

|                  |                |
|------------------|----------------|
| Ref:             | NR/L3/TRK/3242 |
| Issue:           | 1              |
| Date:            | 03/12/2011     |
| Compliance date: | 01/04/2012     |

## Level 2

# Marking of track for stoneblowing machines

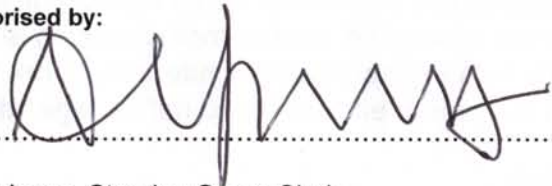
### Endorsement and Authorisation

Endorsed by:



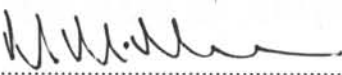
Adam Southern, Working Group Chair

Authorised by:



Andy Jones, Steering Group Chair

Accepted for issue by:



Mick McManus, National Standards Manager

This document is the property of Network Rail. It shall not be reproduced in whole or part nor disclosed to a third party without the written permission of Network Rail.

© Copyright 2011 Network Rail.

Uncontrolled copy once printed from its electronic source.

Published and Issued by Network Rail, Kings Place, 90 York Way, London. N1 9AG.

|                  |                |
|------------------|----------------|
| Ref:             | NR/L3/TRK/3242 |
| Issue:           | 1              |
| Date:            | 03/12/2011     |
| Compliance date: | 01/04/2012     |

## Issue record

| Issue | Date          | Comments     |
|-------|---------------|--------------|
| 1     | December 2011 | First issue. |

## Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 01 April 2012.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this standard.

## Reference documentation

NR/L3/TRK/3241, *Marking of track for tamping machines.*

## Disclaimer

In issuing this document for its stated purpose, Network Rail makes no warranties, express or implied, that compliance with all or any documents it issues is sufficient on its own to ensure safe systems of work or operation. Users are reminded of their own duties under health and safety legislation.

## Supply

Copies of documents are available electronically, within Network Rail's organisation. Hard copies of this document may be available to Network Rail people on request to the relevant controlled publication distributor. Other organisations may obtain copies of this document from IHS. Tel: 01344 328039.

|                  |                |
|------------------|----------------|
| Ref:             | NR/L3/TRK/3242 |
| Issue:           | 1              |
| Date:            | 03/12/2011     |
| Compliance date: | 01/04/2012     |

## Contents

|                                                                 |    |
|-----------------------------------------------------------------|----|
| 1 Purpose                                                       | 4  |
| 2 Scope                                                         | 4  |
| 3 Permanent marking                                             | 4  |
| Figure 1 – “High Cant Deficiency” plate                         | 6  |
| Figure 2 – Permanent marking of track geometry                  | 7  |
| 4 Temporary marking                                             | 8  |
| Appendix A Diagrams showing temporary markings                  | 10 |
| Figure A.1 – Stoneblower machine                                | 10 |
| Figure A.2 – Photo of the working area                          | 11 |
| Figure A.3 – Transitions                                        | 11 |
| Figure A.4 – Lubricators                                        | 12 |
| Figure A.5 – Treadles                                           | 13 |
| Figure A.6 – Platforms                                          | 14 |
| Figure A.7 – Fixed points                                       | 15 |
| Figure A.8 – Crossings                                          | 16 |
| Figure A.9 – Cables                                             | 17 |
| Figure A.10 – Adjustment switches                               | 18 |
| Figure A.11 – Guard and Check rail                              | 19 |
| Figure A.12 – Temporary rail clamps                             | 20 |
| Figure A.13 – Warning of approaching obstruction                | 20 |
| Figure A.14 – Changes in sleeper type                           | 21 |
| Figure A.15 – Multi-Purpose Stoneblower                         | 22 |
| Figure A.16 – Photo of the working area                         | 23 |
| Figure A.17 – Toe                                               | 24 |
| Figure A.18 – Heel                                              | 25 |
| Figure A.19 – Nose                                              | 25 |
| Figure A.20 – Last long bearer                                  | 26 |
| Figure A.21 – Cables Fastened and sprayed                       | 27 |
| Figure A.22 – Stretcher bar and clamp lock                      | 28 |
| Figure A.23 – Marked end point                                  | 29 |
| Figure A.24 – Marked end point photo                            | 30 |
| Figure A.25 – Crossover                                         | 31 |
| Figure A.26 – Marking pattern for crossover                     | 31 |
| Figure A.27 – Diamond crossing                                  | 32 |
| Figure A.28 – LDC information                                   | 33 |
| Figure A.29 – Marking of Lining Design Control areas            | 34 |
| Figure A.30 – Example of marking of Lining Design Control areas | 34 |
| Figure A.31 – Three LDC areas                                   | 35 |

|                  |                |
|------------------|----------------|
| Ref:             | NR/L3/TRK/3242 |
| Issue:           | 1              |
| Date:            | 03/12/2011     |
| Compliance date: | 01/04/2012     |

## 1 Purpose

This standard is part of a pair of related standards, the other being NR/L3/TRK/3241, *Marking of track for tamping machines*, that specify correct and accurate track marking. Consistent track marking will:

- a) avoid confusion between the operators and Network Rail Technical Staff about the work required;
- b) reduce or remove damage to infrastructure ,preventing delays caused due to overrun as the damage is repaired. Sometimes such damage necessitates planning of further shifts which further reduce access for other works;
- c) provide intangible benefits of:
  - 1) increased engagement of the TQS on site;
  - 2) improved relationships and communication between NR and operators (external contractors) on site;
  - 3) greater “buy-in” to the pre-site preparation and design process.

## 2 Scope

This Network Rail standard specifies the process for the marking up of track on Network Rail’s infrastructure prior to the use of stoneblower machines.

This Network Rail standard applies to all permanent and temporary markings made to the track on Network Rail infrastructure.

## 3 Permanent marking

*NOTE Attention is drawn to NR/L2/TRK/2102, 11.3 and NR/L2/TRK/001/C01, 5.31.*

### 3.1

Cant shall be shown in millimetres. The numerals shall be parallel to the rail, marked on the high side of the bearer/sleeper and in the approved materials.

### 3.2

Where two level base plates exist (i.e. the CANT on adjacent roads on S&C is different), the employers’ representative on site shall notify the Lead operator prior to tamping and reach a clear understanding on the cant to be applied.

### 3.3

In transitions, the cant shall be shown in steps of 5 mm.

### 3.4

The length of all transition curves and the radii of all circular curves shall be shown in metres.

|                  |                |
|------------------|----------------|
| Ref:             | NR/L3/TRK/3242 |
| Issue:           | 1              |
| Date:            | 03/12/2011     |
| Compliance date: | 01/04/2012     |

The numerals and letters shall be parallel to the sleeper. Where the two dimensions appear on the same sleeper, the transition length shall be shown on the transition side of the sleeper, and the radius on the curve side.

### 3.5

At the bottom of a transition, the length of the transition together with the zero cant and an arrow indicating the direction of the zero canted track shall be shown.

### 3.6

At the top of transitions (and at each end of the transition between circular curves of similar flexure and different radii), the radius of the circular curve and the length of the transition shall be shown together with the full cant and an arrow indicating the direction of the fully canted track.

### 3.7

All numbers, letters and arrows shall be black on a yellow background (colour code 08E51) on the high rail side of all sleepers.

### 3.8

All markings shall be of such a size so as to be clearly legible from the cab of an on track machine in normal operating mode. The minimum height for CANT markings shall be 60 mm, and 43 mm for transition markings.

### 3.9

For markings painted on the sleeper, proprietary yellow and black paint together with stencils for the numerals, letters and arrows shall be used.

On creosoted timber sleepers:

- a) the markings shall be applied to marine plywood pieces, fixed to the sleepers; or
- b) purpose-made pre-printed black on yellow plates may be securely fixed to the sleepers or other approved products.

### 3.10

To enhance visibility of change of geometry, it is recommended that (as well as geometry plates) the top surface of the sleeper is painted yellow over the complete length at each end of a transition, excluding the rail fastening areas.

Copyright Network Rail  
Provided by IHS under license with Network Rail  
No reproduction or networking permitted without license from IHS

|                  |                |
|------------------|----------------|
| Ref:             | NR/L3/TRK/3242 |
| Issue:           | 1              |
| Date:            | 03/12/2011     |
| Compliance date: | 01/04/2012     |

### 3.11

On circular curves, the full cant and radius, together with a double-headed arrow, shall be shown at every quarter-mile post.

### 3.12

On reverse curve transitions, the zero cant at the bottom of each transition shall be shown on both sides of the sleeper.

### 3.13

*NOTE Permanent signs are required at each end of a site where prohibitions apply, e.g. ballast glued site or direct fastening structures. The restrictions will normally prohibit any On-Track Machine.*

### 3.14

Virtual transitions shall be marked with the two radii and Full Cant with double headed arrow and “VT”.

### 3.15

All curves and adjacent transitions where the design cant deficiency exceeds 150 mm shall be marked every 200 m and at each quarter milepost with a plate on the sleeper in the four-foot.

The plate shall be blue, with the words “High Cant Deficiency” or “HCD” (high cant deficiency) in white, as shown in Figure 1.

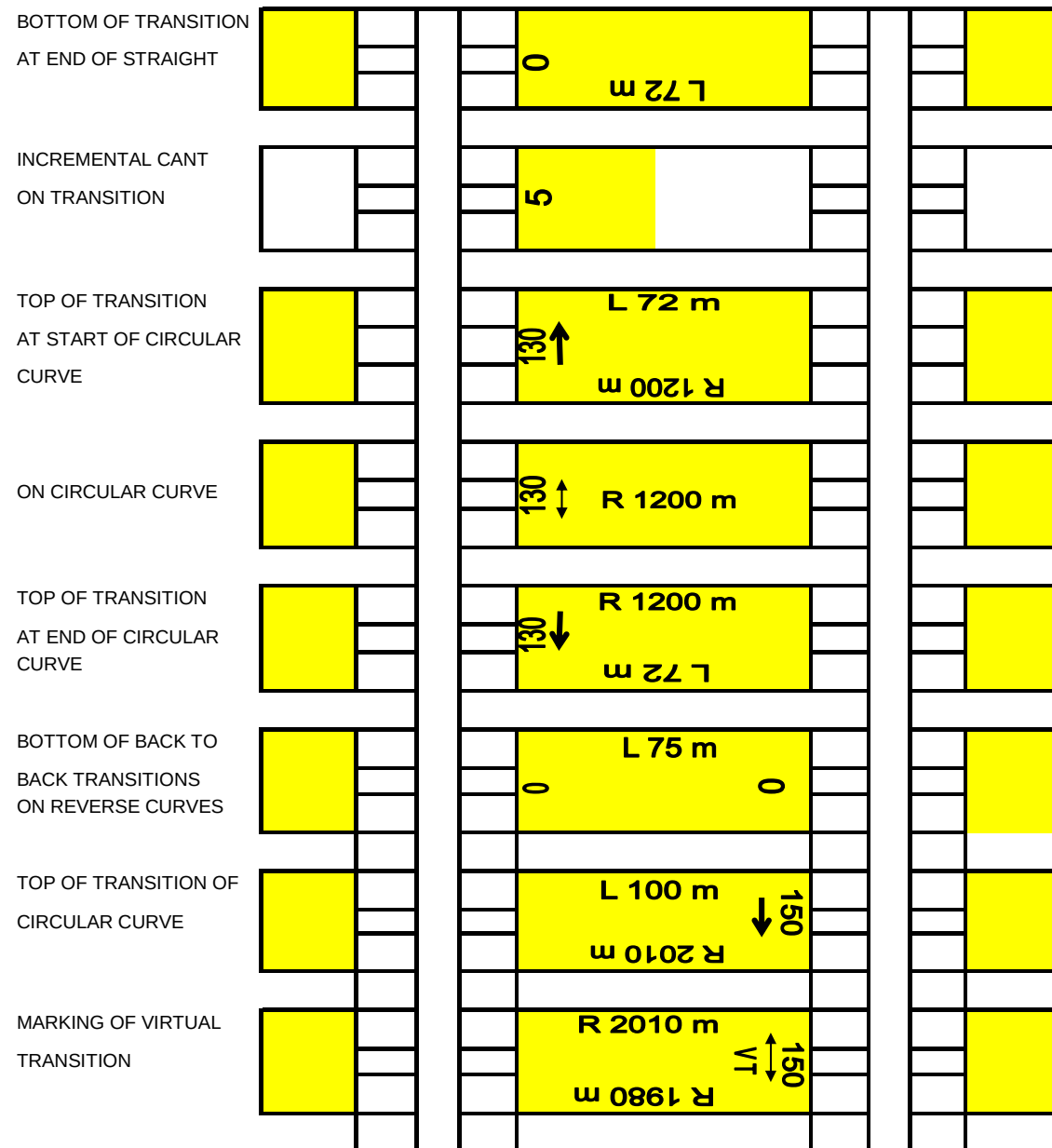


**Figure 1 – “High Cant Deficiency” plate**

|                  |                |
|------------------|----------------|
| Ref:             | NR/L3/TRK/3242 |
| Issue:           | 1              |
| Date:            | 03/12/2011     |
| Compliance date: | 01/04/2012     |

### 3.16

Permanent markings shall be made as shown in Figure 2.



Markings are to be in metric on the high rail side

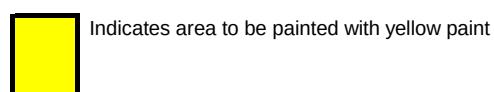


**Figure 2 – Permanent marking of track geometry**

|                  |                |
|------------------|----------------|
| Ref:             | NR/L3/TRK/3242 |
| Issue:           | 1              |
| Date:            | 03/12/2011     |
| Compliance date: | 01/04/2012     |

## 4 Temporary marking

### 4.1 General

#### 4.1.1

Marking obstructions shall be in accordance with the relevant part of Appendix A.

#### 4.1.2

All marks shall be made with either white or yellow chalk, crayon or spray paint.

*NOTE These colours show up better at night.*

#### 4.1.3

*NOTE Permanent way staff may spray paint an X on a sleeper to indicate a location or a sleeper that requires changing.*

To avoid confusion, sleepers that are not to be blown due to an obstruction, they shall be sprayed with "MISS", rather than with an X.

#### 4.1.4

Cables shall be gathered together, positioned to cross the track parallel to the sleepers and marked with spray paint.

*NOTE Cables present a serious risk to safety and performance if they are damaged by stoneblowing tubes.*

#### 4.1.5

*NOTE In OHLE areas, electrical bonds are identified by being coloured red or yellow (either with sleeving or paint).*

To avoid any confusion and potential risk, no spray paint shall be used on the areas of red bonds. The cable position shall be marked as a partial.

#### 4.1.6

All changes to rail section and sleeper/bearer type shall be marked. The depth to which Stoneblower tubes are inserted shall be adjusted for different sleeper depths. A change of sleeper type from wood to concrete, or concrete to shallow depth concrete (marked EFxx) should be noted "WOOD", "CONC" (for concrete) or "SHAL" (for shallow) as appropriate.

*NOTE Stoneblowers cannot be used on steel sleepers.*

|                  |                |
|------------------|----------------|
| Ref:             | NR/L3/TRK/3242 |
| Issue:           | 1              |
| Date:            | 03/12/2011     |
| Compliance date: | 01/04/2012     |

## 4.2 Stoneblowing sites – Marking for measurement and compensation

### 4.2.1 Zero-lift points (tied points/areas)

Markings shall be made as specified in Appendix A, Figures A.7 to A.9.

This shall apply at locations that cannot be stoneblown, e.g. bridges and level crossings.

### 4.2.2 Zero-slew points (tied point/areas)

For lengths of track where no slue is required, “LINE OFF” shall mark the beginning of the non-slue area and “LINE ON” marks the end of the non-slue area. Fixed slue markings shall be made as specified in Appendix A, Figure A.6. Where a zero slew is required, the fixed value will be marked “0”.

Copyright Network Rail

|                  |                |
|------------------|----------------|
| Ref:             | NR/L3/TRK/3242 |
| Issue:           | 1              |
| Date:            | 03/12/2011     |
| Compliance date: | 01/04/2012     |

## Appendix A

### Diagrams showing temporary markings

#### A.1 Temporary marking of obstructions for all stoneblower machines working on plain line

Figure A.1 shows a machine with 8 blowing tubes. Two sleepers are treated simultaneously during work, 4 tubes being used on each sleeper. The tubes are inserted into the ballast along side a sleeper and chippings are blown into the void created when the track is lifted.



**Figure A.1 – Stoneblower machine**

On this type of machine, the operator is facing the direction of work. From the operators position, the lifting hooks and clamps are in front of the sleeper being treated. Marking is required to warn the operator of approaching obstructions so that clamps can be lifted before the obstruction is reached.

Due to the restricted view from the operators cab, obstructions need to be marked clearly on the sleeper in the four-foot.

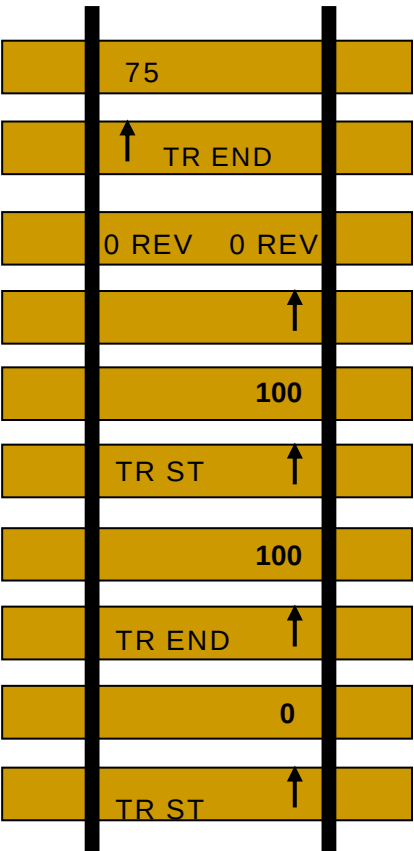
The working area is shown in Figure A.2.

|                  |                |
|------------------|----------------|
| Ref:             | NR/L3/TRK/3242 |
| Issue:           | 1              |
| Date:            | 03/12/2011     |
| Compliance date: | 01/04/2012     |



Figure A.2 – Photo of the working area

The requirements are shown in Figures A.3 to A.11.



- Mark start (TR ST) and end (TR END) of transitions plus maximum cant value.
- Intermediate cant values are not required by crew but will be required by TGS in order to check cross levels.
- Cant markings are to be made on the high rail side.

Figure A.3 – Transitions