



AUSTRALIAN RAIL TRACK CORPORATION LTD

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ARTC DELIVERS TRUE RAIL BENEFITS

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Australian Rail Track Corporation (ARTC) data indicates that over the past two years train operators running over the ARTC network have been delivered an average 6.5% increase in access yield. This has been achieved by a combination of changes in approach to maintenance practices and a program of targeted infrastructure improvement projects.

Track maintenance requirements have been reduced and network capacity increased through the implementation of a five step basic maintenance program which includes: rail surface management; installation of resilient fastenings; fit for purpose sleeper condition; ballast condition and profile; formation and drainage. This program has been combined with the implementation of strategic infrastructure improvement projects using funds drawn from the Commonwealth's \$250m Australian Railway Infrastructure Foundation supplemented by ARTC's own funds.

This article centres on the infrastructure projects delivered by ARTC over the last two years, while the improved maintenance practices and the successful alliance contract models that ARTC has developed with its maintainers will be presented in more detail in a future article.

Project Selection

Project selection has been based on criteria established by the Australian Transport Council (ATC) following the release of the Maunsell Report in 1998. The report suggested goals of increased length of train paths, greater tonnages carried at higher speeds and a reduction in speed restrictions. The goals were designed to increase the uniformity and efficiency of interstate train operations.

However, two years ago, ARTC faced a number of major infrastructure impediments to the achievement of these objectives, including

- Restrictive crossing loop lengths preventing the operation of optimum market length trains.
- Inadequate spacing of crossing loops on some corridors, causing transit delays.
- Long-term speed restrictions across the Nullarbor and in Western Victoria, as low as 40km/h in places.
- The perceived inadequacy of the current infrastructure to cope on a sustainable basis with speeds and axles loads as recommended by the Australian Transport Council.



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The Projects

To achieve the desired result, ARTC implemented the following program of major works:

Project	\$m	Funding
Crossing loop Extentions Melbourne to Albury - 6 loops to 500m Melbourne to Adelaide - 9 loops to 1500m - new 1500m loops at Altona & Mt Barker Adelaide to Parkeston - 19 loops to 1800m - new 1800m loops at Dry Creek & Port Augusta (including the installation of concrete bearer turnouts) Crystal Brook to Broken Hill - 1 loop to 1800m	4.0 6.6 4.2 5.5 6.0 0.5	Comm Comm/ARTC Comm/ARTC Comm/ARTC Comm/ARTC Comm
Derailment Site Repairs Melbourne to Adelaide - 2,600 concrete sleepers Adelaide to Parkeston - 36,000 concrete sleepers + 4km 47kg rail Crystal Brook to Broken Hill - 17,000 concrete sleepers	5.0	ARTC
Track and Structures Strengthening Melbourne to Albury - Resilient Fastenings, 70,000 timber sleepers, shoulder ballast cleaning and drainage - Bridge strengthening Melbourne to Adelaide - Concrete resleepering and rerailling in 60kg - Resilient Fastenings - Bridge Strengthening	15.4 3.2 21.0 3.4 2.0	Comm/ARTC Comm/ARTC Comm/Vic Gov ARTC ARTC
Rail rectification including grinding and joint correction - Melbourne to Albury - Melbourne to Adelaide - System wide	2.0 6.0 3.0	Comm/ARTC
Safeworking Adelaide to Parkeston - Self Restoring switches - System Continuity (Dry Creek & Port Augusta) Appleton Dock Connection	6.0 (see new loops above) 0.8	ARTC Comm/ARTC Comm
Train control & Safeworking consolidation	3.1	ARTC
Total	\$97.8 Million	



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Crossing Loop Extension and New Loops

In 1998 the standard train configurations were:

- Adelaide-Melbourne: 1000m in length, with limited 1300 metre paths
- Melbourne-Albury: 900m in length, with limited 1450 metre paths
- Adelaide-Perth: restricted 1800m paths, generally 1500m

ARTC utilized Commonwealth funds and its own capital funds to extend crossing loops between Adelaide, Melbourne and Albury. The project resulted in the extension of fifteen loops to 1500m in length, and was typically achieved by installing recycled concrete sleepers and 47 kg rail from other mainline sites and the relocation and upgrading or replacement of the existing turnout. Between Adelaide and Melbourne ARTC funded signalling upgrades were carried out in conjunction with the loop extension program.

Work on the joint Commonwealth and ARTC funded \$6.9 million crossing loop and turnout replacement program between Adelaide and Perth was completed in September 1999. This project saw the extension of 19 crossing loops between Crystal Brook and Kalgoorlie to 1800 metres in length, providing the majority of crossing loops between Adelaide and Kalgoorlie with 1800m crossing facilities. Typically the extensions were again constructed by using recycled concrete sleepers and rail with the installation of new concrete bearer, 60kg rail, 300m tangential turnouts.

Derailment Site Repairs

ARTC inherited a backlog of derailment damaged track predominantly across the Nullarbor, but also on Broken Hill Line and between Adelaide and Wolseley. The damage resulted in crippling speed restrictions that were having disastrous effects on train operations and the repair of these sites was quickly identified by ARTC as a priority project.

The project was conducted over two years and included:

- Purchase and delivery of approximately 55,000 new concrete sleepers
- Installation at some sites on a pattern by side inserters and at other sites on a face by the SMD-80 resleeper machine.
- 7km of rerailing with 47kg rail
- 15 km of rail grinding

Policy and procedures have since been developed that will, depending on the severity of the incident / derailment, ensure that speed restrictions will only be of a temporary nature and of no longer than two months.

Track and Structures Strengthening



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In Victoria, \$20 million (jointly funded by the Commonwealth and Victorian Governments) has been spent on upgrading the severely speed restricted Maroona to Pura Pura section of the Melbourne to Adelaide corridor. Upgrading works consisted of a completely new concrete sleeper track structure with 60kg rail. Between Gheringhap and Pura Pura, a further \$5.8 million in Commonwealth funding was provided in 1999/2000, with a further \$5.9 million in 2000/01.

These funds are primarily focused on improving track formation; some concrete re-sleepering and bridge upgrades to permit running 23TAL and 25TAL in the future. These improvements and progressive increases in maximum permitted track speeds have already led to a reduction in transit times between Melbourne and Adelaide of up to 2 hours.

During 1999/2000, \$12.3 million in Commonwealth funding was spent on enhancements to sections of the Victorian standard gauge network under ARTC control. Major works completed include \$11 million of a \$15.5 million upgrade of track by installation of Rex-Lok resilient fasteners and improvements to drainage and ballast condition on the NE corridor between Melbourne and Albury. A further \$5.3 million is being spent on rail rectification, bridge upgrading and other works. Concrete resleepering and rerailing cannot be justified on current traffic levels, however as traffic rises on the corridor this may be reviewed.

Rail rectification including grinding and joint correction

During the 2000/01 financial year, a further \$11.5 million in Commonwealth funding will provide for completion of rail rectification work, the installation of resilient fastenings and track and bridge upgrades on the NE corridor in Victoria. This will extend the life of the timber sleepers on this corridor and provide more stable track dynamics and accommodate higher track speeds and axle loads. The rail rectification program in Western Victoria will account for an additional \$3.0 million.

Additionally, as part of the ARTC's own capital budget, \$4.2 million has been allocated in 2000/01 for ongoing installation of resilient fastenings at key locations in Victoria and track, bridge and signalling upgrades. These works will also assist in reducing the frequency of temporary speed restrictions, and improve overall reliability of the corridors in Victoria.

As part of the ARTC's budgeted capital and major maintenance works programs, a \$10 million network-wide rail rectification program (augmented over a similar period, by Commonwealth funding of \$10.5 million incorporated in the totals above), will be carried out over the next three years. The rail rectification program in Victoria allows for rail straightening, rail grinding and tamping and will significantly improve rail life and allow faster and heavier trains to run.



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Network Management

Two ARTC funded projects totalling \$9.1 million will assist in fulfilling the Corporation's strategy of signalling and telecommunications efficiency to gain travel time improvements. These projects will also greatly assist in improved and better integration of corridor management.

\$6 million has already been spent on the installation of new self-restoring switches at 42 locations between Port Augusta and Kalgoorlie, with the project completed in March 2000. This project was coordinated with the crossing loop extension program in order to ensure that delays to train operators were kept to a minimum. This project has improved corridor reliability and substantially reduced transit times between Port Augusta and Kalgoorlie. Operators also gain further benefits through greater fuel efficiencies as a result of speed restrictions on the mainline at crossing loops being eliminated.

Additionally \$3.1 million spent in the 1999/2000 financial year has allowed for the consolidation of all Victorian safeworking and train control systems related to the interstate standard gauge mainline, to one location under ARTC control. This has assisted in establishing progress in moves towards greater harmonization of safeworking systems and fully integrated corridor management.

Commonwealth funding of up to \$6.0 million will be spent on system continuity upgrades on the east-west corridor before the end of 2000/2001 in order to remove system constraints at two major locations; Port Augusta, and Dry Creek. The objectives for each of the two sites are:

- Improving the separation between the interstate mainline and other lines, increasing the flexibility and efficiency of train operations.
- Ensuring that train control throughout the corridor is managed by ARTC.
- Providing additional 1800m crossing loops, resulting in improved pathing opportunities through these locations.

Measuring Success

Over the past two years ARTC has substantially met the goals of the ATC, and has delivered the following benefits to train operators:

- Reliable 1500m train paths between Adelaide, Melbourne and Albury
- Reliable 1800m train paths between Adelaide, Broken Hill and Parkeston
- The commencement of trials for trains with 23 tonne axle loads in Victoria, with full 23 tonne axles access available in the near future
- All Victorian structures/bridges are now able to support 25 tonne axle loads, which will enable ARTC to allow 25 tonne axle loads immediately the track structure is suitable
- Transit time improvements that enable up to 2.5 hours reduction between Adelaide and Parkeston



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- Transit time improvements that enable up to 2.0 hours reduction between Adelaide and Melbourne (Now only 10.5hrs for the "Overland")
- The length of all ARTC track under speed restriction has dropped significantly, to be consistently below the ATC target of 2%
- ARTC has calculated that operator yield has increased by 6.5% over the past two years

Future Projects

ARTC has identified a number of new projects, that when completed, will result in additional benefits to train operators on the interstate rail network managed by ARTC.

These projects include:

- Bridge rating and repairs, if necessary, to enable 25 TAL across the whole ARTC Network, not just Victoria.
- Implementation of curve speed and clearance improvement works identified during a system audit recently completed.
- The removal of signal and train control "Hotspots" from the Victorian Network at locations where risk assessment has shown improvement is warranted.

