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Track geometry - Inspections and minimum actions

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1 Scope

This module of NR/L2/TRK/001 specifies, in relation to track geometry:

- a) track geometry inspection;
- b) track geometry measurement requirements;
- c) action and associated timescales for the rectification of geometry faults;
- d) the inspection and control measures required for sections of track for which recorded track geometry is worse than 'poor';
- e) the requirements for managing dip angles;
- f) retention of records.

2 Definitions

See Glossary (NR/L2/TRK/001/mod01).

3 Track geometry inspection

- The routine inspection and maintenance regime will be sufficiently detailed to allow the identification and rectification of geometry faults before they present an unacceptable level of risk.
- Routine inspection includes visual Inspections, detailed examinations, cab riding and sampled manual measurement of track geometry.

4 Track geometry measurement

4.1 Requirement

Measurement of track geometry shall be undertaken on all passenger running lines, goods running lines, carriage lines and loops, including all crossovers and turnouts.

- For the requirements for sidings, see NR/L2/TRK/001/mod17.

4.2 Frequency

Undertake track geometry measurement at the nominal planning interval frequencies shown in Table 1.

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Table 1 – Frequency of Track Geometry Measurement		
Track Category	Frequency (Nominal planning interval)	Maximum interval between measurement
1A	4 weekly	10 weeks
1	8 weekly	18 weeks
2	12 weekly	26 weeks
3	16 weekly	36 weeks
4	24 weekly	52 weeks
5	24 weekly	52 weeks
6	24 weekly	52 weeks
Notes: - Additional measurement may be required on routes containing sections of track which deteriorate rapidly (e.g. embankment settlement, slips or mining subsidence). - If a planned track recording run has been missed, the TME should consider whether additional measurement is needed for the whole, or part, of the route before the next scheduled recording.		

4.3 Available methods of geometry measurement

4.3.1 Measurement by track recording vehicles

Use Track Recording Vehicles (TRV) approved by the Professional Head [Track].

NOTE Track Recording Vehicles are able to measure dynamic movement of the track.

4.3.2 Manual measurement

Where it is not practicable to operate train-borne systems, undertake manual measurement using:

- hand propelled track recorders (e.g. the Amber Manual Track Recorder), or
- track gauges.

When measurement is to be undertaken using track gauges only, measure cross level and track gauge at regular intervals along the track, including at any observed dips or cross level irregularities.

Hand propelled track recorders and track gauges will not, on their own, identify any dynamic movement of the track.

To include dynamic movement in the manual assessment of track geometry, it will require the use of void meters and dynamic track gauges.

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4.3.3 Choice of geometry measurement method

Wherever practicable, plan the use of Track Recording Vehicles on the following:

- a) passenger running lines, goods running lines, carriage lines and loops;
- b) high speed (60mph and above) crossover routes;
- c) long crossovers with more than five sleepers between the through timbers on the crossover road;
- d) crossovers between lines with different cant.

Where crossovers and turnouts are not included within TRV planned routes, measure geometry using a manual recorder (preferred) or track gauges.

4.4 Track geometry measurement plan

The Track Maintenance Engineer (TME) shall maintain a register of all tracks in their maintenance area showing:

- a) the method of geometry measurement to be used;
- b) frequency of measurement;
- c) dates planned and completed.

5 Output from track recording

5.1 Analysis of track recording data

Following a track recording run by the TRV, a full set of data, copies of the trace, the immediate action report (detailing geometry faults that exceed the limits) and run log are issued electronically to the TME.

The TME shall review the traces and other output from TGR (Track Geometry Reports) within three weeks of issue. A record of the review shall be made by annotating a copy of the trace.

The review should consider:

- a) geometry faults,
- b) geometry fault trends (including prediction of future faults),
- c) repeat geometry faults,
- d) eighths in the Very Poor band,
- e) eighths in the Maximum band,
- f) track geometry quality trends,
- g) the identification and prioritisation of work,
- h) the effectiveness of completed work,
- i) sites which may require proposing for renewal.

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- Review items (a), (c) and (e) after every recording.
- Where sections of track are recorded at 4 and 8 weekly frequencies, the full review (items (a) to (i)) need only be applied to traces produced at 12 and 16 weeks respectively for these sections.

5.2 Creation of maintenance plans

Use the output from track geometry measurement, along with the findings from other track inspections, to create maintenance plans.

A maintenance plan should:

- a) prevent Immediate Action Level Faults occurring;
- b) reduce the number of Intervention Level Faults occurring or repeating;
- c) minimise the occurrence of poor geometry causing rough rides;
- d) prevent the failure of rail, sleepers, ballast and formation by managing dip angles;
- e) allow Track Quality and geometry targets to be attained;
- f) optimise the use of On-track geometry maintenance machines;
- g) manage sites where there is ground instability (from desiccation, animal burrowing, rotational or sliding ground movement or mining subsidence).

5.3 Input of data for national reports

National statistics are produced for track geometry after measurement by track recording vehicles. These are found within TGR.

Data generated from the TRV calibration runs will not be used to populate national reporting statistics.

Note: Geometry faults are referred to as "Level 2 faults" within TGR. For the purpose of compiling these national statistics, Immediate Action Limit (IAL) and Intervention Limit (IL) faults are counted as 'Level 2 faults'.

6 Response to geometry faults

6.1 Interpretation of timescales for remedial works

Action timescales are in hours or calendar days. Days include weekends, but exclude those days where there is no service.

Timescales for Immediate Action Limit (IAL) faults identified by recording vehicles, reported via Integrated Control Centres (ICC), start at the time the fault was notified to the ICC. For all other faults it is the date the recording data was issued (or, if collected from the vehicle, the date of collection).

For faults detected by manual measurement, the time starts from when the measurement was made.

Rectify these faults in accordance with the minimum action tables (Tables 2 to 4).

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6.2 Immediate Action Limit (IAL) geometry faults

6.2.1. Notification

'Block the line' IAL geometry faults shall be verified (on the train) within 5 minutes of recording and the signal box advised immediately the defect is confirmed.

All other IAL geometry faults shall be reported to the ICC within 60 minutes of discovery and local staff notified (via ICC) within 90 minutes of discovery.

6.2.2 Action

For all reported IAL geometry faults, apply the *Critical Limit Immediate Action* shown in Table 2.

Rectify IAL twist faults, IAL wide gauge faults and IAL Cat C+T cyclic faults in accordance with the *Critical Limit Remedial Action* shown in Table 2.

Rectify IAL Cat I (immediate) and Cat C+T cyclic top faults in accordance with the *Baseline Limit Remedial Action* shown in Table 2.

For all IAL 'block the line' faults, the TME shall:

- undertake a site investigation and complete a TEF3084 within 7 days of the fault occurring;
- complete a wrong side failure report (TEF3064).

The reports shall be reviewed by the Infrastructure Maintenance Engineer (IME) and the RAM [T]. The RAM [T] shall monitor for any trends of 'block the line' faults.

6.2.3 Repeat faults

Repeat IAL geometry faults shall be inspected by the Section Manager [Track] (SM[T]) within 14 days.

Report these inspections on TEF3084.

The SM[T] shall identify repeat 'category immediate' (Cat I) cyclic top faults by manual review of the track geometry recording output. Inspect and report these as above.