

OCTOBER, 1962

STATE ELECTRICITY COMMISSION OF VICTORIA

BENDIGO TRAMWAYS - TRACKS

The Bendigo tram tracks were completely reconstructed immediately after they were acquired by the State Electricity Commission in 1934, with the aim of providing another 15 years' life to the system.

The type of construction employed was considered at the time to be the optimum in tram track construction. All routes in the system were provided with subterranean track drains, and rail was attached to hardwood sleepers bedded on blue metal ballast. The "city" portion of each route was paved with granite setts, and the remainder paved with a bitumen surface.

The original 90lb. grooved rails laid for the commencement of the electric tramways system in 1903, were relaid in the reconstruction of the tracks. The North Bendigo route was extended during World War II to provide service to the Ordnance Factory. The rail used in this track was 80lb. tee rail, which was also the type used with a bolted check in a few locations in the reconstruction work, where it was necessary to replace rail. Some special work was replaced during reconstruction, and some has been replaced since. Even though the special work has been well maintained, the majority of it has now reached a stage where maintenance is becoming increasingly more difficult, because of metal fatigue, and the only solution would be an extensive replacement programme.

Track foundations are not firm, although not as bad as those in Ballarat. This factor coupled with corrosion of the rails below the road surface, is allowing rail movement which apart from impairing the safety of the track, is causing a major problem by damaging road surface. Water further aggravates this problem, as it is doing to a greater degree in the Ballarat System.

(Cont'd.)

The Bendigo tracks have an added complication. In some locations the presence of fine material in the track filling, and the introduction of 'fines', (probably from neighbouring mine dumps) through the broken road surface caused by rail movement, tends to 'build up' on each sleeper as they are depressed with each passing tram. The effect can be clearly seen in Photos 1 and 2, where the road surface has been lifted 3 to 4 inches above rail level immediately above each sleeper, by this 'build up'.

The remaining problems concerning the condition of the tracks are the same as those in Ballarat. Corrosion to the webs and flanges of rails is so advanced, that it is feared that the remaining strength in the majority of the rail, is below a safe limit. Rail wear is extensive and irregular. Checks are badly worn and tracks are over gauge.

These facts can be appreciated by a study of the attached drawing, showing present rail profiles, (compared against original profiles) of rail in locations chosen at random, along each of the four Bendigo routes.

The accompanying photographs also clearly show the deplorable condition of the Bendigo tram tracks. Deplorable, not because of neglect, but because they have had to withstand wear and deterioration, over twice the period for which they were originally designed and intended.

Photo 1. taken on the North Bendigo route, near Arnold Street and Photo 2. of the south end of the Hallam Street loop (Quarry Hill) looking towards the City shows the 'build up', and distorted road surface described earlier in this report.

The menace of swaged and broken rail, wide groove, worn check, and high pavement at the North end of the Hallam Street loop, can be seen in Photo 3.

Probably the most worn rail in the Bendigo system is to be found in View Street, where the steep gradient causes wheel slipping on the out bound track, and the abrasive action of sand while braking on the downhill run, are the contributing factors. Photos 4, 5 and 6 taken in the vicinity of the Rowan Street intersection in View Street show this. Photos 4 and 6 also show evidence of 'flange running'. Photo 4 is true flange running, where the ball of the rail is so worn that a new or near to full size flange of a tyre, will run in the bottom of the rail groove, instead of the tread of the tyre running on the ball of the rail. Photo 6 is 'flange running' of a different type. The cheek of the rail is so worn on its inner surface that a 'shelf' has formed, and a newly flanged wheel will run on this false bottom in the groove.

Another example of this is seen in Photo 7 of the Manchester loop west inner rail. Photo 8 is an example of the alarming amount of corrosion which has taken place to rail, below road surface.

The effects of wear, and structural change in metal, due to fatigue and extensive repairs by electric welding without adequate preheating or stress relieving, can be seen in the following photos, of special work throughout the system. Photos 9 and 10 Switch casting, Hayes Street loop North end, Eaglehawk route.

Photo 11 Crossover, terminus end of Fire Station loop Golden Square.

Photo 12 Switch casting, bifurcation points Charing Cross, Golden Square route.

Photo 13 South end of switch casting, Mitchell Street opposite "Ezywalkin".

Photo 14 North Bendigo route. Switch casting, bifurcation at Arnold Street.

To maintain the Bendigo tramway tracks in a condition consistent with accepted safety standards for a public transport medium, and within reasonable economic bounds has become virtually impossible.