Network control on the Rail Access Corporation network: "getting it right"

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Abstract

Rail reform in Australia offers the industry an opportunity to rethink rail operations, implement change and select initiatives which will assist rail to "get it right".

Under the Rail Access Corporation, train operations in New South Wales are in the process of re-establishment. Under the generic heading of "network control", changes are under way in train control systems, train control infrastructure, train operational standards, timetabling and service planning. The management structure of rail is changing to accommodate a new approach to network control.

Competition between operators for train paths increases as the business grows, presenting network capacity problems. Solutions in part lie in the careful introduction of technology and improved operating systems to network control.

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Introduction

Rail Access Corporation came into existence in 1 July 1996 following the passage of the State Owned Corporations Amendment Act 1995 No 32 and the Transport Administration Amendment (Rail Corporatisation and Restructuring) Act 1996 No 56. The Corporation is responsible in New South Wales for the provision of access to the network and for the management of efficient, safe and reliable infrastructure and network control. In regard to network control, the Corporation must prepare the master timetable and allocate train paths. As well, standards must be set for the allocation of train priorities, including the resolution of clashes when the master timetable breaks down and according a "…reasonable priority and certainty of access for passenger services." [1]

The network control activity offers particular opportunity for improvements, both in process and in productivity. Network performance can be enhanced through the efficiencies available in clever network control. The end customer will also benefit from improved information flowing from the network control management system

The national agenda for rail reform extends into the harmonisation of standards and operational systems. Interstate operations can be enhanced and new operators encouraged if the barriers to entry are reduced. There are definite opportunities through cooperation between railways in the area of network control. [2]

Background to organisation change

The former, vertically integrated, State Rail Authority (SRA), was restructured on 1 July 1996, to form a rail transport sector with Rail Access Corporation to own and manage the operations on the network, in which:

a) The essential infrastructure is owned by the Rail Access Corporation (RAC)

b) The essential infrastructure is maintained by contracted Infrastructure Works and Maintenance Providers (IWMP), with Railway Services Authority (RSA) undertaking the task in the first instance.

c) The new State Rail Authority (comprising CityRail and Countrylink) operates passenger services. FreightCorp, National Rail and other operators run freight services and heritage groups operates special services New operators are invited to seek access.

d) Network Control, a Division within SRA, is contracted to RAC to provide train control services.

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[1] Transport Administration Amendment (Rail Corporatisation and Restructuring) Act 1996 No 56 Schedule 1 19D 1(g)

[2] Please note that opportunities which could impact upon rail's market share versus other forms of transport, including variations in access pricing, are not central to this paper and will not be discussed

e) The Rail Services Australia provides to the industry services associated mainly with infrastructure maintenance and construction but also rolling stock services, railway design and railway specific technical support.

f) FreightCorp is corporatised and operates freight services in New South Wales.

Restructuring the rail transport sector in New South Wales was initiated in response to the National Competition Policy, opening up access to what was regarded as monopoly infrastructure. The goal is to enable competition to occur both above and below the rail Competition should occur amongst operators of train services and competition should ultimately occur amongst maintenance providers. An international firm new in NSW rail maintenance is Fluor Daniel Pty Ltd which has successfully tendered for two of the three competitively tendered geographical railway maintenance bundles.

The competitive tendering of the rail maintenance sector was suspended for an eighteen month period by the State Government. It was felt that the existing maintenance provider, Railway Services Authority, lacked the opportunity to demonstrate the desired managerial focus. Corporatised on 1 July 1988, the now Rail Services Australia will again be expected to compete openly for railway maintenance services when the competitive tendering roll-out program re-commences on 1 July 1999.

Rail reform in New South Wales provides an opportunity to rethink rail operations and implement change. The separation of functions above and below the rail allows railway companies time and energy to think critically about success factors for their businesses

The original decision on the part of the State Government to leave Network Control within the State Rail Authority (SRA) is a reflection of the importance of network control services on the suburban passenger operation. Train control in particular has a most important influence on success of the daily metropolitan operation, particularly when unscheduled incidents occur.

Network Control services can broadly be described as those activities necessary for the planning and implementation of train paths. The service extends to the management of incidents which occur on the network. Service planning (timetables) and train control are generic terms for these activities.

Rail Access Corporation (RAC) holds a view that to satisfy its legislative accountability for the equitable allocation of access, the activity of network control is core and should be managed from within the Corporation rather than being performed under contract with SRA. Further, the impact of network control on the commercial performance of the Corporation is similarly important and close control is sought on this basis as well. Although some changes in organisation roles in this regard are possible in the future, SRA and RAC continue to work cooperatively to provide improvements in service

The Network Control Division of SRA is integrated into the Operations Division of SRA. As well as traditional network control services, SRA provides to RAC under contract, safeworking standards and safeworking compliance services, track possession planning, route modelling, dangerous goods management, heritage trains management, special loads services and rolling stock technical support. Many of these services are potentially clear candidates for placement in other management areas.

The Network

RAC, through its contracts with the Network Control Division of the State Rail Authority and Infrastructure Works Maintenance Providers, is responsible and accountable for the maintenance and management of the NSW rail network. The NSW network has the following dimensions:

Total track kilometres	9,104 (Lines in use)
Total number of network staff	1,197 (Network Control Division SRA staff providing contract services to RAC)
Total number of passengers	267.255 million (1996/97)
Passenger tonne kilometres	40.9 million
Tonnes of freight transported	82.659 million (1996/97)
Total number of paths scheduled	950,000 Annually (approximately)
Gross tonne kilometres	44.9 million

The RAC network can be practically divided into several distinct sub networks; the metropolitan suburban passenger system, the Hunter Valley coal network, the interstate network and the grain and minerals network. Each has a different emphasis and usage requirement.

The strategic direction for each sub network varies but a consistent approach needs to be adopted for the network in total.

Network	Train Kilometres (Millions)	Gross Tonne Kilometres (Millions)
Metro Suburban Passenger Network	37.80	9,417
Hunter Valley Coal	3.74	13,140
Grain	2.76	5,210
Minerals	1.39	1,135
Interstate Freight	6.12	11,529
Intrastate Freight (General)	3.05	2,745

Metropolitan Suburban Passenger Network

The operation on this network focuses on reliable, on time services for commuter peak hours. Passenger information, fleet and crew rostering are priorities for the operator (State Rail). Capacity restricted areas are normally resolved by the provision of additional track infrastructure but "soft" solutions will be sought from train control management systems in the future.

Hunter Valley Coal Network

This network is potentially available for multiple operators. Already, FreightCorp, Countrylink and CityRail operate services in the same area. (Only one is an operator of coal freight.) True challenges for the rail reform will arise when a further operator commences services in the coal business. The coal chain in the Hunter Valley consists of the mine, the loop, the main line, the terminal, the stockpile and the coal loading facility. Train control protocols will need to consider the full coal chain system if an efficient and equitable network service is to be provided. Again, capacity issues will arise as the total tonnage throughput increases. Infrastructure and train control management solutions will be required to resolve capacity shortfalls.

At June 98, a number of infrastructure projects were in progress or in the final planning stages to improve capacity and coal chain traffic flexibility. These include:

Bidirectional resignalling from Branxton to Wittingham

Cost Estimate: $2.9m
Time to Complete:17 months

Wittingham loop extension & bidirectional working

Cost Estimate: $2.1m
Time to Complete:12 months

Hexham crossovers and bidirectional signalling

Cost Estimate: $4.1m
Time to Complete:12 months

Relocated crossovers at Port Waratah

Cost Estimate: $0.46m
Time to Complete:8 months

Grain and Minerals Network

The nature of this network is a contrast to the others because the infrastructure is geared to low volume freight levels and is of light rail branch line construction with basic train control and signalling systems. The operation of the network is often seasonal and the commercial margins are small.

Interstate Corridors

Interstate rail requires reliable journey times for longer, more cost-efficient trains. Reliable arrival and departure times are critical. Customer related information in real time is highly important.

To promote interstate freight movements, the concept of a dedicated freight path through the Sydney metropolitan area is being actively studied. Preliminary cost estimates of possible freight path corridor options vary from between $100m and $150m to complete required stage one works. One such project for the Northern Corridor Access option is the $31m Flemington Grade Separation project. This priority funded State (NSW State Government $15.5m) and Federal (Australian Rail Track Corporation (ARTC), $15.5m) project, has been approved to allow freight a clear path through the key Flemington junction area. This work will enable the intense passenger train levels necessary for major events at Olympic Park, such as the 1999 Royal Easter Show, to proceed without impact on normal freight movements.

Australian Rail Track Corporation

The ARTC is a Federal body whose primary aim is to promote rail use throughout Australia. Specifically, the ARTC wishes to strongly promote and facilitate the interstate carriage of rail freight. To advance this issue, ARTC seeks to harmonise the current diversity in train management standards and protocols, co-ordinate Commonwealth expenditure on capital projects which facilitate interstate freight movements and create a one-stop shop for rail access for new train operators seeking multi-state rail access.

The ARTC impacts upon RAC at a number of points including:
- Provision of Commonwealth funding for suitable projects (eg Flemington Grade Separation Project).
- Provides the driving force to advance negotiations with all current major state rail providers to obtain uniform protocols, standards, minimum data records, train management principles and rail access regimes

Safeworking standards

The rail reform process identified the need to review the allocation of intellectual property among the four rail entities. The safeworking or operational standards were identified as the property of RAC on the basis of network wide application.

An "unbundling" process was completed to ensure that operator specific standards were assigned to SRA, FreightCorp and Rail Services Australia

Under the leadership of the Australasian Railway Association, a Code of Practice for operational standards is being developed. The twin objectives of the project are to provide a generic code which will comply with the Australian Standard for Railway Safety Management (A.S.4292) and to facilitate harmonisation of operational standards along the interstate routes. The ongoing review and development of operational standards on the RAC network will be done as far as possible in conjunction with the national project.

Standards will be rewritten in a "performance" style, wherever possible. Supplementary procedures which will complement the network standard will be required by each operator or maintainer on the network. The commercial advantage of operators and maintainers can be facilitated through these procedures.

It is interesting to note that there are many fundamental differences in safeworking across Australia in matters as simple as terminology but as serious as safety risk management. At this time, many issues have been raised for resolution but the likely outcome is still unknown. Resources are required to complete this task which has the potential to have as much impact on the viability of the interstate network as many of the infrastructure investment projects.

There will be an impact on the intrastate networks of all States as a result of the safeworking standards review. It is unlikely that two different sets of standards will apply in the one State and therefore by default, safeworking standards across the country could be drawn together as one in this process.

2000 Olympics

RAC's role in the Olympics is to supply reliable infrastructure. Being exclusively a major passenger rail event, RAC's primary concern is that, as far as possible, normal business for non-passenger operators continues during the Olympic preparation period and the event itself is not subject to infrastructure related delays. To that end, and to meet contractual freight obligations, RAC is playing a considerable part in the planning and facilitation of the Flemington Grade Separation Project which will ensure that freight bound to and from Northern NSW and Queensland will not be affected during major Olympic Park events.

Network Management Strategies

RAC has devoted considerable time and effort into developing strategies to better manage the complex and varying aspects of the NSW rail network. RAC has expanded its view of what is currently accepted as "train control" and under a new label, that of "network management", will seek to integrate currently distinct and separate areas.

The network management concept for RAC is designed to be a statewide and comprehensive approach towards train management.

This type of approach is considered essential to enable RAC to meet the challenges which it currently faces including:

a)   meeting all legislative obligations;

b)   providing equitable and high quality services to all train operators; and,

c)   making rail a viable alternative to road freight.

As such, RAC has developed a clear and articulate mission for the delivery of network management services in NSW, namely:

> *"To ensure fair and cost efficient delivery of high quality network management services."*

To achieve this mission, it is recognised that five fundamental areas must be handled extremely well to "Get it Right."

Network Management Goal Areas

These areas and their associated goals are as follows:

a)   *People - Competent Network Control staff who possess a progressive, change tolerant and performance based culture.*

To engender a staff culture which will embrace new technology, process and practices. RAC recognises that it has a responsibility in turn to provide improved facilities, appropriate incentives and remuneration, adequate training and competency development and supportive technology and leadership.

b)   *Operating Standards - Facilitate network operation at acceptable safety standards.*

Operating standards, protocols and systems in a new multi-operator environment will also require change. They will have to be risk based, well documented but simple, commercially responsible and harmonised across different states.

c)   *External Organisations - Partner external organisations to promote commercial prosperity.*

To effectively partner external organisations will require network management to be reliable, environmentally compliant and cost effective.

d) *Technology - Own appropriate technology for the delivery of network management services*

Technology to support and not hinder network management, must provide superior information but be low risk, reliable, proven and introduced in a non-threatening manner.

e) *Management - Manage network operations in a manner which achieves performance benchmarks.*

RAC's vision for the future management of NSW's rail networks will require a management culture which is performance based, customer oriented and able to critically evaluate safety, environmental, and investment risks.

The above points are undeniably ambitious goals, but RAC's progress can be measured when taken in the context of the rail network. RAC has proposed that the above goals be measured by examining five key result areas for network management:

a) safety (number of network management incidents);

b) customer satisfaction (customer satisfaction index);

c) cost (total cost for network management services);

d) on-time running (number of delays per month and total delay time per month); and,

e) productivity ($ per km hours) (Train Path dimensions).

Network Management Projects

Obtaining a positive improvement in RAC's success measures will require the strategic investment of resources in carefully considered and well scoped projects. Though predominantly still in the planning stage, it is envisaged that the network management projects will include:

a) Finalisation and roll-out of Train Order Working for all branch lines and the main western line.

b) Modernisation and rationalisation of NSW's signalling infrastructure.

c) Modernisation and rationalisation of RAC's infrastructure in yards.

d) The creation of modern, fully integrated regional network management centres

e) A review of the functional and geographic boundaries of all existing train control centres.

f) Introduction of multi-skilling where appropriate.

g) Introduction of information systems and technology, with a vision towards integration and automation where feasible or necessary. Examples include:

- WAYNEI - an information system capable of managing information being provided by wayside devices

- SCADANEI - an electrical control system

- Train Management Information System - an information system used to plan and monitor the day to day train operations on the NSW rail network

- Incident Information Management System - a management tool for the recording and distribution of incident reports

Though these projects may take a number of years to complete, it is anticipated that their introduction will not only significantly change, but also dramatically improve network management in NSW.

Summary

There is a great deal of work to be done in the Australian rail industry to win a greater market share of all freight and passenger movements. Improvements in network control management will play a very important role as more and varied train operating companies join the network. There is innovation in Australia and around the world ready to be applied to existing networks when a clear understanding is available of requirements under local conditions while still retaining Australia wide consistency. Rail Access Corporation has a strategic view of network management and will insist that at this opportunity we must "get it right".