AUSTRALIAN RAIL TRACK CORPORATION LTD

Engineering (Track & Civil) Instruction **ETI-01-04**

P1 Gauges

Applicability

ARTC Network Wide	✓	**Western Jurisdiction**		**New South Wales**		**Victoria**	

Audience	Main Points	Amendment Record
Welders KK Operators	An additional measurement tool for the weld grinding process To be used in conjunction with a straight edge Only measures variations along running surface not weld height When not in use instrument should always be kept in its box	Original information provided by R Nancarrow and reviewed by T Calver May 2008

INTRODUCTION

Even relatively small vertical deviations in weld geometry can cause huge dynamic forces on passage of wheels.

High frequency, short duration dynamic loads due to waviness in rail surface across the Heat Affected Zones (HAZ), corrugations and wheel flats are called P1 forces. They are particularly detrimental to rails, pads and concrete sleepers.

The "P1 GAUGE" has been developed as an **additional measure** to be used, together with the straight edge, to measure the result of the weld grinding process. It will only measure small variations along running surface **but not the weld height**.

The principle of operation is based on a 50mm base line with a steel probe measuring the rise or fall of the next 50mm. The resulting indication is normally read in terms of "Go" and "No Go". The angular displacement may also be expressed in milliradians as indicated on the instrument. ARTC standard ETM–01–01 limits readings to 7 milliradians for new welds.

P1 Gauge

INSTRUCTIONS FOR USE

The gauge is held with the forefinger and thumb between the three wheels, as shown in Fig. 1, and placed on the rail next to the weld to be checked. The three wheels **must be pushed down to ensure firm contact** with the rail surface as the gauge is slowly run across the section to be measured.

Issued by	**Date**
John Furness, Manager Standards	20 May 08

Figure 1

On track, position the gauge at the **centre of the running or contact band**. Run the gauge **once** across the weld zone and the adjacent ground rail as shown in Fig.2.

Figure 2

Note: The white line in Fig 2, is just shown to illustrate the location of the centre of the running band. There is normally no need to mark the rail like this, as the centre can be judged by eye.

On a "flat" surface the pointer will be at the zero position and have no significant movement as the gauge is traversed across a section being examined. If there is a rise or fall in the section under test, the pointer will move in either a positive or negative direction. The gauge face is marked with a "0" in the centre, "OK" on both sides and a "NO GO" zone; this "NO GO" area indicating that the section being tested is outside the required tolerance.

If a weld to be measured is say, 0.3mm high when measured over **a metre length**, **and is correctly ground**, then the weld and the adjacent rail will be convex in shape. The pointer may then move **very** slightly off the "0" reading as the gauge is run across the area being tested, this result being acceptable.

Dial Indicating Tolerance Zones

Any high or low sections, as indicated by the movement of the pointer, will be at the centre of the instrument, on the rail surface, under the dual wheels.

If the pointer moves into either of the "NO GO" sections then the grinding is less than the required standard and further remedial grinding must be carried out.

Note: For guidance only, if the needle goes to the full extremity of the dial face, the slope angle will be approximately 18-20 milliradians.

INSTRUMENT MAINTENANCE

When not in use, the instrument should always be kept in its plastic box.

Due to the abrasive nature of the rail surface after grinding there will be some wear on the probe in contact with the rail. To resist this wear the probe is hardened steel. However, when it does wear, the pointer can be returned to a zero reading by placing the instrument on a flat smooth surface and the following simple adjustment carried out. This is described and shown in Fig. 3:

1) Using a small screwdriver, loosen the set screw at the rear of the gauge.
2) Rotate the eccentric axle with a larger screw driver until the pointer is at the "0" mark.
3) Re-lock the set screw. Do not over-tighten.

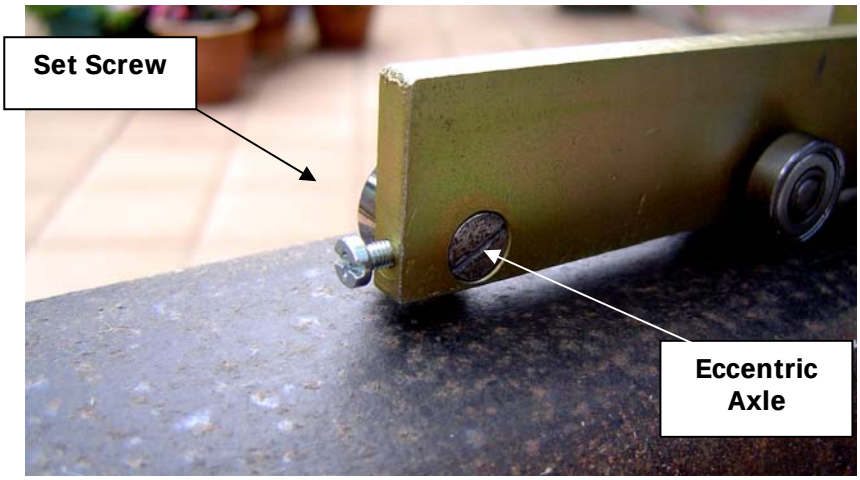

Figure 3

No lubrication is required and, if used, may attract dust and grit and make the instrument unserviceable.

If necessary the instrument can be returned to the Team Leader for adjustment, maintenance or repair.