

# PERFORMANCE AUDIT IN BRIEF

## Signal failures on the metropolitan rail network



THE AUDIT OFFICE  
OF NEW SOUTH WALES

### About the audit

RailCorp provides almost a million metropolitan passenger journeys each day.

Sydney's rail network is large and complex. The signalling system has many parts, including around 3,800 trackside signals, 2,900 train stops, 6,800 track circuits and 2,200 sets of points. The system employs a range of technologies, some quite old.

Signalling systems are critical for the safe operation of a rail network. If there is a signalling failure, the signals go red and trains are brought to a stop or run at a reduced speed while staff investigate and fix the problem.

One of RailCorp's key performance targets is for 92 per cent of peak hour services to run on time. Signalling failures can delay many trains and inconvenience many passengers. Effective maintenance and response to signalling failures is therefore crucial to achieving on-time running.

This audit examines whether RailCorp is effectively managing the risk of signal failures. It focuses on whether RailCorp is keeping the number and duration of signal failures low enough to support its on-time running target.

### Audit opinion

Between 2004 and 2006, the number of signalling failures, signalling downtime and the number of trains delayed as a result of signal failures all fell. RailCorp's on-time running performance improved over the same period.

The fall in failures is a clear indication of improved performance. Changes in the definition of on-time and to the timetable during 2005 and 2006, however, make

it difficult to determine whether improvements in response downtime and signalling delays are due to a true performance improvement.

RailCorp has improved its management of signal assets and its response to signal incidents. For example, it now has an incident response framework and places key staff at critical locations to respond quickly to signal failures. This has contributed to these improved results.

To build upon this strong base, RailCorp needs to determine with more confidence the number and duration of signalling failures the network can tolerate without impacting on service levels. This would reduce the risk that it may focus too little or too much effort on signalling failures compared to other causes of delays such as train breakdowns.

RailCorp also needs to compare its signalling reliability and incident response practices and performance against other networks. This would give it another important perspective on its performance.

It needs to determine the signalling system required to meet the expected 2016 patronage levels, and how it will get there. This would reduce the risk of spending money on a signalling asset which will not meet projected service demands.

Over the next few years, RailCorp will also need to be vigilant to ensure maintenance does not lapse. Much work to upgrade and expand the network is planned, such as Rail Clearways and the new north-west and south-west rail lines. These projects will place pressure on RailCorp's maintenance spending and its pool of skilled staff.



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## Further information

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Internet site: [www.audit.nsw.gov.au](http://www.audit.nsw.gov.au)

## Key findings

### Is the number of signal failures low enough?

RailCorp signalling asset management practices have improved. It has adopted a good asset management model, improved data collection and analysis, and is on target to eliminate by 2011 the infrastructure maintenance backlog which occurred in the late 1990's and early 2000's.

We could not conclude, however, whether RailCorp was keeping signalling failures low enough. It uses past performance to determine the number of signalling failures the network can tolerate, but should also trial reliability modelling.

RailCorp has yet to adequately compare the reliability of its signalling to other networks.

RailCorp is working to determine the signalling system required to meet the State Plan's 2016 patronage targets. Without this, it could spend money on upgrading signal assets which may be replaced or removed from service shortly thereafter.

Planned work to expand and improve the network over the next few years could put pressure on signal maintenance spending and staffing.

### Is the duration of signal failures low enough?

RailCorp's incident response procedures and practices have improved. RailCorp has implemented an incident management framework.

It locates key staff across the network to respond to signalling failures, and during peak times places staff on standby at vulnerable parts of the network.

For the same reason as for the number of failures, we could not conclude whether RailCorp was keeping the number of delays and the duration of signalling failures low enough.

In relation to signalling, RailCorp is yet to review how well its incident response framework is implemented, whether it results in satisfactory outcomes and how it captures lessons for continuous improvement.

While it locates response staff around the network, it needs to undertake a systematic risk assessment to ensure it has the right people, at the right place, at the right time.

RailCorp is yet to benchmark its response performance with other networks. It reports its performance in regard to on-time running and delays that occur during the peak hours, but should also report this on a 24-hour basis.

## Summary of recommendations

We recommend RailCorp, in relation to signalling:

- trial reliability modelling to help set failure and duration targets
- determine the signalling system needed to meet 2016 State Plan patronage targets
- balance the resource demands of maintenance with those of expansion and improvement
- review staff competencies and redesign work to help address emerging skill shortages
- review how its incident response framework impacts on signal incidents
- base incident response strategies on a systematic risk assessment
- benchmark the reliability of its signalling assets and response performance.