The Nelson Point - Newman Railway is 426km

Port Hedland-Yarrie Railway is 208km

Yandi spur line is 30km

Area C spur line extension from Yandi is 38km

Jimblebar spur line is 32km
Safety Performance - Rail Classified Injuries

Classified Injury Frequency Rate for Rail (including contractors)

Historical  Actual CI  Actual

00/01  01/02  02/03  03/04  Jul-04  Aug-04  Sep-04  Oct-04  Nov-04  Dec-04  Jan-05  Feb-05  Mar-05  Apr-05  May-05

Historical: 47.3, 28.1, 17.2, 7.8, 10.4, 12.6, 11.6, 10.5, 9.5, 10.5, 10.5, 10.5, 9.5, 10.5, 9.5, 10.5
Actual CI: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
Actual: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
Tonnes Railed

Rapid Growth Period
Rail KPI’s - Long Trains (300-336 Cars)

Yandi & MAC
Newman

Apr 05
3,642 Long Trains
Million Tonnes Railed Per Employee

Employee Productivity Tripled in the last 10 years

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<thead>
<tr>
<th>Year</th>
<th>Value</th>
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<td>FY97</td>
<td>0.148</td>
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<td>FY98</td>
<td>0.151</td>
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<tr>
<td>FY99</td>
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<td>FY00</td>
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<td>FY02</td>
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<td>FY04</td>
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<td>FY05</td>
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Railroad Manning

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<th>2001</th>
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<th>2005 Plan</th>
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<td>FY04</td>
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<tr>
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<tr>
<td>FY05 Plan</td>
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</table>
Rolling Stock Fleet Expansion Program

- **Rakes**
- **Ore Cars**

**Original**
- 8 AC600 Locos
- 40 Dash 8 Locos
- 2210 Ore Car

**Arrival of 3 SD40**
- 2,210

**Arrival of 5 SD40**
- 2,484

**Arrival of 6 SD40**
- 2,971

**Arrival of 13 SD70**
- 3,203
- 3,410

**10 Train Schedule**
- 21, 21, 22, 22, 22, 23, 23, 23

**12 Train Schedule**
- 24, 24, 25, 25, 26, 26, 27, 27

**Rolling Stock Fleet Expansion Program**

- **Train Schedule**
- **Locos**
  - 8 AC600 Locos
  - 40 Dash 8 Locos
  - 2210 Ore Car

**Dates**

- Feb-03 to Dec-05

**Months**

<table>
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<tr>
<th></th>
<th>Dash 8</th>
<th>AC6000</th>
<th>SD40</th>
<th>SD70ace</th>
<th>(Oct05)</th>
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<tr>
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<td>8</td>
<td>20</td>
<td>13</td>
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<tr>
<td>Traction Horsepower</td>
<td>4,000</td>
<td>6,000</td>
<td>3,000</td>
<td>4,300</td>
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Automatic Train Protection - ATP System
Current Train Operations

Newman Line

- 12 ore trains per day / 14 trains 1 July 05
- Flexibility of One / Two / Three Rake Trains
- Train configuration:
  - 1 rake = 104 ore cars = 12,480 tonnes of ore
  - 2 rakes = 208 ore cars = 24,960 tonnes of ore
  - 3 rakes = 312 ore cars = 37,440 tonnes of ore

- Goldsworthy Line

- 4 ore trains per day
- Train configuration:
  - 90 ore cars = 7,650 tonne of ore
Asset Protection

- 12 Hotbox / Hot Wheel Detectors
- 1 Cold Wheel Detector
- 1 Wheel Impact Monitor
- 3 in Motion Weighbridges
- Acoustic Bearing Detection
- Dragging Equipment Detectors
- Auto Locomotive Downloads
- Video Imaging
Instrumented Ore Cars (IOC)

- Vertical suspension travel (ride quality)
- Wheel-rail acceleration (rail condition)
- In-train forces
- Lateral stability (hunting)
- Longitudinal acceleration
- Car body / draft gear pocket strains
- Temperature
- Brake pipe pressure
IOC Reporting

Dumping Forces Measured

Car side wall strains
IOC Other Applications

- Bearing Temperature & Brake Pressure
- Track Assessment Sensors
- Improve Car Body Life
  - Strain Gauge on Sidewalls
  - Measure Car Body Dumping Strains
  - Control Service Dumping Peaks
- Strain Gauge on Draft Gear Pocket
  - Measure Longitudinal Train Forces
  - Control Service Loading
  - Peaks & In Train Forces
The following bearing faults are detected:

- Cone Faults
- Roller Faults
- Audible Wheel Flats
- Cup Faults
- Looseness / fretting
- Noisy Wheel sets (flanging)
Video Imagining Technology

- Flange Height
- Flange Width
- Vertical Flange
- Hollowing Depth
- Rim Thickness
- Wheel Diameter
Video Imaging Reporting

1. Tabulated
2. Pictorial
3. Graphical

Hollowing Depth Report on Train 7 on 30/10/2002

<table>
<thead>
<tr>
<th>Car Seq</th>
<th>Car ID#</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
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<tr>
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<td>1361</td>
<td>0.40mm</td>
<td>2.16mm</td>
<td>0.09mm</td>
<td>0.50mm</td>
</tr>
<tr>
<td>43 [2]</td>
<td>1181</td>
<td>2.68mm</td>
<td>1.57mm</td>
<td>0.00mm</td>
<td>0.00mm</td>
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<tr>
<td>63 [2]</td>
<td>4313</td>
<td>0.62mm</td>
<td>0.01mm</td>
<td>0.00mm</td>
<td>0.00mm</td>
</tr>
<tr>
<td>72 [2]</td>
<td>1301</td>
<td>0.01mm</td>
<td>0.00mm</td>
<td>0.43mm</td>
<td>0.40mm</td>
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<tr>
<td>100 [2]</td>
<td>2323</td>
<td>0.25mm</td>
<td>0.00mm</td>
<td>0.02mm</td>
<td>0.25mm</td>
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<tr>
<td>125 [1]</td>
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<td>0.00mm</td>
<td>1.08mm</td>
<td>1.73mm</td>
<td>0.57mm</td>
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<tr>
<td>159 [1]</td>
<td>1412</td>
<td>1.30mm</td>
<td>0.67mm</td>
<td>3.46mm</td>
<td>0.67mm</td>
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<tr>
<td>181 [1]</td>
<td>1711</td>
<td>1.73mm</td>
<td>0.70mm</td>
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<tr>
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<td>0.26mm</td>
<td>2.31mm</td>
<td>3.24mm</td>
<td>1.00mm</td>
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</table>
37 Traceable Components for each Ore Cars
Train Driving Simulator

Used To Define Driving Strategy & Training Needs
Aluminoothermic / Flash Butt
In Track Flash Butt Welder
Rail KPI’s Broken Rails

Calendar Year

- '93: 37
- '94: 62
- '95: 69
- '96: 64
- '97: 34
- '98: 29
- '99: 25
- '00: 49
- '01: 56
- '02: 36
- '03: 27
- '04: 23
- '05: 4

April
Best Practice

R&D programme since 1970, combination of ‘in-house & Monash University

It focuses on four main areas:-

• Rail / Wheel Interface
• Higher Axle Load
• Train Lengths / Cycle Time
• Components Life
Higher Axle Load

Operating Improvements

Axle Load

- 28.5 tonnes: 89 (1970)
- 30.0 tonnes: 96 (1974)
- 32.5 tonnes: 107 (1986)
- 35.0 tonnes: 116 Yandi (1996)
- 37.5 tonnes: 126 Yandi (1999-2004)

Wet tonnes per wagon:

- 1970: 89
- 1974: 96
- 1986: 107
- 1996: 116 Yandi
- 1999-2004: 126 Yandi

40.2 tonnes
Rail / Wheel Interface

Ore Car Wheel Life
Million Tonne Kms

- 1980: 0.34
- 2005: 1.9

Rail Life (Tangent Track)
Million Gross Tonnes

- 1980: 350
- 2005: 1,800
Train Lengths / Cycle Time

Train Length
Cars / Train

<table>
<thead>
<tr>
<th>Year</th>
<th>Current</th>
<th>1992</th>
<th>1984</th>
<th>1972</th>
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<tbody>
<tr>
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<td>208</td>
<td>180</td>
<td>131</td>
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<tr>
<td>Cycle Time</td>
<td>40</td>
<td>36</td>
<td>30</td>
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</tr>
</tbody>
</table>

Train Cycle Time
Hours
Environmental & Efficiency

Fuel Savings

- 1978: 1.45
- 2005: 0.68

Contributing Factors:
- Rail / Wheel profile
- Aerodynamic Ore Cars
- Efficient Locomotives
- Distributed Power
- Higher Axle Load
- Longer Trains
- Driver Strategy
What’s in the “Future”

- Continued Safety Focus
- 40 tonne axle loading
- “Cruise Control”
- Train Automation
- Electric Brake Trials
- Increased Tonnage (16 train schedule arrival based)