

Glengowrie Depot Upgrade



Nick Marciano, Manager Tram Maintenance, PTS



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Introduction – Nick Marciano

- Took up role of Tram Maintenance Manager in June 2009. Prior to that:
 - 35 years in manufacturing – starting as Apprentice Fitter & Turner and becoming a professional engineer
 - Bachelor of Engineering, Diploma of Business Management
 - Previous 20 years – GM Manufacturing & Project Engineer (Mechanical) at Mitsubishi



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Introduction

- To begin with, I will describe the upgrade from a Project Planning and implementation perspective.
- Then I will describe the upgrade from a depot management perspective.

Background

- In June 2008 the Tram Extension project from City West to Entertainment Centre, Hindmarsh was announced, and required:
 - procurement of 6 Citadis and 4 Flexity - Classic trams to supplement the existing fleet of 11 Flexity trams
 - Upgrading of Glengowrie Tram Depot stabling, maintenance and operational facilities to accommodate increased fleet
 - Stage 1 – 2009 – 2011 involved stabling & maintenance upgrade
 - Stage 2 – 2012 involves new operational facilities

Design Stage

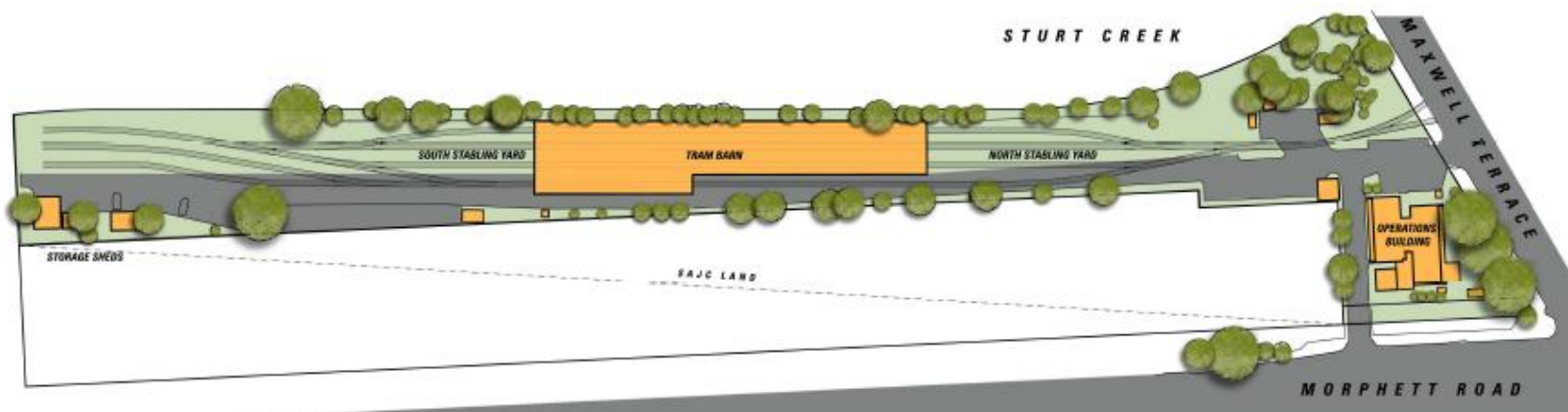
- DPTI Project Team visited Melbourne during 2009:



- Kew Depot (new pit, overhead platform works & custom construction handstand)
 - Glenhuntley Depot (new rainwater recycling installation)
 - Brunswick (tram wash facility)
 - Preston Depot & Workshop (wheel manufacturer & reprofiling and spray paint repairs)
-
- Looked at rail bending & turnout assembly
 - Visited fabricators & suppliers of track turnout components

Design Factors

- Narrow site



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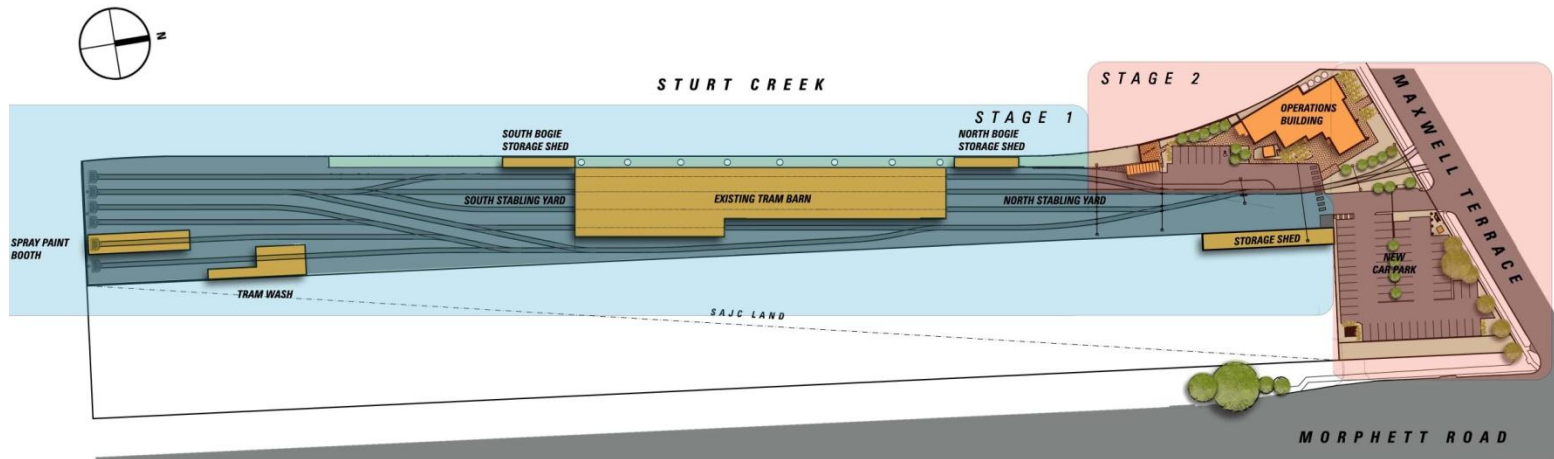
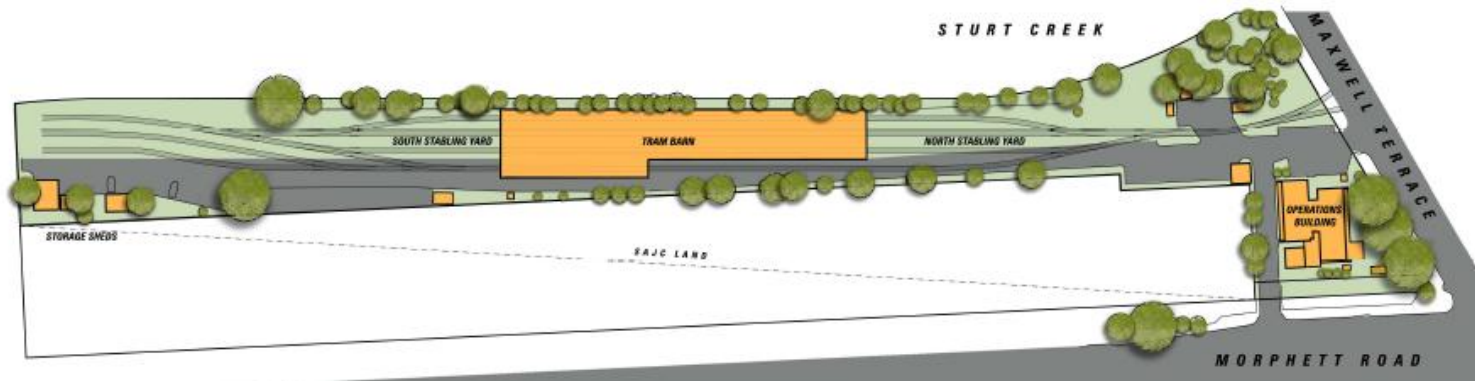
Design Factors

- Most functional stabling layout achieved in South Yard
- New tram road bypassing barn to east
- Although desirable, tram wash not feasible in North Yard.
- Main Stores shed to be located in front of depot to minimise delivery vehicle travel
- New pit and lifting facilities required for longer Citadis trams
- New Operations Building to be located on vacant land at front west minimising disruption to operations (Stage 2)
- Most efficient car parking to east minimising track crossings (Stage 2)

Design Factors – Employee Input

- Build external barn bypass track
- Use unused space on western side of land for stores sheds and water tanks
- Widen Roads 1 & 2 South pit to assist moving alongside edges of trams
- Provide flatter surface on Road 3 South – West for better lifting jack positioning.
- Road 3 South pit track extension for manoeuvring bogies

Before and After Design



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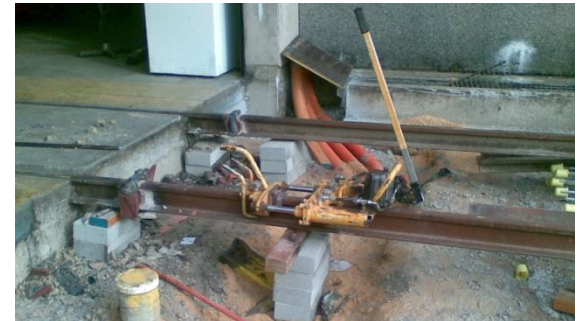
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Design Factors – Track Construction

- Concrete – rail in one layer of pavement
- Grooved tram rail obtained from Melbourne
- Fabrication of special Junction Sections to join grooved rail to existing 82lb rail within Barn
- Standard 1 in 5 Tram turnouts and mechanisms

Installation of
northern threshold
junction section at
Barn Road 4



Design Factors – Track Construction



- Special Two-way turnout on Road 2 in the South Yard – increases efficiencies of tram movements and enables stabled trams to enter the key maintenance station at Road 3 South in the Barn directly from Road 2 and less directly from Road 1

Key Reconstruction Projects – Depot Yards

- Bypass track along eastern side of Barn negating need to travel through Barn to South Stabling Yard
- Reconstruction of South Yard with additional storage tracks and tram wash and spray booth facilities
- Reconstruction of North Yard track
- Construction of new parts Storage Sheds using yard perimeters
- Construction of Tram Wash and Spray Booth Facilities

Key Reconstruction Projects - Barn

- Excavation of deeper pits to better accommodate working under low floor trams
- Construction of new Overhead Platforms designed to work on either Flexity or Citadis trams
- Installation of a new Tram Lifting facility on Road 3 North for lifting Citadis trams
- Acquisition of a Bogie Drop Trolley for removing & relocating Citadis tram bogies
- Reconstruction of Maintenance Staff Offices & facilities

Key Reconstruction Projects – Our Mission

- To undertake all this work while still operating regular tram services and maintaining the fleet

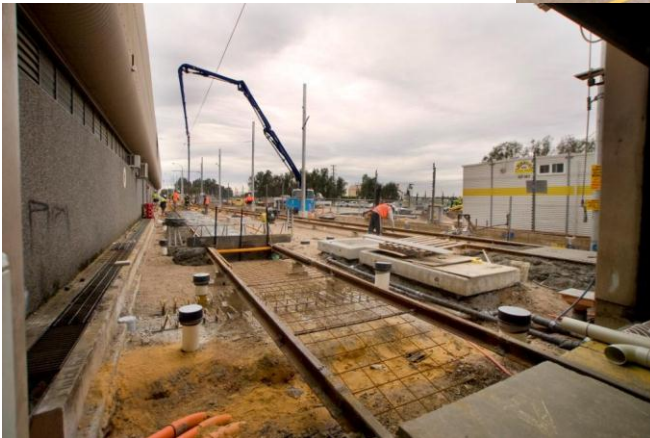


Barn Bypass Track

Barn Bypass (Road 5)
before construction
– December 2009 →



Construction of
Roads 4 & 5
facing south –
June 2010



Construction of
Roads 4 & 5
facing north –
June 2010



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South Yard Construction



Before reconstruction –
December 2009



Aerial view before reconstruction
– December 2009

South Yard Construction



Reconstruction – February 2010



Overhead construction - April
2010

South Yard Construction



Partial completion - June 2010



South Yard completed - March
2011

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North Yard Construction



Before reconstruction –
December 2009



Aerial view before reconstruction
– December 2009

North Yard Construction

Weekend closure –
June 2010 →



North Yard
complete –
March 2011



Roads 1 & 2
rebuild – July
2010



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Stores Construction

Previous Stores – South
Yard –
December 2009 →



Bogie Store -
North Yard -
October 2010



Sand Hopper Store
– South Yard –
October 2010



Stores Construction

North-East Store under construction –
July 2010 →



North-West and
North-East
Stores –
October 2010



North-East Store
completed –
March 2011



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Tram Wash and Spray Booth

Tram Wash and Spray
Booth – South Yard - July
2010 →



Ground Floor
rebuild – July
2010



Tram Wash
water
storage
tanks



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Tram Wash and Spray Booth

Flexity Tram enters Tram Wash from north end on test – May 2010



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Tram Wash and Spray Booth

Flexity Tram exits Tram Wash south end on test – May 2010



Tram Wash Safety Switches



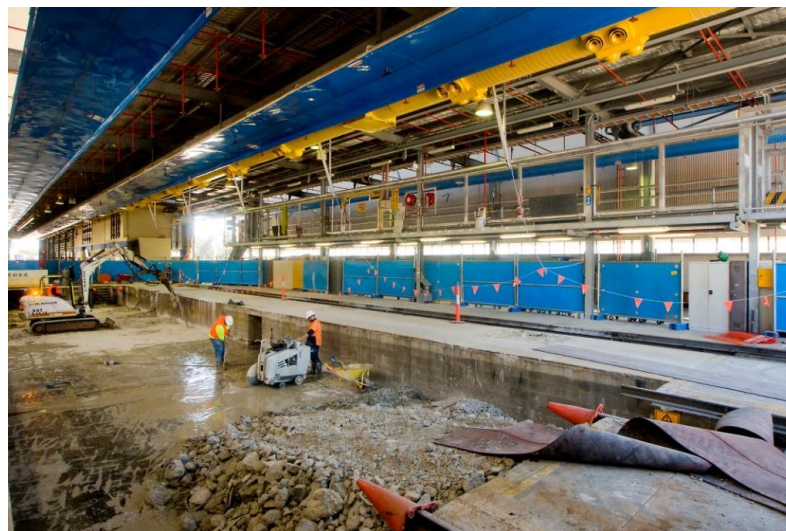
Tram re-enters Tram Wash at south end



Pit Reconstruction



Roads 1, 2 & 3 South Pits - Before reconstruction – December 2009



Roads 1 & 2 South Pit – During Reconstruction – June 2010

Pit Reconstruction



Roads 1 & 2 South Pit - Complete
– March 2011



Road 3 South Pit – Reconstruction
complete – March 2011

Road 3 North Lifting Construction



Road 3 North – Before
reconstruction – December 2009



Road 3 North Lifting – Testing
Flexity Tram – October 2010

Road 3 North Lifting Construction

Citadis tram entering
Road 3 North for lifting
test February 2011 →



Jack positioning



Tram being
prepared for lifting



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Road 3 North Lifting Construction

Citadis tram raised during
Road 3 North for lifting
test - February 2011 →



Road 3 North
Lifting Jacks –
March 2011



Bogie Drop Trolley
being tested –
February 2011



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Barn Office Reconstruction

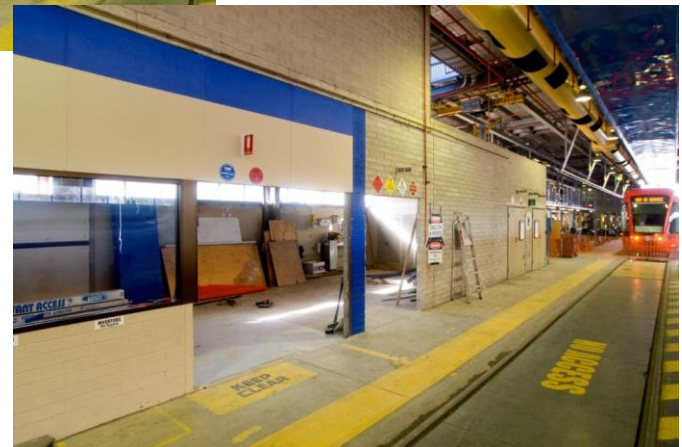
First floor – North end
reduction - July 2010 →



Ground Floor
rebuild – July
2010



First Floor –
South end
extension –
July 2010



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Barn Office Reconstruction



Partial completion -
October 2010



Completed Barn Office –
March 2011

Challenges Faced

- Ensuring Safety Compliance at all times
- Maintaining tram servicing schedule
- Arrival and familiarisation of six Citadis trams during depot upgrade
- Opening of Entertainment Centre, Hindmarsh line during upgrade:
 - Flexity trams available for new line crew training
 - Citadis trams available for crew training
- Maintaining clear communication with all parties:
 - DPTI Special Projects, Maintenance & Operations Staff, External Contractors, On-site contractors
 - Daily meetings with Project Supervisor
 - Weekly meetings with major stakeholders
- Managing conflicting needs of on-site contractors and PTS staff:
 - De-energising overhead versus tram availability for maintenance and training
 - Up to 10 times normal amount of people on site at different times



Challenges Faced

- Closure of South Yard during reconstruction:
 - Trams stored overnight at Hindmarsh, South Terrace, Glenelg and on main line near depot
 - Three H cars stored off site
 - No access to Road 3 South major service bay
- Construction of new track and overhead past eastern side of Barn impeding vehicular access to South Yard
- Relocation of inventory items
- Dust and noise from pit excavations
- Temporary Office and Amenities relocations:
 - Temporary computer wireless network
- Delays in installation of equipment and teething problems:
 - Tram Wash, Lifting Jacks, Bogie Drop Trolley, Platform End Gates



Further Upgrade Projects

- Acquisition of tram Sand Filling Vehicle



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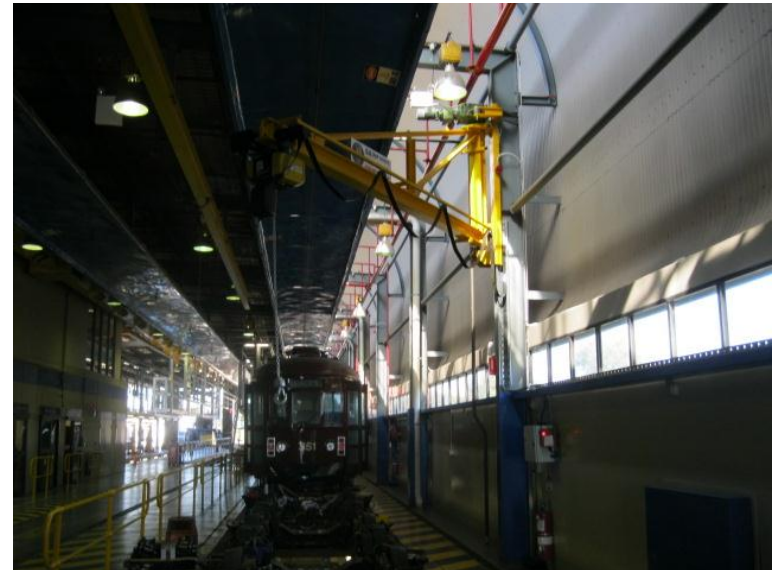


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Further Upgrade Projects

- Installation of JIB Crane on Barn Road 1 central



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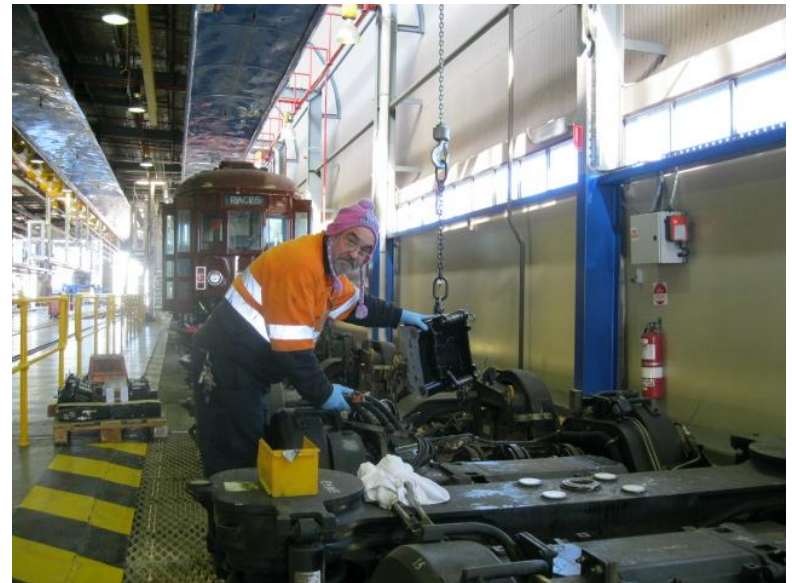


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Further Upgrade Projects

- Installation of JIB Crane on Barn Road 1 central



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Further Upgrade Projects

- Pit Guard Rails and painted walkways



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Further Upgrade Projects



- Installation of Platform End Gates



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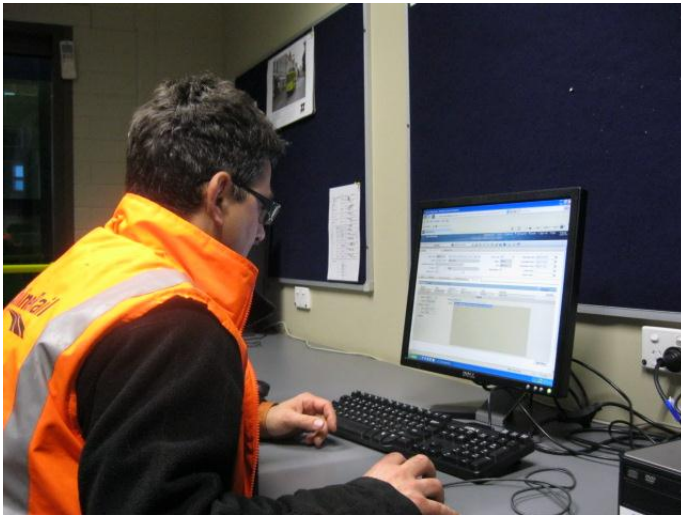


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Further Upgrade Projects

- Migration to a new computer based maintenance and inventory management system
- Acquisition of MiniProf Wheel measurement system



Further Upgrade Projects

- Major revision of stores inventory
- Acquisition of dummy bogies for moving trams during major servicing
- Re-opening of Rd 4 South pit



The Future

- Change to major service methods
- Focus on improving tram reliability
- Localise wheel machining
- Shunt vehicle required
- Spare bogies acquired to minimise tram down time
- Improving systems & procedures to ensure employee competency
- Dual trade Apprentices and introduction of new apprentices
- Implementation of Compliance Audit Regime



Staffing

- 1 Maintenance Manager
- 1 Work Scheduler
- 1 Workshop Supervisor
- 4 Underbody mechanics
- 6 Electricians
 - 1 Apprentice
- 2 Body Repairers

Today



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Glengowrie Depot Upgrade



Aerial view of Glengowrie Depot taken in 2009 before upgrade

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Glengowrie Depot Upgrade



Aerial view of Glengowrie Depot taken in September 2010

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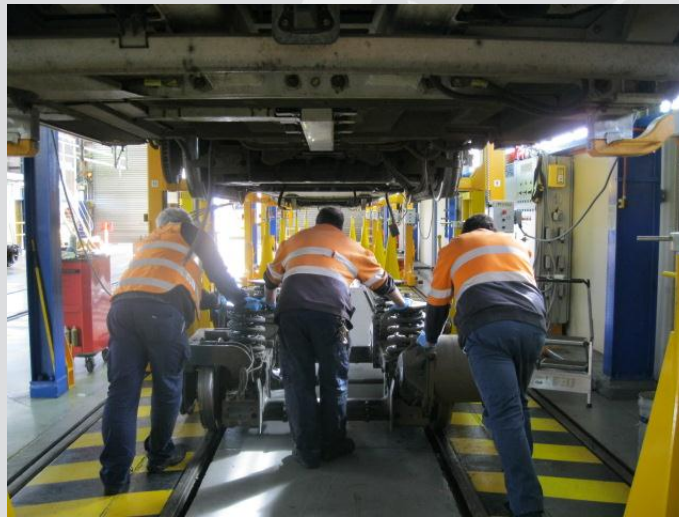


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The End



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