shippers in 1988-1989 was obtained directly from the Tasrail revenue projections outlined in Appendix XI. Given the competitive nature of the road transport industry in Tasmania, it was assumed that road transport freight rates would closely approximate the cost of road carriage in the event of rail closure. Relevant costs were obtained from the road transport model detailed in Appendix VI.

Based on a comparison of projected rail, road and sea (in the case of sulphuric acid) freight rates, it is estimated that the closure of Tasrail would result in the price of transport faced by shippers increasing by $14.4 million (1986-87 prices) in the 1988-89 year under the medium growth forecast (see Table IX.1). Woodchip logs, by virtue

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1. The possible implications on the total transport task of rail closure are considered in the discussion regarding scale of operation.

TABLE IX.1 ESTIMATED INCREASE IN THE PRICE OF TRANSPORT IN THE EVENT OF RAIL CLOSURE, 1988-89 TO 2007-08 (MEDIUM FORECAST)

Year	*Increase in the price of transport ($ million)*
1988-89	14.4
1992-93	9.8
1997-98	8.0
2002-03	8.4
2007-08	8.6

Note All figures are expressed in 1986-87 prices.

Source BTE estimates.

of the low rail rate in comparison to estimated trucking costs, account for 50 per cent of the increased burden. Coal and pulpwood logs represent a further 30 per cent of the increase.

In the years following 1988-89, it was assumed that road transport rates would remain constant in real terms. Consequently, the change in the price of transport faced by Tasrail shippers in the event of rail closure is expected to decline to a low of $8.0 million (1986-87 prices) in 1997-98 as Tasrail achieves anticipated real freight rate increases. In subsequent years, the shipper cost of Tasrail closure is anticipated to increase slowly, reflecting a larger task and constant rail freight rates.

Quality of service

The relative quality of service offered by rail and road transport is dependent on the interaction of factors such as reliability, transit time, capacity availability, delay costs and commodity handling arrangements. Rail is unable to match road transport in terms of frequency, transit time or perhaps more importantly, flexibility. However, with the exception of the time sensitive segment of the Tasmanian container market, transit time consistency (or reliability) rather than transit time itself, is the important consideration for Tasrail shippers. As such, the dramatic improvement in Tasrail reliability observed by shippers in recent years is significant. In

addition, Tasrail traffic consists almost entirely of high volume bulk products which are generally more efficiently handled by rail transport.

It is important to note that both rail and road transport are used in the carriage of all major Tasrail products (with the exception of sulphuric acid where rail and sea transport are utilised). Furthermore, almost all Tasrail shippers indicated that modal choice is not unduly affected by the regulations regarding road transport in Tasmania at current rail freight rate levels.[2] Therefore, shipper willingness to use rail is based on the trade-off between freight rates and the overall quality of service offered by the respective modes. For current Tasrail shippers, any positive valuation placed on the quality of service provided by road transport, as opposed to rail transport, is sufficiently less than the freight rate differential between the two modes to justify the continued use of rail transport. However it has not been possible to directly quantify the trade-off between freight rates and quality of service on either an individual shipper or commodity basis.

Transport handling arrangements

The operations of all major Tasrail shippers have been geared towards a long-term continuing use of rail transport. While no major shipper uses rail transport exclusively, plant operations are based on a certain allocation of inputs and/or outputs by road and rail. For example, the Forest Resources Long Reach mill is geared for a 50 per cent allocation of log inputs by both road and rail transport. In the event of rail closure, rail loading equipment would have to be written off and some improvements in road transport despatch or receival arrangements may be required. All major shippers (with the exception of Tioxide) acknowledged that their operations could be maintained in less than ideal circumstances with a total reliance on road transport. However, difficulties may be encountered achieving the required road transport loading rates for products such as coal and fertiliser. Specific information is not available to quantify the cost of changes in commodity handling arrangements.

Scale of operation

In the event of rail closure, it would be expected that Tasrail shippers would, where possible, pass on the increased price of transport to their consumers. However, in some instances competitive

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2. Appendix VII provides details of the Tasmanian rail protection policy.

forces within industries may not allow these increases to be passed on. For example, both APPM and Forest Resources indicated that some rationalisation of woodchip log operations could be anticipated: some logs currently sourced by rail would be uneconomic at prevailing road transport rates. Maintaining the current level of log inputs may result in logs being sourced by road transport from locations closer to the Long Reach mills. Although woodchip log tonnage would remain relatively constant, the road transport task may be smaller than that shown in Table 3.4 which is based on the current log cutting pattern. However, there is no appropriate data available which provides any indication of how log sourcing may change in the event of rail closure.

There is some doubt that Tasmanian coal would continue to be favoured by Tasmanian secondary industry in the event of rail closure. It is possible that it may be more economic for some industries to source coal from the mainland as Fingal is around 200 kilometres from each of the main consumers. Given their proximity to suitable port facilities, APPM (Burnie) and ANM (Boyer) would be the most likely consumers to consider such a change. The loss of one or more major customers would greatly impact upon the scale of Cornwall Coal operations in the Fingal Valley.

Specific industry developments resulting from rail closure, such as those detailed above, have the potential to reduce the scale of Tasmanian industry operation and associated turnover. In addition, such developments would reduce the estimated road task following rail closure detailed in Chapter 3. Therefore, the estimates of pavement damage and truck operating costs, presented in the economic and financial analyses, may somewhat overstate the total cost. However, since these potential industry scale effects are of a speculative nature, they have not been explicitly included in the economic or financial analyses contained in Chapters 4 and 5.

APPENDIX X ROAD AND RAIL ACCIDENTS

This appendix discusses the relative safety of road and rail transport and assesses the net impact following transfer of the freight task to road transport in the event of closure of Tasrail.[1]

Road and rail accidents

Data limitations have restricted the analysis to accidents recorded in the normal collection of road accidents. Accidents at railway crossings, and accidents directly involving heavy vehicles are included whereas industrial accidents to railway and road transport industry employees are excluded.

Tasmanian road accident data conforms to Australian trends. Casualty accident rates are falling over time, measured by number of persons, motor vehicles registered or vehicle-kilometres travelled (VKT) (Federal Office of Road Safety 1986).

During 1986, 91 Tasmanians were killed in road accidents and 2060 people suffered injuries requiring treatment. Three of these deaths occurred at level crossings (ABS 1986). Accidents involving articulated trucks resulted in nine deaths and 37 injuries as indicated in Table X.1.

Casualty accidents occurring at Tasrail level crossings show marked variation from year to year, as shown in Table X.2.

Effects of closure of Tasrail

When investigating accidents in 1982 the Transport Department of Tasmania (now Transport Tasmania, (TT)) concluded that measurement of accident rates per VKT is the most reliable method and this approach is also used by the Federal Office of Road Safety (FORS).

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1. All rail accidents would be eliminated, other than accidents on the private Emu Bay Railway.

TABLE X.1 CASUALTIES RESULTING FROM ACCIDENTS INVOLVING ARTICULATED TRUCKS, 1982 TO 1986

Year	*Fatalities*	*Injured persons*
1982	4	19
1983	6	23
1984	3	22
1985	9	44
1986	9	37
Yearly average	6.2	29

Source ABS (pers. comm. 1987).

TABLE X.2 CASUALTIES RESULTING FROM ACCIDENTS OCCURRING AT LEVEL CROSSINGS, 1980 TO 1986

Year	*Fatalities*	*Injured persons*
1980	2	1
1981	0	0
1982	2	6
1983	2	3
1984	0	5
1985	0	0
1986	3[a]	5
Total	9	20
Yearly average	1.3	2.9

a. Includes two Tasrail train crew and one truck driver.

Source ABS (1987).

TABLE X.3 PROJECTED ACCIDENT CASUALTY RATES, 1988-89
(Number per 40m VKT)

	Fatalities		*Casualties*	
Source	*All vehicles*	*Articulated trucks*	*All vehicles*	*Articulated trucks*
FORS	0.8	na	na	na
TT	1.08	0.724	48.4	14.8

na Not available.

Sources Federal Office of Road Safety (1986). Transport Department of Tasmania (1982).

Appendix VI analyses the transfer of the rail freight task to other transport modes in the event of closure of Tasrail. It is estimated that the transfer would add 40 million VKT to the annual total vehicle-kilometres travelled by articulated trucks in Tasmania in 1988-89, under all scenarios. Over time, the forecasts for high and low growth diverge from this medium growth scenario.

The data in Table X.3 suggests that one fatality and about 15 injuries could be attributed to the additional exposure to articulated trucks. Keeping the railway open might be expected to result in one to two fatalities a year and about three injuries.[2]

Casualty accident costs

The cost of accidents is a controversial area, particularly with regard to the valuation of fatalities and injuries. For the purpose of this assessment, the savings to society of rail accidents avoided and the cost of additional road accidents incurred were valued according to preliminary results of research being undertaken by the BTE. BTE preliminary estimates of fatality costs are around $435 000, while the average cost of injuries is estimated at around $15 600 per person.

In 1988-89 it was estimated that the net effect of rail closure on accidents would be small with a cost to society of around $60 000. However this total annual cost is indicative only and should be treated with caution.

2. Casualty accidents involving Tasrail are forecast on the basis of the existence of the network with no allowance for the volume of either rail or road traffic.

Property damage

Property damage as a result of road accidents - to vehicles, buildings, roadside furniture (signs, barriers, lights etc), vegetation and animals - occurs at a much higher frequency than casualty accidents. As there is no requirement to report such damage, quantification is particularly difficult. However some indication may be gained from insurance premiums. In Appendix VI it is estimated that an additional $2.8 million would be paid in 1988-89 to provide insurance cover for new trucks required to fulfil Tasmania's freight task.

Overall impact

Difficulties with both rail and road data sets complicate assessment of net effects over time although it would appear that the community will be at a higher risk of injury immediately following closure of Tasrail.[3] Differences in the risk of fatalities indicate that the community would be at less risk after closure of Tasrail.

The community is particularly sensitive to safety issues surrounding heavy vehicles which are generally regarded as aggressive elements in the traffic flow, particularly in adverse weather conditions and at night. Fears are supported by evidence that drivers of heavy vehicles are less likely to be killed or injured than occupants of other vehicles (see, for example, Swan 1983).

However, the evidence suggests that level crossing accidents are more significant than those involving heavy vehicles. Over a four year period three deaths in heavy vehicle accidents would be expected, compared with five at level crossings. The reverse applies to injured persons, where 15 would be expected a year with additional truck traffic, and only three a year with the railway open.

A gradual improvement would be expected in the incidence of truck accidents if recent trends are maintained. Improvement to vehicle safety and the condition of Tasmanian roads would be expected to be contributory factors.

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3. For example, data available for analysis covers a relatively short period (five years in the case of Tasrail) and includes a small risk of double counting.

APPENDIX XI RAIL REVENUE PROJECTIONS

To provide an input to the financial evaluation of Tasrail, estimates of future Tasrail revenue were prepared by the Bureau. The projections presented in this appendix relate directly to the freight forecasts outlined in Chapter 3 and to future rate profiles prepared for each of the commodities carried by Tasrail.

The criteria for the setting of charges for services provided by Tasrail (as part of Australian National) are defined in section 21 of the *Australian National Railways Commission Act 1983*. In accordance with the Act, the principles of freight rate determination provided by the Commission to the Minister state that rates will be determined in a commercially oriented fashion, with the objective of attaining the highest level of cost recovery possible.

Several long-term contracts were taken over when Australian National assumed full operational and financial responsibility for Tasmanian railways in February 1978. Generally, these long-term contracts established low rates and contained rate escalation formulae which did not move in line with cost increases. However, these contracts have either expired, or are no longer effective.

Currently, Tasrail agreements are determined as a result of negotiation and confirmed through an exchange of letters between Australian National and the customers concerned. Customers are notified of rate increases at six-monthly or yearly intervals.

The future rate profiles, prepared for Tasrail traffic, were based on reference to both the avoidable costs of carrying a commodity and the perceived elasticity of demand for rail services.[1] Since rail transport is a derived demand, the elasticity of rail transport demand depends on both commodity market demand and supply conditions and the scope for intermodal competition. The interaction of these factors

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1. The elasticity of demand for rail services measures the responsiveness of the freight task to real freight rate movements.

determines the rail transport price achievable in the marketplace. (For further details see BTE (1976)). A lower limit to price is determined by the avoidable cost of providing the rail service. Given road transport provides a close substitute to most Tasrail services, road transport costs, together with the protection afforded by the rail protection scheme generally provide an upper bound to rail transport prices.

The revenue projections derived for Tasrail, expressed in 1986-87 dollars, are presented in Table XI.1. In comparison to the 1986-87 revenue of $21.4 million (Australian National, pers. comm. 1987), a real revenue increase of between 25 and 32 per cent is anticipated under the three scenarios to 1988-89. The medium growth forecast of $27.3 million represents earnings of 5.31 cents per net tonne-kilometre in 1986-87 prices.

In the years following 1988-89, revenue is expected to be maintained at around $26 million under the medium forecast, while earnings per net tonne-kilometre are anticipated to reach 5.96 cents by 2007-08 (expressed in 1986-87 prices). Under the high growth scenario, real revenue is expected to increase by around 40 per cent from $28.2 million in 1988-89 to $40.2 million in 2007-08. Over the same period, the low growth forecast suggests that real revenue will decline by over 20 per cent from $26.7 million to $20.8 million. The implications of these revenue projections in relation to the financial performance of Tasrail are examined in Chapter 5.

TABLE XI.1 TASRAIL REVENUE PROJECTIONS, 1988-89 TO 2007-08 (CONSTANT 1986-87 PRICES)

($ million)

	Revenue				
Scenario	*1988-89*	*1992-93*	*1997-98*	*2002-03*	*2007-08*
High	28.2	34.4	37.1	39.1	40.2
Medium	27.3	26.0	25.0	26.3	26.8
Low	26.7	24.0	21.5	21.1	20.8

Source BTE estimates.

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ABBREVIATIONS

AADT	Annual Average Daily Traffic
ABRD	Australian Bicentennial Road Development Program
ABS	Australian Bureau of Statistics
ALTP	Australian Land Transport Program
AN	Australian National
ANM	Australian Newsprint Mills
APPM	Australian Pulp and Paper Mills
ASCO	Australian Standard Classification of Occupations
ATP	Adult Training Program
AWE	Average weekly earnings
BLMR	Bureau of Labour Market Research
CES	Commonwealth Employment Service
DEET	Department of Employment, Education and Training
DMR	Department of Main Roads
DoA	Department of Aviation
DoT	Department of Transport
DSS	Department of Social Security
ERVL	Economics of Road Vehicle Limits
ESAL	Equivalent standard axle load
EZ	The Electrolytic Zinc Company of Australasia
FORS	Federal Office of Road Safety
GDP	Gross Domestic Product
HFP	Huon Forest Products
IAESR	Institute of Applied Economic and Social Research
ISC	Inter-State Commission
LCL	Less than container load
MR	Main road
ntk	net tonne-kilometre
RAS	Relocation Assistance Scheme
SOC	Social opportunity cost
SGIS	Separation Gratuity Incentive Scheme
TEP	Tasmanian Employment Program
TOC	Total operating cost
TPFH	Tasmanian Pulp and Forest Holdings

TT	Transport Tasmania
UB	Unemployment Benefits
VKT	Vehicle-kilomtres travelled
VRIS	Voluntary Redundancy Incentive Scheme
VTIS	Voluntary Termination Incentive Scheme