

It was decided that all parts of the works must be accessible for the freest use of industrial trucks to transport materials.

The principle of one car per road was adopted for both the lifting shop and paint shop so that no car, when repairs were complete, could be blocked by an unfinished car. Because of the large number of roads involved, this required a traverser served shop. Good lifting appliances were to be provided where necessary and special attention given to the provision of excellent lighting for both day and night.

The workshops were also designed on the principle of bringing the work to the men where practicable rather than the reverse. This kept the staff in definite locations and simplified supervision and the delivery of materials.

All parts were to be standardised. Faulty apparatus was to be removed from a car and given a replacement as quickly as possible. The faulty part was then to be repaired and placed in the store for reissue. It was planned to maintain a good supply of spare parts. The emphasis was to be on executing repairs as quickly as possible, for as the Chief Mechanical Engineer observed in 1926, the cars represented a large amount of capital invested and they should be kept in service and earning revenue as continuously as possible.

In 1926 it was stated that in the earlier stages of the work it was planned that the shops would be used mainly for fitting the equipment to the cars, and that this work was being carried out at a rate that would keep almost the entire of the first section constantly occupied. The second section, when complete would deal with maintenance work.

It was stated that what had been constructed and the work then taking place, consisted of five main sections -

1. Lifting and Repair Shop 530' x 80' x 32 roads
2. Bogie Shop 346' x 90' x 2 roads
3. General Shop (Heavy) 530' x 60'
4. General Shop (Light) 346' x 80' x 21 roads
5. Paint Shop 350' x 40'

Buildings.

In 1926 the buildings were described as of steel frames with fibro-cement (elsewhere called fibrolite) panelling except for the eastern wall of the bogie shop and the northern wall of the paint shop. These were of brick. The roofs were of saw-tooth design with glass louvres for lighting and ventilation. Corrugated fibro-cement was used as roofing. There were balanced roller shutters for all car entrances. Platforms and gangways were provided throughout for cleaning and maintenance work on roof lights. The floors were of concrete, rendered in bitulithic asphalt which was considered very durable and, it was observed, 'comfortable for those employees who are continuously on their feet'. Also it did not fret and give off free dust as a result of wear.

The area between the shops and including the traverser pit was concreted for ease of movement for the industrial trucks, to provide good drainage in wet weather and to reduce the dust nuisance at other times.

Hard roads were being built between the various workshops to facilitate transport.

Lifting and Bogie Shops

The bogie shop was built of brick and was 160' long x 90' wide. It had been provided with an electric travelling crane and 130' long inspection pits at each side of the building, leaving a wide working space between the roads. The car construction and repair shop, 330' long x 140' wide, was built of steel with fibrolite sides and roof and accommodated 20 roads, three of which were fitted with inspection pits.

An examination pit capable of accommodating an 8-car train adjoined the main buildings. A train arriving at the depot for attention was placed over this pit for examination and the various cars requiring attention were marked off. The train then moved forward so that any car could be placed on the traverser as required and cut out from the others. The traverser then moved the car to one of the roads in the lifting shop where it would be run in by operation of the traverser capstan.

The car was lifted by the overhead electric crane and the bogies disconnected and run out. An ample length of track was provided between the lifting shop and the traverser to accommodate the two bogies and at the same time provide space for the free movement of industrial trucks. The car body would then be lowered on to trestles and the necessary repair work begun.

The bogies in due course were run on to the traverser and transferred to 'A' road in the Bogie shop, where the sequence of operations was as follows -

The bogie was first cleaned and the gear cases and suspension bearings of the motors removed, after which the motors were lifted from the bogie by the overhead crane. The bogie then moved a further stage down the shop and the brake levers, bolsters, springs, etc. were removed. The bogie then advanced a further stage, where the frame was lifted from the wheels, the axle boxes being removed as the wheels passed the axle box section. The wheels were then conveyed to the wheel section at the end of the bogie shop where they received the necessary attention, during the course of which they were transported towards road 'B' on the opposite side of the bogie shop.

After dismantling, the necessary attention was given to the motors and all bogie parts which were ultimately delivered in their proper sequence to points adjoining road 'B' in the bogie shop. The work was progressively assembled. The finished bogie, complete with motors, left the shop to be returned by the traverser to the road in the lifting shop on which it may be required.

For dealing with equipment repairs in the main repair shop, 'Tiering' industrial trucks were used. These trucks were very mobile and the platform could be placed beneath the car body and raised under any equipment which had to be removed. When the equipment in question had been released from the car, the truck platform was lowered and the truck

delivered the equipment to the particular section of the shop dealing with this class of repairs. In 1926 the existing installation provided for twenty roads in the lifting shop.

Paint Shop

The paint shop was 350' long x 105' wide, of steel, with saw-tooth roof and fibrolite covering. A hot air plant has been installed consisting of a system of underground ducts with gratings at intervals throughout the shed. The hot air was supplied by an electrically driven fan and the ducts so proportioned in area as to ensure a constant pressure at the gratings.

Connecting the bogie and car shop on one side and the paint shop on the other was a traverser way which was of a design new to New South Wales. It was so constructed that industrial trucks could run from shop to shop. This was done by providing ramps down to the traverser bed between each pair of roads.

The paint shop had twenty-one roads, and car bodies needing painting were placed on shop bogies in the lifting shop, run out on the traverser and placed on the desired road in the paint shop.

The paint shop was heated by means of a hot-air system supplied by George Vincent & Co. Ltd. of Sydney. The air was passed first through a water spray air washer, then forced by a fan through steam-heated radiators, the steam being supplied from a battery of low-pressure slow combustion boilers. The heated air was led through ducts in the concrete floor and passed out through openings placed between the rails and under the cars.

Equipment

Traverser

The traverser was of departmental design and constructed by T. Newell & Sons of Pyrmont. The operating speed was 260' per minute and a suitable capstan head with guide pulleys was provided for pulling cars on and off the traverser. A special feature of the traverser design was the small vertical depth required (10 1/2"), the sides of the traverser pits being graded so as to provide for the unrestricted movements of industrial trucks throughout the works.

Overhead Cranes

The electric overhead cranes were operated by 600 volt direct current motors -

Lifting and Repair Shop: One crane installed and a duplicate to be provided when necessary.

Span: 75'. Capacity: 30 tons with two crabs of 15 tons each.

Bogie Shop: One crane. Span 85'. Capacity: 15 tons.

Machine Shop: One crane installed and a duplicate to be provided when necessary.

Capacity: 5 tons.

Machine Shop Equipment

All the principal machines were provided with individual motor drive, the motors being operated with 440 volt, 3-phase, 25 cycle current from a 500 kVA transformer which was located in the transformer room.

The tool room was equipped with a universal grinding machine, twist drill grinder, emery wheel and the usual facilities for tool storage.

High tension tests were carried out in a special compartment to which 1,500 volts D.C. was supplied from a small motor generator set. This equipment was used for testing motor generators, air compressors, etc.

Triangle and Test Track

A triangle equipped with overhead wiring allowed electric trains or single cars to be turned end for end.

A test track of about one half-mile in length was available upon which electric cars could be tested and any necessary adjustments to the equipment tried out.

Wood-working and Upholstering

No separate department was provided in the electric car repair shops for wood-working and upholstery, as this was to be carried out in the main carriage shops to be established on a site immediately east of the electric car repair shops.

Fire Prevention

The paint shop and lifting shop were equipped with a Grinnell sprinkler system as a precaution against fire, with the water tank located at the rear of the paint shop.

Equipment of Electric Cars

These workshops were provided essentially for the maintenance of the electric rolling stock. In 1927 however, the conversion from steam to electric traction was in full progress and the workshops were being used for the dual purpose of maintenance work and for the installation of the electrical equipment on the cars. The latter work was being carried out by contract and over 150 motor cars and 150 trailer cars had been equipped and sent into service by September 1927.

8.0 REFERENCES

Article Visit of Inspection to the Chullora Railway workshops, 7/9/27 by the Institution of Engineers, Department of Railways, 1927, SRA Archives

Ranken, R.L. Track and Construction Work in Electrification of the Sydney and Suburban Railways, article in Transactions of the Institutions of Engineers, Australia, Vol. 7, 1926.

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9.0 APPENDICES

9.1 Appendix A - Inventory Sheets

9.2 Appendix B - Burra Charter

THE AUSTRALIA ICOMOS CHARTER FOR THE CONSERVATION OF PLACES OF CULTURAL SIGNIFICANCE (The Burra Charter)

Preamble

Having regard to the International Charter for the Conservation and Restoration of Monuments and Sites (Venice 1966), and the Resolutions of 5th General Assembly of the International Council on Monuments and Sites (ICOMOS) (Moscow 1978), the following Charter was adopted by Australia ICOMOS on 19th August 1979 at Burra Burra. Revisions were adopted on 23rd February 1981 and on 23 April 1988.

Definitions

Article 1. For the purpose of this Charter:

- 1.1 *Place* means site, area, building or other work, group of buildings or other works together with associated contents and surroundings.
- 1.2 *Cultural significance* means aesthetic, historic, scientific or social value for past, present or future generations.
- 1.3 *Fabric* means all the physical material of the *place*.
- 1.4 *Conservation* means all the processes of looking after a *place* so as to retain its *cultural significance*. It includes *maintenance* and may according to circumstance include *preservation*, *restoration*, *reconstruction* and *adaptation* and will be commonly a combination of more than one of these.
- 1.5 *Maintenance* means the continuous protective care of the *fabric*, contents and setting of a *place*, and is to be distinguished from repair. Repair involves *restoration* or *reconstruction* and it should be treated accordingly.
- 1.6 *Preservation* means maintaining the *fabric* of a *place* in its existing state and retarding deterioration.
- 1.7 *Restoration* means returning the EXISTING *fabric* of a *place* to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material.
- 1.8 *Reconstruction* means returning a *place* as nearly as possible to a known earlier state and is distinguished by the introduction of materials (new or old) into the *fabric*. This is not to be confused with either re-creation or conjectural reconstruction which are outside the scope of this Charter.
- 1.9 *Adaptation* means modifying a *place* to suit proposed compatible uses.
- 1.10 *Compatible use* means a use which involves no change to the culturally significant fabric, changes which are substantially reversible, or changes which require a minimal impact.

Explanatory Notes

These notes do not form part of the Charter and may be added to by Australia ICOMOS.

Article 1.1

Place includes structures, ruins, archaeological sites and landscapes modified by human activity.

Article 1.5

The distinctions referred to in Article 1.5, for example in relation to roof gutters, are:

- maintenance — regular inspection and cleaning of gutters
- repair involving restoration — returning of dislodged gutters to their place
- repair involving reconstruction — replacing decayed gutters.