

Track – Magnetic Particle Testing (MPT)

Scope

Includes: Magnetic Particle Testing (MPT) using a.c. electromagnets or d.c. electromagnets or permanent magnets
Excludes: Liquid Penetrant Testing (LPT)

Preparation

Tools, equipment and plant items required but not limited to:

- White contrast paint
- a.c. electro-magnet or d.c. electro-magnet or permanent magnet
- Black magnetic ink
- Wire brush
- Solvent cleaner
- Rags or cloths
- Lighting (500 lux at the test surface)
- Calibrated lift test block
- Approved rail thermometer
- Approved umbrella (with earthing strap, if required)

Work planning considerations :

- Staff undertaking these operations must be trained and certificated in the technique being applied
- Magnetic properties of rail to be tested – rail must be ferromagnetic or MPT will not work (in this case, LPT shall be used)
- Surface temperature must be no greater than 50°C

Method

1. Test magnet by ensuring that;
 - an a.c. electromagnet can lift a 4.5kg weight with a pole spacing of no greater than 300mm,
 - **or** a d.c. electro or permanent magnet is capable of lifting an 18kg weight.
2. A wire brush should be used to remove rust, grease or scale contamination before cleaning the area to be tested by wiping with a solvent cleaner dampened cloth.
3. Allow the solvent cleaner to evaporate from the test surface (2 minutes).
4. Shake the tin containing the white contrast paint vigorously for ten seconds.
5. Apply one light coat of white contrast paint to the test area in a light even coat, holding the tin at least 30cm away from the test surface.
6. Shake the tin containing the magnetic ink vigorously for ten seconds.

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7. Apply magnetic ink and immediately apply magnetic field. The magnetic field should be applied in one or more directions, dependent on the anticipated orientation of the defect. When using permanent magnets or d.c. electro-magnets the test area is no greater than the area of the circle inscribed between the pole pieces.
8. Leave magnetic field in place for sufficient time for indications to build up before removing.
9. Inspect the test area as soon as the magnetic ink and field are applied and continue to inspect until magnetic field is removed.
10. If post cleaning is required, clean the test area with a wire brush followed by a solvent cleaner dampened rag or cloth.
11. Report and action any defects identified in accordance with NR/SP/TRK/132.

References

Supports Ellipse Standard job

- Code to be created

If applicable refer to the following associated documents:

- NR/SP/TRK/056 Rail testing: Non-Ultrasonic Procedures
- NR/SP/TRK/032 Joining of Rails by Aluminothermic Welding
- NR/SP/TRK/132 Weld repair of rails

- Risk Control Sheets:
- NR/L3/MTC/0002/TK000 Generic Track Risks
- NR/L3/MTC/0002/TK701 Magnetic Particle Testing