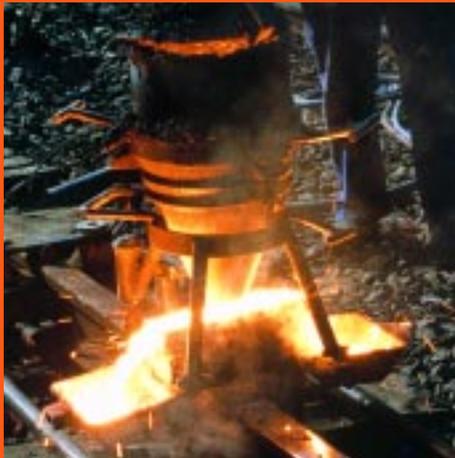
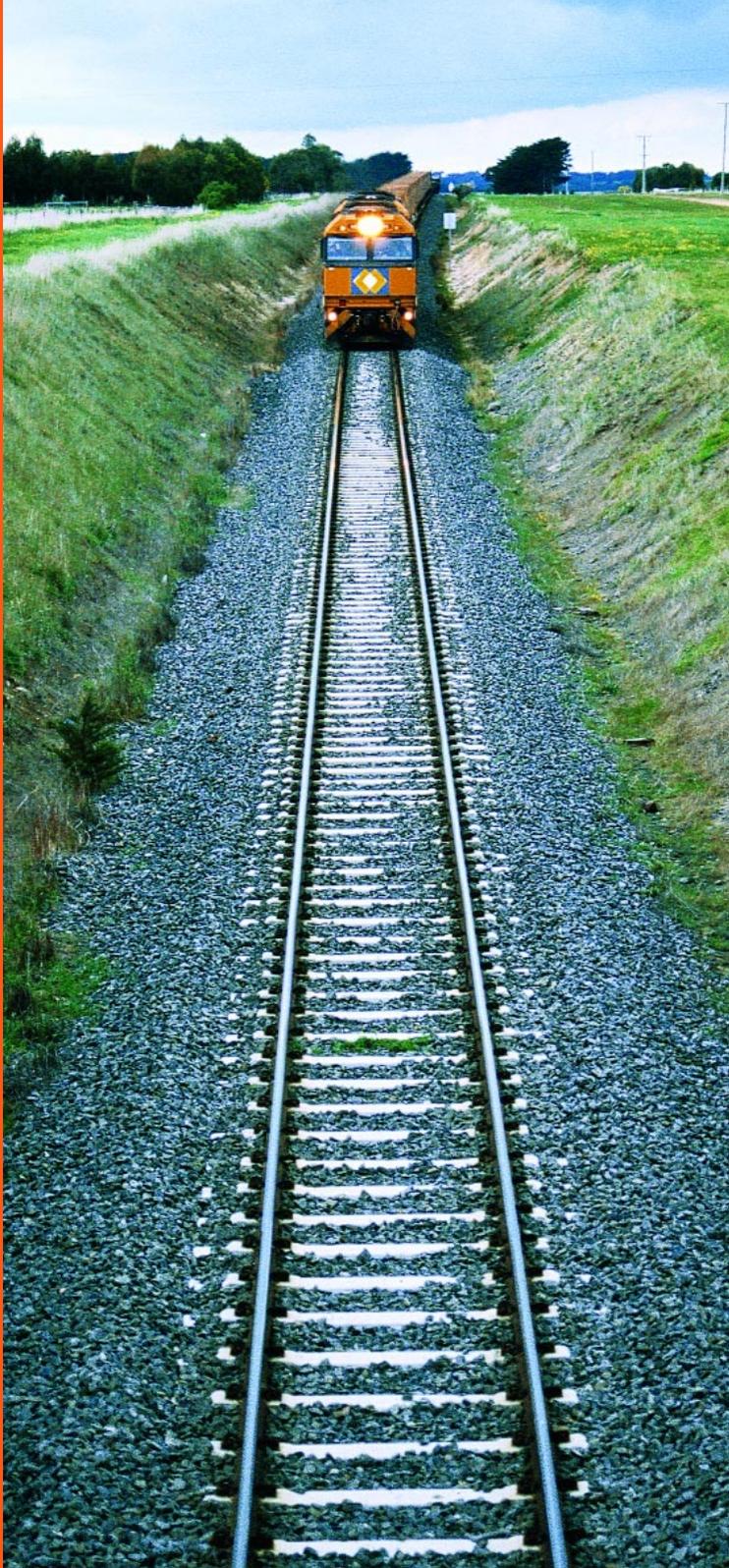


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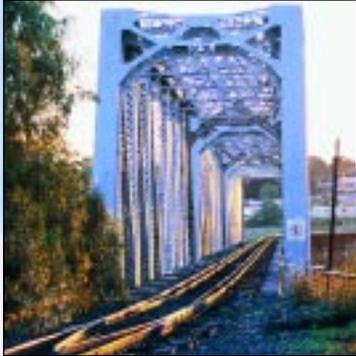
AUSTRALIAN RAIL TRACK CORPORATION LTD



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Over the last three years, an extensive program of infrastructure upgrades funded by ARTC and the Commonwealth Government combined with more effective management of train operations has resulted in increased reliability and capacity across the ARTC network.



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Chairman's Report

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It is with pleasure that I present the 2000/01 Annual Report of Australian Rail Track Corporation Ltd (ARTC).

During the year, ARTC continued to vigorously pursue strategies aimed at improving the competitiveness of rail both at the structural and operational levels and to ensure a sound commercial basis for the corporation in the future.

The corporation has a unique role as a Commonwealth-owned Corporations Law entity, subject to the normal expectations of shareholders, while at the same time being bound by its Constitution to bring about a seamless, competitive rail network across State jurisdictions. This is a challenging role which requires clear objectives and cooperative interaction with many parties. In the past year, I believe ARTC has made good progress towards meeting these requirements.

One of the most significant developments of the past year was the recent announcement that the Commonwealth and New South Wales Governments had agreed to examine access and track management arrangements in New South Wales, with a view to transferring interstate track management responsibility to ARTC. Management of the interstate track in New South Wales is consistent with ARTC's charter to provide efficient and seamless access across the interstate rail corridor. Every effort will be made to achieve this to the satisfaction of all parties concerned.

Unfortunately, ARTC was not successful in securing the lease of the interstate track between Kalgoorlie and Kwinana following the sale of the Western Australian Government's Westrail Freight business. ARTC was, however, able to negotiate a 15 year wholesale access arrangement over the Kalgoorlie to Kwinana rail corridor. This agreement will likewise assist ARTC to

provide a single point of interstate rail access across the nation.

At the request of the Minister for Transport and Regional Services, ARTC conducted a national audit of the interstate rail system. This provided the most comprehensive report to date on the performance requirements of rail, and the investment necessary to improve rail's competitiveness in the market place. The report examined the market characteristics of access price, transit time, reliability and service availability and concluded that an investment of \$507 million would provide a sound investment return for the industry and make rail a viable and sustainable transport alternative.

It is pertinent that the national audit observed that the success of the investment required the rail system to be managed as a single network with a coherent set of management policies and priorities.

As a consortium member, ARTC further progressed the concept of the Australian Inland Rail Expressway during 2000/01 and will continue to be involved with the development of the project. ARTC, with its partners, is at present identifying the major issues associated with the Melbourne to Brisbane inland corridor. It will be important to ensure that this project, if it is to proceed, produces an economically efficient outcome.

Notwithstanding ARTC's involvement in a number of strategic rail issues during 2000/01, the corporation paid close attention to and has delivered on the Australian Transport Council and customer-related objectives of train reliability, enhanced track yield and reduced transit time. These areas are considered critical in improving rail's competitive position and will continue to be actively pursued by ARTC.



Chairman's Report

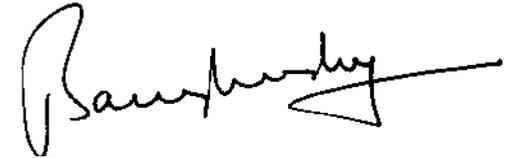
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Towards the end of the 2000/01 financial year, ARTC transferred to the Australasia Railway Corporation through a head lease, the Tarcoola to Alice Springs rail corridor. The transfer of the corridor was a requirement contained in ARTC's Constitution and will have a material impact on the company's revenue base and overall profitability in future years. Nevertheless, ARTC believes that the initiatives put in place in the first three years of the corporation's life will ensure that the solid financial performance to date will continue.

I am pleased to report that ARTC continues to deliver sound financial results to its shareholders. During 2000/01, ARTC recorded a return on assets of 8.3%, and paid an interim dividend to the shareholders of \$2.0 million as part of a total 2000/01 dividend foreshadowed of \$6.75 million.

The year ahead will witness further structural change in the rail industry, particularly with the sale of National Rail and the NSW Freight Corporation. Despite the uncertainty that this may cause in the marketplace, I am confident that ARTC will continue to meet the expectations of shareholders.

In conclusion, I would like to express my appreciation for the contribution made by fellow directors, management and staff over the last twelve months and the continuing support of ARTC's customers, suppliers and shareholders. Only through these combined and sustained efforts can ARTC produce the important results expected of it.



B K Murphy
Chairman
Australian Rail Track Corporation Ltd





Managing Director's Report

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The last twelve months has seen a continued improvement in rail market share on the East West corridor. In the context of tight economic activity, rail achieved a 78% share of the land transport market and a further effective increase in net tonne kilometres.

With the provision of longer crossing loops and improved axle loads during 1999/2000, rail operators have started to take advantage of these with more consistent operation of longer trains and resultant higher yields.

Infrastructure improvements have continued to be pursued throughout 2000/01 by ARTC, with the objective of improving rail's competitiveness. The maximum weight limit of 3,300 tonnes through the Bordertown to Adelaide section has been lifted to 5,000 tonnes. In Victoria, bridge works and major track strengthening have been undertaken to enable the Victorian infrastructure to service 23 tonne axle loads at a maximum speed of 80 km/h and to bed down sustainable 21 tonne axle loads at 110 km/h. The higher performance standards will be introduced as soon as regulatory concurrence has been achieved in Victoria.

A program to improve the safety and efficiency of interfaces in Victoria has been developed and submitted for regulatory approval. The program will extend CTC coverage and automatic interface points between branch lines and the mainline.

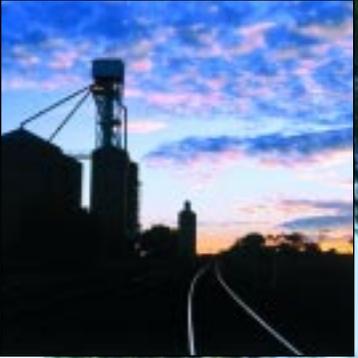
The North East mainline in Victoria (Melbourne to Albury) underwent a major track-strengthening program that

was substantially completed during 2000/01. The program incorporated major sleeper replacement and the installation of resilient rail fastenings throughout the corridor. An extensive rail rectification program supplemented this work while track formation was substantially rehabilitated through a shoulder ballast cleaning program and improvements to drainage and water run-off.

PROGRESS IN REFORM

ARTC has been an active participant in the development and implementation of the National Code of Practice. The National Code of Practice for Operations and Safeworking has been implemented across the South Australian, Western Australian and New South Wales segments of the ARTC network. ARTC is working with the Victorian Regulator and other network operators, seeking to have the National Code implemented on the Victorian sector of the ARTC network during 2001/02.

During 2000/01 ARTC, at the request of the Commonwealth Government, undertook a review of the investment needs on the defined interstate network and the Australian Transport Council goals for that network. The Study was undertaken with the support of rail operators who were represented on the Study steering committee through the Interstate Rail Operators Group (IROG), with two representatives on the committee.



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The Study had six objectives:

- determine the extent to which ATC targets had been met and any adjustments which should be made to the targets;
- determine what was required to gain a commercially sustainable shift in modal share by rail corridor;
- establish a framework of operational engineering management and

infrastructure initiatives which could achieve modal shift;

- conduct an economic and financial evaluation of the investment initiatives;
- establish a business case for investment on the interstate network;
- Evaluate the potential cash flows from investment to attract private sector investment.

The Study concluded that an optimum investment of \$507m on the network would provide a Benefit Cost Ratio of 3.2, benefits of \$1,453m and a Nett Present Value of \$994m. The investment would also result in a significant improvement in rail's interstate intermodal market share from the present base of 38%.

In February 2001, ARTC formally submitted a voluntary Access Undertaking to the Australian Competition and Consumer Commission

(ACCC). The Undertaking covers the ARTC network as a whole and is modelled as an open access regime. This voluntary Undertaking is the first received by the ACCC from the rail industry. It is anticipated that the Undertaking process will be completed during 2001/02.

ARTC completed its lease documentation for the Tarcoola to Alice Springs rail line that has been leased at \$1 per annum to the Australasia Railway Corporation as part of the Darwin line development.

FUTURE DEVELOPMENTS

ARTC has been evaluating new safeworking technologies for possible introduction over the next few years. The train order, CTC and other signalling systems presently operating on the ARTC network will require replacement during the next five to ten years. It is appropriate at this time to explore replacement of these systems with new technologies, which also bring enhanced safety, capacity and efficiency to rail operations. The evaluation of options will be completed during 2001/02.

The evaluation of the development and business case options for an Inland Rail Route from Melbourne to Brisbane has also been undertaken by ARTC as a member of the Australian Inland Rail Expressway (AIRE). It is anticipated the business case for the proposal will be concluded over the coming year.

Throughout 2000/01, ARTC has continued to focus its operational and infrastructure management on improving and developing the rail network. During the year over 96% of healthy rail services arrived on time on the ARTC network.

ARTC has in 2000/01 continued its program of enhancing the rail infrastructure to enable sustained improvements for rail operations and competitiveness. This is being achieved with the active support of our suppliers and the commitment of ARTC staff.

ARTC looks forward, in partnership with the rail operators, to sustaining and building the rail market.



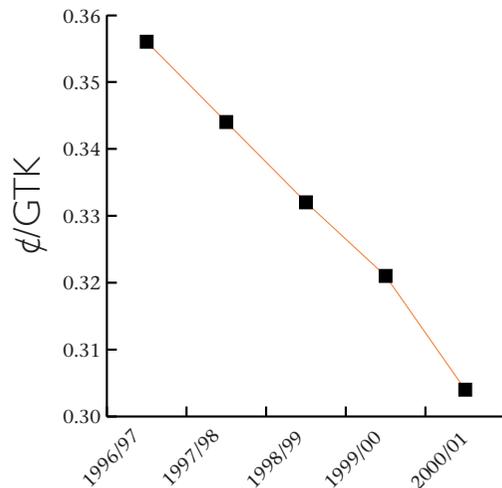
David Marchant
Managing Director
Australian Rail Track Corporation Ltd



Market Indicators

Trading conditions during the year were challenging, as was anticipated following the introduction of the Goods and Services Tax. The impact on traffic volumes resulting from the unexpected decline in economic growth from December onwards, was largely offset by increased tonnages of grain being hauled, with South Australia experiencing its second largest harvest on record. The commissioning of the new export grain facilities at Appleton Dock (Melbourne) also attracted

substantial additional grain tonnage onto the ARTC network.

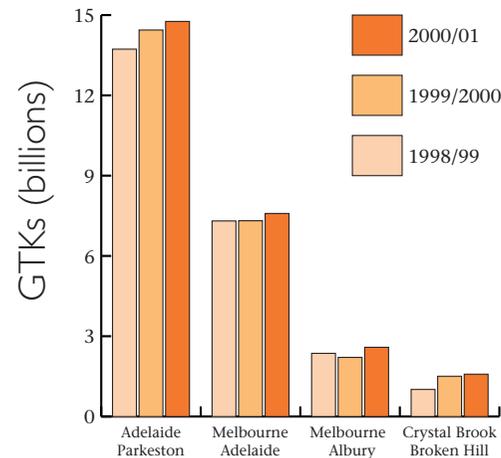


Real Average Access Revenue Yield
(2000/01 \$)
(2000/01 CPI excludes the effects of ANTS)

CORRIDORS

All major ARTC corridors recorded steady growth in gross tonne kilometres (GTK) during 2000/01. Total GTKs increased by 2.5% from 26.60 billion GTK in 1999/2000 to 27.26 billion GTK in 2000/01. This follows GTK growth of 3.5% between 1998/99 and 1999/2000.

Continued growth in the Sydney to Perth express freight market has resulted in an increase in train paths being utilised on the Broken Hill-Crystal Brook-Port Augusta corridors with two dedicated return services now running weekly. Towards the end of the financial year, a new weekly Adelaide to Sydney intermodal service commenced operation. This connects with services to and from Perth and additional traffic is attached and detached at Parkes (NSW).



Gross Tonne Kilometres by Corridor

While growth was recorded on all corridors, intermodal traffic on the Sydney to Melbourne corridor remains under intense competition from road transport. Much of the growth on this corridor is attributable to the movement of grain from southern NSW to Appleton Dock. Reliability improvements, resulting from ARTC initiated capital upgrades, between Melbourne and Albury and the potential for a single management regime on this strategic freight corridor are aimed at providing the foundations for rail to capture increased market share.

As a result of the crossing loop extension program on all corridors, train lengths continue to grow. However, the opportunity remains for operators to further exploit the productivity gains offered through the ability to run heavier and longer trains, thus improving access revenue yield.

Real access revenue yield continues to improve. On average the cost of access for freight services over the ARTC owned network has fallen by 15% in real terms over the past four years.

EAST WEST SUCCESS

Over the last three years, an extensive program of infrastructure upgrades funded by ARTC and the Commonwealth Government combined with more effective management of train operations has resulted in increased reliability and capacity across the ARTC network.

On the strategic freight corridor from the eastern states to Western Australia, this has resulted in rail's market share of the westbound land transport task recently rising to a record 78%, from 75% in 1999/2000. Freight rates are estimated to have fallen by at least 30% since the introduction of competition on this corridor.

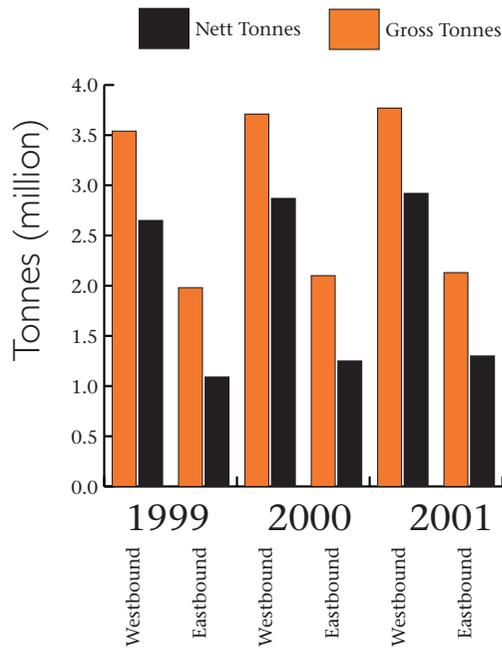
As the result of track upgrading and other infrastructure improvements up to two and a half hours has been cut from freight train transit times between Adelaide and Perth.

ARTC and Commonwealth funded projects implemented between 1998 and 2001, including crossing loop extensions and self restoring switch upgrades have allowed the regular operation of 1800m length trains in both directions across the Nullarbor and increased the reliability of all services on this corridor.

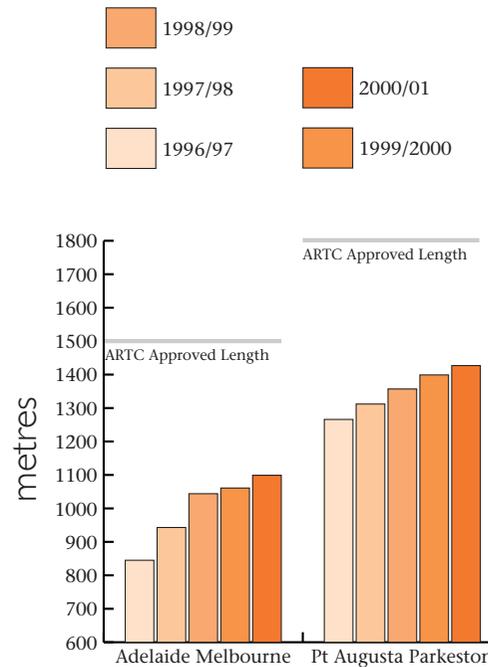
The reversal in rail's fortunes has coalesced with the application of open access principles to interstate rail

corridors and above rail competition that has led to more aggressive marketing by rail operators. However, sea freight using the single voyage permit system continues to place rail operators under strong competitive pressure.

Three operators, National Rail, Specialized Container Transport and Toll Rail provide through freight services over this corridor and Great Southern Railway's Indian Pacific provides transcontinental passenger services.



East West Rail Corridor Tonnages



Train Length by Corridor (Average for high flagfall services)



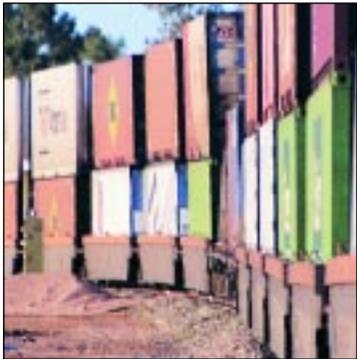


INTEGRATED TRANSPORT SOLUTIONS

A key aim for ARTC is to ensure that business and industry are provided with efficient transport options for the future and that rail remains an essential and sustainable element of the Nation's transport and logistics network.

In order for this to occur, rail must become more responsive and flexible to the demands of the marketplace. Further integration of the logistics chain, greater reliance on hubbing, the development of 'inland ports' and the growth in e-commerce are all challenges the industry will have to adapt to over the next few years.

Efficient intermodal interfaces will become even more critical in the provision of the seamless transport solutions demanded by the marketplace. ARTC is investigating ways in which the necessary rail transfers can be made more efficient and be better integrated into the current network. The focus will be on identifying key interface points and ensuring that the rail infrastructure can meet the increasing demands on it to alleviate congestion in port and urban areas.







Operations & Safety



RELIABILITY

During 2000/01 almost 11,500 scheduled services operated across the ARTC network.

Of these, over 6,000 services were classified as healthy services and were not delayed more than 15 minutes due to operator caused incidents. Of these healthy services, 96.3% exited the network on time.

This result exceeded the previous year's performance of 94.4%. ARTC has recorded an improvement in this key performance measure over the past three years.

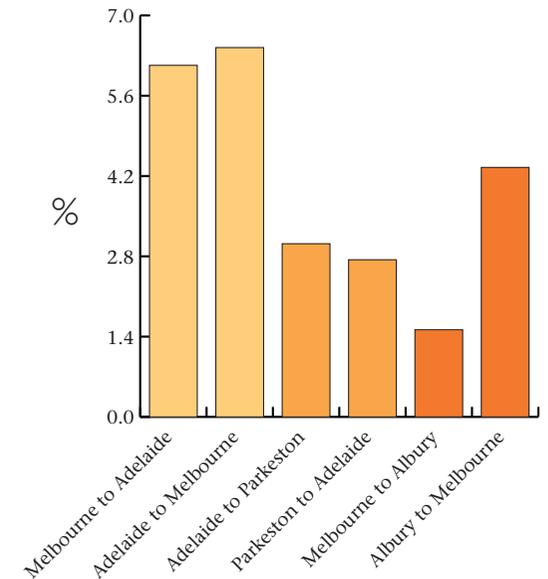
In addition to the high rate of on time exit for healthy services, 35% of unhealthy services also exited on time. An unhealthy service is one that suffers an operator attributed delay en route or is more than 15 minutes late entering the ARTC network. Of these services less than 3% had their performance deteriorated by factors caused by ARTC.

TRANSIT TIME

ARTC conducted a major review of train schedules during the past year, culminating in the introduction of revised timetables on 4 February 2001.

The new schedules delivered significant transit improvements on all corridors and realised the benefits of the ARTC and Commonwealth's substantial capital expenditure program over the last three years on the ARTC network. This extensive program of infrastructure upgrades, combined with more effective management of train operations, has resulted in increased reliability and capacity across the ARTC network.

Significant transit time improvements have been delivered across a wide range of services on all ARTC controlled corridors. The revision of schedules also provided an additional two paths for high speed intermodal traffic on the Melbourne to Albury corridor and additional services on the Broken Hill to Crystal Brook corridor.



Percentage Improvement
Transit Times 2000/01

NATIONAL CODE OF PRACTICE

During the period under review, ARTC became the first track manager to introduce the National Code of Practice for Operations and Safeworking - a major step in reversing "the break of gauge" mentality in rail safety.

The code was developed under the auspices of the Australasian Railway Association, the Commonwealth Government and each of the State and private rail operators and was officially introduced on June 3 2001 across the ARTC network in South Australia, New South Wales and Western Australia. This followed an extensive program of industry consultation and safe working training for train control, maintenance and driving staff.

This introduction of the code is a major step in gaining a safer and consistent rail transport network. As each jurisdiction moves to the national code the rules will become consistent for train operators on the interstate mainlines.

Over the next 12 months, ARTC is hopeful that it will gain regulatory approval from the Victorian Regulator to commence implementation of the national code on its Victorian mainline.

Following implementation of the code the entire suite of ARTC safeworking documents were published on the ARTC website.

OPERATIONS AND SAFETY

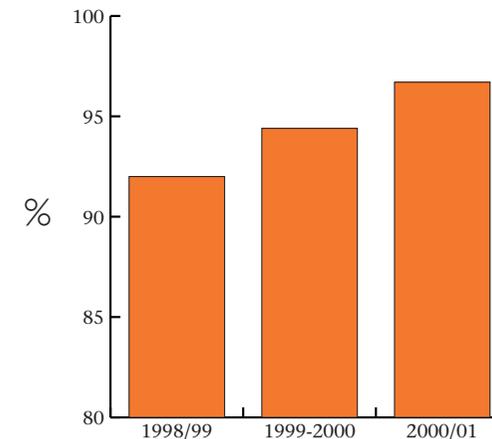
During 2000/01, Continuity Program improvements were completed at Port Augusta. The implementation of this element of the project delivered complete control of the ARTC network to the ARTC Train Control Centre.

With the transfer of the Tarcoola to Alice Springs rail line to the Australasia Railway Corporation, ARTC was awarded the provision of the train control contract for services over this line. ARTC also continues to provide contractual train control services covering the Appleton Dock terminal and NRG's Stirling North to Leigh Creek coal line.

ARTC has undertaken to remedy locations where access to the network can be achieved without interaction of the ARTC train controller. To date remote control locking has been installed at Ararat and under the Hot Spots project this will be further enhanced with the introduction of CTC Signalling from Newport to Gheringhap and from Maroona to Pyrenees. In addition remote control locking will be installed on the points at Inverleigh and Westmere sidings.

Installation of Driver Initiated Control Equipment (DICE) was completed at four crossing loops between Gheringhap and Maroona. This ensures quicker transit time over this section of track, which will be further enhanced with the introduction of CTC under the Hot Spot project.

During the year, ARTC has fulfilled all statutory compliance issues both internally and externally to meet the safety requirements of the various state based rail regulatory bodies.



Percentage On Time Exit of Healthy Trains



Engineering

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During 2000/01, ARTC completed a number of critical projects specifically targeted at improving infrastructure and operational reliability. These projects were also directed at improving transit times and the yield of both the infrastructure and for operators. At the same time ongoing preventive and periodic maintenance works were undertaken across the network. The extensive programs of shoulder ballast cleaning and rail rectification that commenced during 1999/2000, continued throughout 2000/01. The improved track standard achieved by this work will reduce future maintenance costs, allow higher speeds and axle loads to be sustained across the network and extend the life of the track infrastructure.

MELBOURNE ALBURY IMPROVEMENTS

During the year, a major project to rehabilitate and upgrade the North East line in Victoria from Tottenham to Albury was completed. Work was focused on achieving the ATC goals for increased speeds and axle loads on the interstate network. Following the upgrade works the track capability, including bridges and structures, has been raised to allow for operation of trains with 23 tonne axle loads at 80km/h and 21 tonnes at 110km/h, whilst maintaining the XPT and similar trains at 130km/h. The innovative approach taken to achieve these track improvements at less than 25% of the cost of more traditional methods has been recognized through several industry awards (See page 18).

ADELAIDE MELBOURNE IMPROVEMENTS

Between Adelaide and Melbourne work focused on completion of the signalling upgrade between Monarto South and Bordertown. This new computer based interlocking system has

eliminated old cabling, together with relay interlocking at extended crossing loops and in several block sections. This has reduced field infrastructure and improved signal reliability. The extended loops have enabled operators to further advantage of 1500m train lengths on the corridor.

Works continued in Western Victoria to build on gains in transit time and reliability already made on this corridor under Project 10.5. These works included significant bridge and culvert works to enable up to 25 tonne axle loads, ballast profile improvements and drainage improvements to cuttings and embankments. Shoulder ballast cleaning was completed on a significant proportion of the line, along with further drainage works. A major resleeper program is planned on this section in late 2001 to support the gains made in ballast quality through the shoulder cleaning program.

Major track realignments at selected locations were also successfully undertaken. Further realignment works due for completion in 2001/02, as part of the Safeworking Hotspots Project, will improve ARTC control of access to the network. The new crossing loops in progress at Mt Barker and Laverton will also be commissioned to allow greater flexibility in the running of 1500m length trains on the corridor.

ADELAIDE KALGOORLIE IMPROVEMENTS

The System Continuity Project between Stirling North, Port Augusta and Spencer Junction was completed during the year. Previously this section of the interstate network was operated on train orders and manual working through Spencer Junction Yard. Previously this created delays for services transiting Port Augusta on the strategic East West

corridor. The introduction of a new computer based CTC signalling system has allowed direct ARTC control over this section of the corridor for the first time, from the ARTC Train Control Centre.

The realignment and reconstruction of the mainline and crossing loop have also allowed train speeds over this section to be raised to a uniform 60km/h, delivering significant transit time savings for through trains. Network capacity has been enhanced with the construction of an 1850m crossing loop at Port Augusta. A successful community education campaign was conducted in the area to ensure awareness of the increased track speeds.

On the Broken Hill to Crystal Brook corridor work programs focussed on improved drainage, upgraded ballast formation and bridge and culvert remediation.

Works were also completed to remove redundant track and signalling assets at Islington enabling the track speed to be raised to 80km/h in this section. Further works are proposed in 2001/02 for the final continuity site at Dry Creek. These will create a crossing loop for 1800m trains and rationalise track and signalling infrastructure currently shared by the interstate and local suburban networks. The introduction of a new computer based interlocking at this site will improve safety and reliability of operations through the Dry Creek area.

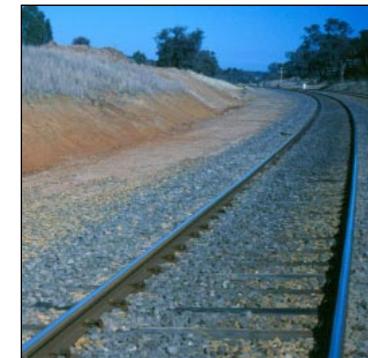
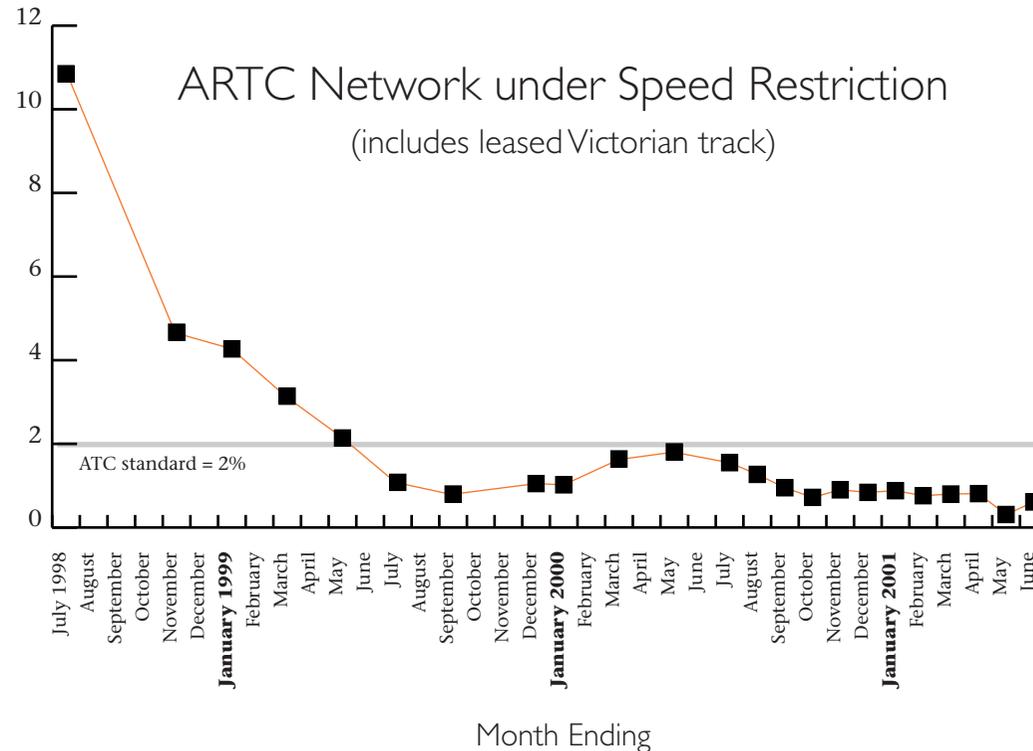
In addition to the System Continuity works, ARTC continued the program started in 1998/99 to install concrete bearer turnouts at crossing loops, and repair pre-existing derailment sites on the Trans Australia Railway (TAR). Works were completed at seven locations on the TAR to ensure that gains in transit time and reliability made through projects such as the Self Restoring Switch Project continue to be maintained.

AXLE LOAD INCREASES IN VICTORIA

Since July 1999 when ARTC took up the lease of the Victorian standard gauge interstate rail network, it has been the focus and goal of ARTC to improve the infrastructure so as to permit the operation of trains at ATC axle loads and speeds over the leased trackwork.

The extensive program of track upgrading and bridge strengthening carried out over the last three years has rendered the infrastructure on the leased Victorian network suitable to allow the ATC standards to be implemented. ARTC is continuing to work with the Victorian Regulator to address a number of regulatory and operational issues in order that these standards can be implemented before the end of 2001.

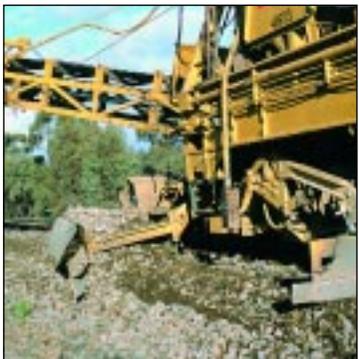
Infrastructure





North East Corridor

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THE CHALLENGE

On the Melbourne to Sydney corridor, rail market share has fallen dramatically in recent years. A major factor in this downward trend has been the condition of the track, which has impacted greatly upon service and reliability levels.

The Melbourne to Albury ARTC section of this corridor was characterised by light rail, dog spike fasteners on timber sleepers, fouled and poorly profiled ballast and inadequate formation drainage. All these factors

combined to create an inadequate track structure incapable of withstanding the

demands that would be imposed upon it by trains operating at ATC and ARTC objectives for axle load and speed.

Track operating standards for freight trains were previously set at 100 km/h for axle loads up to 19 tonnes and 80 km/h for axle loads up to 21 tonnes.

The traditional engineering solution would have involved a near complete rebuild of the line over much of its entire length. However, the estimated project cost was of the order of \$100m to \$130m. The North East line therefore became the focus for developing a cost effective track rehabilitation strategy, which could also be applied to other parts of the ARTC network.

THE FIVE STEP HOLISTIC APPROACH

The strategy adopted was to start with the existing asset in its current condition and, as an alternative to undertaking the major upgrade, focus on improving the capacity and remaining life of the various track components.

The result was the development of a five step holistic approach to address the condition of the rail surface and the modulus of the track and formation. A further key element addressed the life and load bearing capability of the bridges on the line.

The total cost of the upgrade (\$30.3m) was met from ARTC funding and the Commonwealth Rail Infrastructure Fund.

The major components of the strategy were:

- Rectification of surface defects in existing rail through straightening and grinding
- Targeted timber sleeper replacement using lower strength but fit-for-purpose materials
- Installation of resilient track fastenings
- Shoulder ballast cleaning
- Attention to improved drainage through cut-off and cess drains

In addition to these five steps, fatigue analysis of bridge structures using established, but less conservative techniques, was undertaken. With the addition of bracing to improve buckling strength, the fatigue life of bridges has been extended by 20 to 25 years and they are able to withstand higher axle loads.

Following completion of the project, the track is now able to meet ARTC's interim goal of achieving the ATC standards of: freight trains at axle loads up to 21 tonnes, maximum speed of 115 km/h, freight trains at axle loads up to 23 tonnes, maximum speed of 80 km/h.

OUTCOMES

Higher speeds and a lower proportion of track under speed restriction will enable train operators to improve service reliability and transit times between Melbourne and Albury. Similarly, the improved rail surface condition will reduce maintenance costs for both ARTC and its customers and the improved wheel/rail surface contact will lower rolling resistance and improve fuel economy.

A separate project has also been completed to extend a number of crossing loops to 1500m allowing the operation of longer trains.

As a result of the work undertaken on the North East line, the track will be able to sustain train operations to the ATC goals of speed and axle loading for an estimated 10 years. At that time, ARTC will be in a position to determine whether the growth in traffic demand warrants the more substantial investment using more traditional solutions.

The Five Step Holistic Engineering approach has been recognised by the Institution of Engineers' Australia – South Australian Division as being a sound engineering achievement and was granted an Engineering Excellence Award. The Project has also won the inaugural National Transport Outcomes Award.

SAFEWORKING

ARTC is entering the final phase of prescribing the systems requirements for its next generation safe-working technology. This is the culmination of 12 months preparatory work, during which time ARTC has sought expressions of interest, in the form of a generic pre-qualification tender, from organisations capable of meeting the corporation's expectations.

In the pre-qualification phase ARTC has prescribed a 'moving block' type application as a replacement for the various safeworking technologies it has inherited. Given the benefit of experience gained through that phase, ARTC is confident that the technology to support 'moving block' is developing in both Europe and the United States. In the meantime, ARTC has considered and recognised the benefits of pursuing a strategy that enables it to replace current safeworking systems with an interim technology.

This strategy will enhance network capacity and safety and lay the foundation for migrating to 'moving block' technology, as that technology matures.

TRAIN PLANNING

The process used to develop train plans by the various rail authorities, continues to remain largely reliant on manual processes. This often results in long iterative attempts to modify train plans and in particular, master train plans. Whilst ARTC uses a degree of software assistance in this process, it also continues to rely on a significant manual input.

ARTC is preparing to introduce a software support tool that will greatly improve the productivity of the train planning function. The software is currently being developed and tested by ARTC and WestNet Rail, in conjunction with an Adelaide based software house.

The ability to respond to operator requests for train path considerations and to achieve productivity improvements will be greatly enhanced by use of this software.

RAIL ACCESS MANAGEMENT SYSTEM

ARTC's Rail Access Management System (RAMS) is now becoming the industry standard software for use by rail authorities. The system records train consist data, information about a train's position on the network, details of incidents and train delays, the capturing of data for billing purposes and for related reporting.

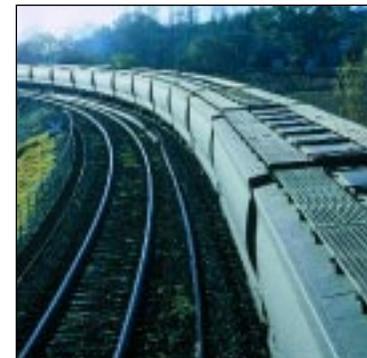
The software has reached an advanced stage of maturity on the interstate networks managed by ARTC, WestNet Rail and QR, and is currently being tailored for introduction in New South Wales.

Systems Technology

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Wayside Detection

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INTRODUCTION

Derailments and other related incidents are one of the most destructive and expensive disruptions to train operations and impact heavily on both ARTC and train operators. The majority of rolling stock related derailments are the result of bearing failures. ARTC has investigated the cause, type and number of incidents on its network with a view to introducing wayside monitoring equipment that will assist in reducing the number of these incidents.

A Wayside Steering Committee, comprising ARTC and operator representatives was established. ARTC provided an overview of the types of equipment available, the associated costs and benefits and correlated against the range of incidents that could be identified through the installation of such equipment.

ARTC has concentrated on preventative detection, so as to provide operators time to remove poorly acting rolling stock from service before complete failure and thereby minimising any interruption to services.

With the support of the Wayside Steering Committee, ARTC has invested in three Wheel Impact Load Detectors (WILD) and one Rail Bearing Acoustic Monitor (RailBAM).

WHEEL IMPACT LOAD DETECTORS (WILD) SYSTEMS

WILD units have been installed on the ARTC network at three strategic locations, at Lara (Victoria), Port Germein (South Australia) and Parkeston (Western Australia) thereby monitoring the majority of traffic over the network.

The WILD units allow ARTC and operators to quickly and accurately perform condition monitoring of wheelsets on both wagons and locomotives. Defects on rolling stock wheels cause ongoing damage to rolling stock components and track infrastructure. The detection and subsequent removal of the wheel defect, which created the impact, reduces the potential of wheel and bearing failures as well as infrastructure failure.

On an average journey from Melbourne to Perth, a wheel defect will impact approximately two million times over the network. As these impacts increase in magnitude, it is easy to quantify the effect they have on rolling stock and infrastructure.

The WILD system monitors wheelsets passing over it at speeds from 30 km/h to 130 km/h and has the ability to distinguish between wagon configurations, such as five packs, and Trailerrail units. It has the capacity for train and wagon identification and trending of wagon wheel defects.

Data collected at the sites is electronically forwarded to the ARTC Train Control Centre where the data can be distributed to train operators in a confidential and secure manner. A training program is currently under way to ensure the ARTC train transit managers, train controllers, IT administrators, ARTC engineering staff and train operators are appropriately trained in interpreting the data.

RAILBAM SYSTEM

Acoustic systems provide advanced warning of developing bearing faults and therefore are used for predictive action and planning for the removal of bearing defects before they can cause derailments. Thermal imaging systems such as Hot Box Detection systems generally only detect imminent or actual failure.

Commissioning and testing of ARTC's upgraded RailBAM Acoustic Bearing Monitor system at Nectar Brook (South Australia) occurred in June 2001. The commissioning of the system was conducted using seeded bearing faults of varying severity and type.

These tests were successful in the detection of a wide range of bearing faults. Severe faults were detected with a success rate of 100% while borderline faults were detected at a rate of 85%. No sound bearings were falsely identified as faulty and there were no false alarms.

The principle of operation is based on identifiable sound characteristics being emitted by bearing faults. A bearing fault periodically excites structural resonances that serve as carriers of the periodic bearing fault signal. Acoustical sensor arrays are used to measure the noise induced by bearing fault. The acoustic sensor array employs beam forming and a parabolic reflector in order to 'focus-in' on the wheel bearings thereby reducing extraneous noise.

Optical wheel detectors are employed to link wheel/axle position to acoustic measurements and to AEI tag readings. They also give readings of train speed and enable the measurement of wheel diameter.

Once a train has passed the system and information has been analysed, the system compiles a Pass By Summary (PBS), a Train Management Report (TMR) and Trending Measurement Data (TMD). This information is transmitted via communication lines to the RailBAM web site where it is displayed and activates alarms when generated.

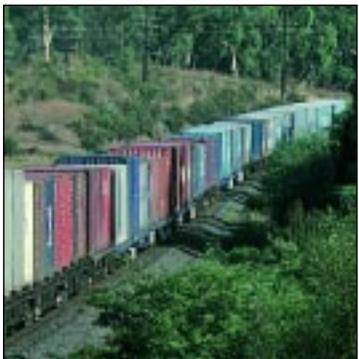
The operation of the RailBAM system will be trialled and further refined during the coming year and fault alarm limits developed. Once the 12 month review period is complete the system will be monitored by ARTC train transit managers and train controllers, who will notify operators when alarms are generated.





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THE CHALLENGE AHEAD

On the East West corridor, rail has clearly demonstrated that it can deliver. The challenge now is to ensure that the appropriate framework is provided to mirror the success of the East West corridor on other key national transport corridors such as Melbourne to Sydney and Sydney to Brisbane. This is critical if the interstate rail network is to provide industry with alternative and sustainable transport options for the future and to grow its market share.

At the request of the Federal Minister for Transport, ARTC recently initiated an independent condition and performance audit of the interstate rail network. The final report has recommended an investment of \$507 million in the network, principally on the North South (Melbourne-Sydney-Brisbane) axis.

The proposed \$507m investment program responds to the economic needs of Australia's very competitive freight market. This investment in Australia's national infrastructure will deliver substantial benefits to industry, the environment and the Australian community including:

- Increase by 38% the share of interstate freight carried by rail.
- Remove 128,000 long distance truck trips per year from the interstate highway system (based on year 2000 traffic volumes), increasing in future years.
- Yield a benefit/cost ratio of 3.2 (discount rate 7%).
- Provide benefits to the Australian community of \$1.5 billion

The proposed program responds to the economic needs of Australia's very competitive freight market. It also provides important environmental and safety benefits to the community. These are:

- Reduced prices for freight haulage, with the largest benefits on the east coast
- Improved service (shorter transit times and improved reliability)
- Reduced accidents
- Reduced greenhouse gas emissions
- Reduced costs of road damage.
- Postponed spending to increase rail's future capacity to take more trucks off the road.

On the Melbourne-Sydney-Brisbane freight corridor the optimal investment is \$398 million.

- This would boost market share over the whole corridor by 59% (Sydney-Melbourne by 77%).
- This is the highest priority investment on the national rail network. It would remove 111,000 long distance truck movements from the overstretched highway system (the Hume, Pacific and Newell Highways)
- This rail corridor has seen very little investment for several decades, so additional investment produces very high benefits (more than \$1 billion).

The majority of the investment in the north-south corridor will be on the Sydney Freight Priority Project, to reduce the time taken to move freight in and

out of Sydney, and improve service reliability. Sydney's rail system is the major bottleneck in the national transport network. Eliminating this bottleneck, to control future growth in truck traffic on Sydney arterial roads, should be a very high priority goal for Australia's transport system.

On the East West corridors (Melbourne-Perth and Sydney-Perth) the optimal investment is \$109 million. This small investment would yield benefits of \$337 million, complementing the modest investment made in recent years.

\$155 million of the proposed investment program has been already committed by the Federal Government to works in NSW, mainly the Sydney Freight Priority Project, subject to acceptance of conditions by New South Wales.

The ARTC investment program would complement the proposed investment in an 'Inland Route' proposed by the Australian Inland Railway Expressway group, in which ARTC is a participant.

The Audit reported that optimised investment on the current Melbourne-Sydney-Brisbane route should be undertaken regardless of any future investment in the 'Inland Route'.

The Audit concluded that substantial progress had been made in upgrading the performance of track controlled by ARTC, as a result of a modest investment program and significant improvement in management coordination and asset utilisation. The Track Audit report found that the benefits would not be achieved unless the institutional arrangements for track management, access and operating procedures are coordinated under unified management.

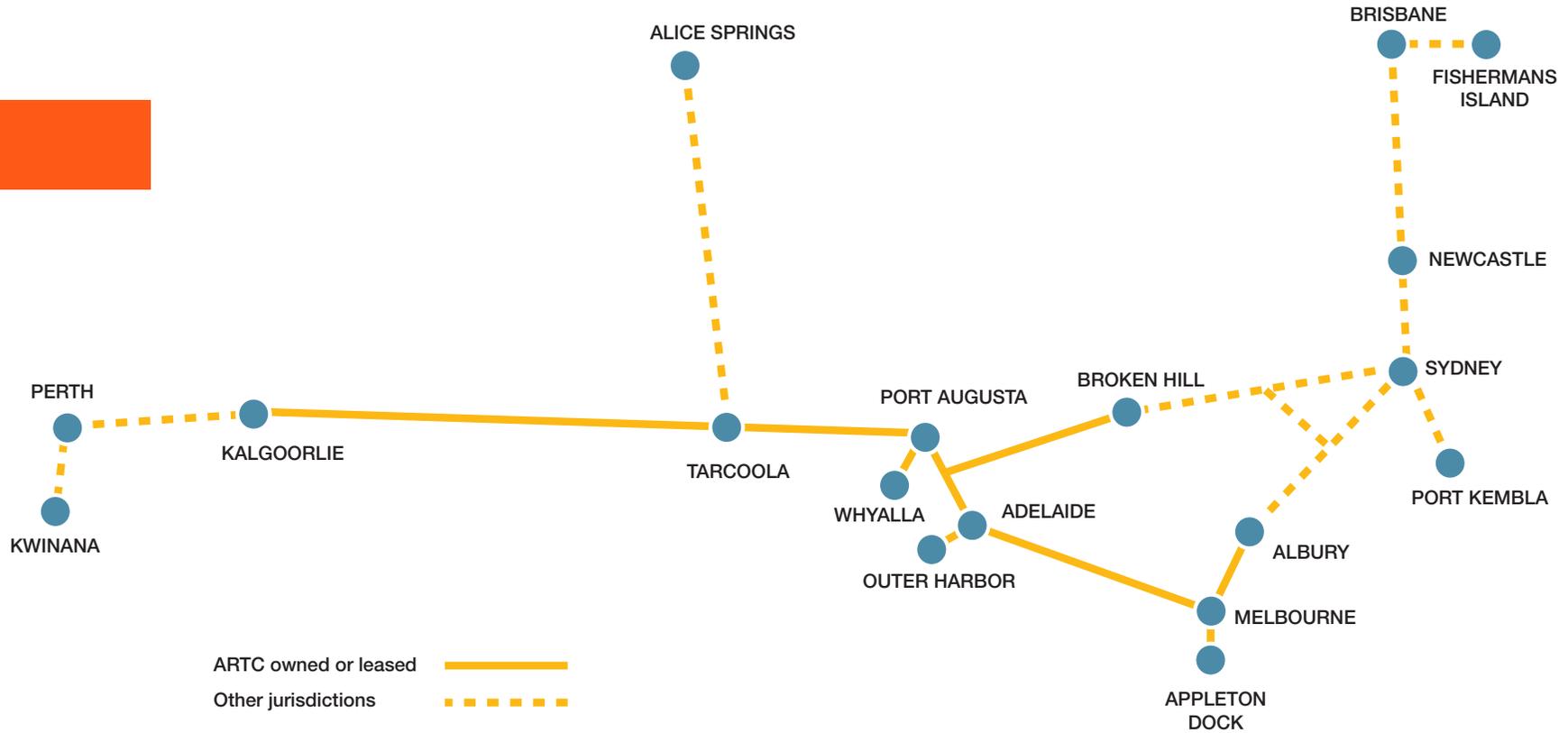
The full report and supporting papers can be accessed on ARTC's website www.artc.com.au.





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