Report on "Fit for Purpose" Condition of Yilliminning to Bruce Rock Line, and the Katanning to Nyabing Line: November 2003

Executive Summary

The Katanning to Nyabing line was inspected by hi-rail vehicle on the 5th November. The Yilliminning to Bruce Rock line was inspected by hi-rail vehicle on the 6th November. Written records collected during the field inspection, and other relevant records were examined in the WestNet head office in Perth on the 7th November.

It is the technical opinion of the author that:

a) the Yilliminning to Bruce Rock line has been maintained "Fit for Purpose" within Clause 15 and Schedule 4 of the Network Lease since the 17th December 2000 and, in particular, is capable of supporting grain train operations at the speed and axle loads of 30 km/hr @ 16 t.a.l;

b) the Katanning to Nyabing line has been maintained "Fit for Purpose" within Clause 15 and Schedule 4 of the Network Lease since the 17th December 2000 and, in particular, is capable of supporting grain train operations at the speed and axle loads of 20 km/hr @ 16 t.a.l.

c) the current system for inspection and patrolling of each of the Yilliminning to Bullaring, Bullaring to Bruce Rock and Katanning to Nyabing lines is commensurate with the "Fit for Purpose" standard described in paragraphs 1 a) and b) above; and

d) forward maintenance plans for each of the Yilliminning to Bullaring, Bullaring to Bruce Rock and Katanning to Nyabing lines are commensurate with the maintenance of the "Fit for Purpose" standard described in paragraphs 1 a) and b) above, to at least the end of the 2005 calendar year.

Background

The author was retained by WestNet Narrow Gauge Pty. Ltd. to provide a technical opinion, on whether:-

1) The Yilliminning to Bruce Rock line has been maintained "fit for purpose" since December 2000, and if it is capable of supporting single locomotive hauled grain trains with 16 tonne axle loads at 30 km per hour.
2) The Katanning to Nyabing line has been maintained "fit for purpose" since December 2000, and if it is capable of supporting single locomotive hauled grain trains with 16 tonne axle loads at 20 kph.
3) Whether or not the current system for inspection and patrolling of each of these lines is "fit for purpose" for the standards described above.
4) Whether or not forward maintenance plans are adequate to maintain this standard until at least the end of the 2005 calendar year.

Author's Qualifications

The author is currently employed by QR, which is a government owned corporation operating within Queensland, N.S.W, and undertaking consulting work in foreign countries. The author has spent approximately 20 years as a District Engineer, managing maintenance and construction of narrow gauge railway tracks in Queensland. The author also has 5 years as an Infrastructure Manager for the southern half of Queensland, which is a railway network approximately the same size as WestNet, and includes over 100 km of standard gauge track. The author has spent the last 2 years estimating forward infrastructure capital and maintenance costs for the purpose of access pricing.

Methodology Employed

The author undertook a high rail inspection of the Katanning to Nyabing line on the 5th November. This included a visit to the local Permanent Way Superintendents Office, to view records of previous maintenance work. Frequent stops were made during the high rail inspection to walk the track and inspect rail and sleepers and drainage structures. The inspection was conducted in the company of the Narrogin based Permanent Way Superintendent, and the Infrastructure Services Manager.

The author also undertook a hi-rail inspection of the Narrogin to Yilliminning, and Yilliminning to Bruce Rock sections on the 6th November. The Permanent Way Superintendent from Northam swapped with the Narrogin Per Way Superintendent at Bullaring, which was the start of his area of responsibility. Both the Infrastructure Manager and the Infrastructure Services Manager were in the vehicle on this day of inspection.

The author also attended at the WestNet Rail office on Friday 7th November, to view capital works plans, and records relating to derailments, broken rails and track buckles and track geometry recording car output. The author also viewed projected grain haulage figures for the 2004 and 2005 calendar years.

General Comments on both Lines

The track structure is relatively light for the given axle loads. Consequently, the length and weight of trains used, and the total annual tonnage hauled are relevant to the maintenance effort required. In general gross tonnages are very light, and vary considerably year to year. They are projected to be highest between Badgebup and Katanning, and between Ainsworth and Bruce Rock in the 2004 and 2005 calendar years. The section Yealering to Bullaring is in fact projected to take virtually no traffic, as it sits between the Kwinana and Merredin grain catchment areas.

Drainage structures (consisting of timber and concrete components mainly), and constructed surface drains between Katanning and Nyabing are currently in good to excellent condition. A minority of timber components are nearing their life expectancy, but appear to have a life that will extend past 2005. This is of course subject to termite attack being detected and eliminated as required. Pre-cast box culverts and other concrete components are on site at 45.500 km to replace a timber culvert.

Drainage structures on the Yilliminning to Bruce Rock section have several steel components, as well as timber and concrete. Three small bridge structures at the 27.800 km (approximately), the 30.600 km (approximately) and the 35.600 km (approximately) have speed restrictions of 20 kph, 25 kph and 20 kph respectively. The latter was inspected in some detail, and appears capable of handling trains at 30 kph. Only limited surface rust is apparent. There is very little loss of cross section, and remedial work has greatly reduced loading on structural members. Some concrete compression members have large cracks, but their location is such that it does not affect their performance under load. A speed restriction of 25kph has existed on a culvert at 142.450 kilometre since before 1999, because of poor vertical track alignment across the structure.

In general drainage structures are minor in nature. Surface drainage adjacent to track on the Yilliminning to Bruce Rock section is fair to good, and it is planned to improve same by removing vegetation growth in critical areas. Work is of a minor nature, and can easily be achieved in a short time frame. Timber components need to be checked for termite attack to ensure life beyond 2005.

In general poor drainage only has a detrimental effect on timber sleepers over long time periods, and so is of little relevance to performance of the track asset over the next 2 year period. It has been more than adequate for the period 2000 to 2003. Note however, that this does not warrant the structures adequate for flood events for which they have not been designed. Their have been 10 washaways of embankment recorded between Bullaring and Bruce Rock during 2002 and 2003.

Comments in subsequent sections of this report will thus be restricted to the track structures.

Yilliminning to Bruce Rock Maintenance

Date nails indicate the last major mechanised re-sleepering on this section, was done in 1991/92. Rail is generally 60lb WA, with some welded 31 kg rail on select curves.

60lb WA rail is generally of 1910 to 1915 vintage. Joints at the Yilliminning end are at a half rail stagger (approx 20 ft). Joints towards the Bruce Rock end are square, and show more dip than those at the Yilliminning end. Box anchors exist at 1 in 4 from Yilliminning to Bullaring, with occasional creep anchors. Beyond this point, joint sleepers are box anchored with some creep anchors. There have been 9 rail breaks on this section of track (approximately 144 track kilometres) during the last 3 years. Approximately 60% of the track between Yilliminning and Yealering is crushed rock ballast. This section has been maintained fit for purpose from December 2000, except for the 3 minor bridge structures listed above, and two speed restrictions of 20 kph that have existed between 135.500 and 136.500 km (Ainsworth-Ardath section) and 161.500 and 167.000 km (Ardath- Bruce Rock section) for the whole period. These are obviously sections that have been affected by flooding and wash-outs in the past, and during the period of concern. There are plans to address formation and sleeper condition at these two locations during 2004. Note also the restriction on the culvert at 142.450 km of 25 kph that is as a result of a dip in the track. It is proposed that this remain beyond 2005.

Records show that there have been no infrastructure related derailments in this section of track since the 15th December 1994, and no derailments from any cause since 1998. Maintenance expenditure records show an average of $3,570 per kilometre per year has been spent between Bullaring and Bruce Rock (Merridin grain path) during the last 3 years. Average annual maintenance expenditure between Bullaring and Yilliminning has been $5,960 per km over the same period. This amount includes a major washout repair in 2003. Work was underway during the inspection to upgrade 2 level crossings. Work was in progress to distribute 2,500 steel sleepers and 500 timber sleepers for later insertion. Current activity was on the Ainsworth-Bruce Rock section, with some sleeper stockpiles still existing at Bruce Rock.

Katanning to Nyabing Maintenance

Date nails in sleepers indicate the last major re-sleepering on this branch in about 1985/1986. Rail on this branch is 66 kg weight from 1.5 km to 6.5 kilometres. This area also has 1 in 2 steel sleepers. After that it is generally 50 metre lengths of 60lb WA rail, that has been formed by huck bolting and gluing short rail (40 ft lengths). There have been 17 rail breaks on this branch (approximately 62 track kilometres) in the last 3 years. No track buckles are recorded. Part worn 66 kg/metre rail is laid out along the branch between 6.5 km and 18 km. Only 18 kms of this branch is NOT crushed rock ballast. Timber sleepers generally have box anchors at 1 in 4 and creep anchors at 1 in 4. There are two locations on this branch where loaded trains travel at 30 kph in order to gain momentum to climb grades. Maintenance expenditure has been approximately $23,730 per km per year on this section of track, over the last 3 years.

This section has been maintained fit for purpose from December 2000, and has been supporting single locomotive hauled grain trains at 16 tonne axle loads. In fact two grain trains were observed on this branch on the day of inspection. No track condition was observed that would restrain such an operation, and there were no speed restrictions current. The last derailment from any cause on this branch was on the 19th August 1994. All level crossing signage had recently been upgraded on this branch by road authorities.

In fact, it appears that the whole section between Badgebup and Katanning has been maintained fit for 30 kph train operations (or better) for the last several years.

Current System for Inspection and Patrolling

Permanent Way Superintendents indicated that they send persons to patrol these lines at a minimum frequency of once per week in accordance with WestNet Rail's Narrow Gauge Mainline Code of Practice. They travel in hi-rail vehicles. They also inspect daily at times along sections when trains are running, and there is excessively hot or cold, or wet weather. Evidence of this exists in the number of broken rail and runaway joints reported by patrolmen. The lack of derailments caused by infrastructure problems also provides evidence of adequate patrolling.

Forward Maintenance Plans for 2004/2005 Calendar Years

Katanning to Nyabing

This would require tamping of recently installed cluster reduction sleepers, some ballast regulating to restore ballast profiles in the same areas, and spot sleeper renewals to reduce further clusters of defect sleepers that develop. The capital budget of roughly $600,000 for each of two years should easily allow for this to be achieved, with nearly 5% of ALL sleepers able to be renewed. It is consistent with tonnages forecast also.

Yilliminning to Bullaring

This area would appear to need only defect sleeper cluster management over the next 2 years, with minimal tonnage to be moved.

Bullaring to Bruce Rock

With the current commitment to 3,000 sleepers between Ainsworth and Bruce Rock, only work on formations and sleepers on speed restricted areas between 135.500 and 136.500 km, and between 161.500 and 167.000 km would be needed to maintain the consistent standards for the next 2 years. Steel sleepers are of course a long term investment, that would have benefits beyond 2005. Budgets show approximately $200,000 to improve grain yards and sidings, nearly $100,000 to improve level crossings, and over $300,000 for formation and sleeper work. Structures spending of $90,000 should also be adequate. Extra creep anchors or more sleepers with elastic fasteners are required between Ainsworth and Bruce Rock, to restrict rail creep and thus prevent abnormal sleeper breakages. Given current condition, and forecast grain tonnages, this is the section that will require the most work over the next 2 years to maintain fit for the nominated purpose.

Clive Plunkett
C.P. Eng (Civil), M.B.A., A.FA.I.M., F.P.W.I.