

RAIL INNOVATIONS

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STEEL SLEEPERS

It was found after several years that the wooden sleepers used in the construction of the Whiteman Park Tramway were failing at a concerning rate especially on track curves. This was due both to the age of the second-hand sleepers and the action of termites.

Recently, PETS had the chance to buy some 1,200 second hand steel sleepers which have since been used to replace failed wooden sleepers. PETS track workers have had to “learn by doing” in handling the steel sleeper, and use spacers obtained from TRAKLOK in Adelaide.

The sleepers are hollow, broadening out from a narrow top to a broad base about 30cm wide.

It has been found that the correct gauge is re-established by the use of the steel sleepers with the rails being clipped to the sleepers. More ballast is required to fill the hollow underside of the sleeper which is packed to 45cm either side of each rail.

507 steel sleepers had been inserted in the PETS track by July 2002. The principal advantage of the steel sleepers is their long life.

In answer to questions raised it was indicated that rust does not appear to be a problem.

Corrosion between rail and sleeper possibly likely after 10 years can be managed with the use of rubber sandwiches. This corrosion would depend on the amount of traffic on the line.

FABRICATION OF CROSSING UNITS

AETM has used tee head rail and railway type switches from the start of tracklaying due to the fact that all the grooved rail was removed from the streets of Adelaide after the system closed in 1958. Tee head rail was made available by the South Australian Railways consequent to branch line and siding closures.

The Museum has two styles of crossing block:

1. The railway frog type currently at both ends of the crossing loop, on the road 7 & 8 fan, and from the mainline to the road 7 & 8 fan. Steel inserts allow for smooth use by tramway profile wheels.
2. The mild steel tramway style block currently on the depot fan at all points and also from the mainline to the new north shed road 10. Three of these were manufactured outside during the construction of the depot fan. Two were manufactured in-house in the late 1980's to replace a railway style frog on roads 2 & 3, and one in 2001 to connect road 10 to the mainline. (Road 9 has not been built to date)

Railway frogs were used where the required angle was available – mild steel blocks catered for switches with other angles.

Design of the block

The height of the block is determined by the height of the rail used on either side of the block. The length is determined by the angle of the crossing and an allowance for the full width of the railhead at both ends. This indirectly prescribes the width of the block. The angle is measured by attaching a protractor to a plank of wood on which a centre line has been drawn. The plank is placed on the rail and the curved rail leading into the crossing. The required angle is then read from the protractor.

The steel block is then ordered along with a 20mm steel plate to which will be welded the block and the rails. The plate is twice as wide as the block plus sufficient length for the welding required to attach the stub rails to the plate.

Manufacture

The two blocks manufactured in-house were made on the Butler Shaper machine purchased in 1988. The block is de-burred and painted with marking blue, then the centre line and the final profile lines are scribed. Because the maximum stroke of the shaper is only 26" and the full length of the groove required in the block is longer, the groove is machined in from both ends.

A hole is drilled at the midpoint of each groove to allow the tool to stop at the end of the set length of stroke in air rather than against solid metal which could damage the cutting tool. After each groove is machined out a radius tool then machines a radius on the portion of the block that wheels actually run on. A lead-in is also machined at one end to allow for any wheel float as the truck passes over the block. The ends of the block are then machined at an angle for the rails to butt against ready for welding.

Installation

The block is welded to the plate and the stub rails are placed in position – their running surfaces aligned with a long steel rule – and tack welded to the plate. After all stub rails are tack welded in position and a final check made, all rails and the block are welded to each other. The unit can then be placed in its final position and the stub rails welded to the rails of the switch. The crossing is then fit for service and any dents and rollovers as each tram is tested over it can be ground off. In time the mild steel block will work harden as the grain structures of the steel are compressed. No block in the museum has needed any attention apart from some minor widening of the grooves for the trams with ex-Brussels 21E trucks.