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# Requirements for the operation of Dynamic Track Stabiliser on or Adjacent to Structures (formerly RT/CE/P/018)

**This temporary front sheet facilitates change to the new Network Rail Standards referencing nomenclature.**

**The Ref above will be formally allocated to this standard when it is next changed in the meantime the contents, date and issue number of this Network Rail Standard are **UNCHANGED** and with immediate effect it should be referred to as “(new ref) formerly (old ref)”.**

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## Information for users

The attached standard:

RT/CE/P/018

Issue 1

has essential supplementary information within the catalogue of supplements (RT/LS/CAT/007):

## Instructions for use

It is essential that you first read and understand the supplement pertaining to the standard before proceeding to the standard. You must then apply the requirements of the supplement to the standard.

**Proceed to supplement ►**

**I have read & understand the supplement.  
Proceed to standard ►**

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# RAILTRACK LINE

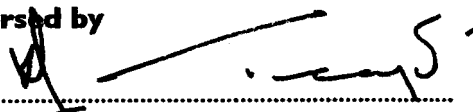
## PROCEDURE

### REQUIREMENTS FOR THE OPERATION OF THE DYNAMIC TRACK STABILISER ON OR ADJACENT TO STRUCTURES

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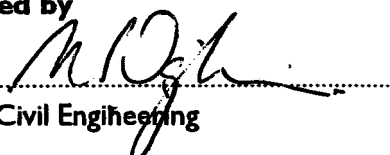
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### **Summary**

This Procedure defines the procedures to be followed to permit the use of the dynamic track stabiliser and the limitations on its use over or adjacent to structures to ensure the integrity of structures is safeguarded.

### **Issue record**

This Procedure will be updated when necessary by distribution of a complete replacement. Amendments from previous issues will be shown by a thick line in the right hand margin.

**Issue:** 1    **Date:** August 1997    **Comments:** New Procedure to replace former BR CE/WC-min 89/88 - 07/89

### **Responsibilities and distribution**

This Procedure is for the use of all persons responsible for the maintenance and renewal of Permanent Way over or adjacent to structures and the maintenance of structures.

### **Implementation**

The restrictions on the operation of the Dynamic Track Stabiliser shall be complied within two months of the issue of this Procedure.

The Dynamic Track Stabiliser register, including amendments to GEOGIS, and marking of Sections of lines over which the Dynamic Track Stabiliser is not permitted to operate shall be completed by 1 July 1998.

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**CONTENTS**

<b>Section</b>	<b>Description</b>	<b>Page</b>
1	Purpose	3
2	Scope	3
3	Definitions	3
4	Dynamic Track Stabiliser Operating Register	4
5	Categorisation of structures	4
6	Review prior to use of Dynamic Track Stabiliser	5
7	Restrictions on use of Dynamic Track Stabiliser	6
8	Certification of work by Dynamic Track Stabiliser	6
Appendix	Principles of operation of dynamic track stabiliser	7

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**I PURPOSE**

The purpose of this Procedure is to specify requirements for procedures to be in place to control the operation of the Dynamic Track Stabiliser and to specify the limitations on its use over or adjacent to structures such that the integrity of structures is maintained, whilst allowing the benefit of the use of the machines to be obtained.

Appendix A provides background information on the effects of the operation of the Dynamic Track Stabiliser on or adjacent to structures with recommendations for use in the application of the Procedure.

**2 SCOPE**

This Procedure applies to Permanent Way work anywhere on Railtrack's controlled infrastructure.

**3 DEFINITIONS****Dynamic Track Stabiliser (D.T.S.)**

A self propelled on-track machine for consolidating track ballast by inducing high frequency vibration into the ballast.

**Railtrack Director's Nominee (R.D.N.)**

The Civil Engineer having delegated responsibility for the maintenance of structures within the Zone.

**Permanent Way**

The structure of the track plus the ballast, any blanketing material (including geotextiles) and associated drainage.

**Structure**

A construction such as a bridge, (rail, road, foot or equestrian), viaduct, retaining wall, tunnel or similar, signal or electrification post or gantry, station construction such as a platform wall, track drainage manhole or cable pit, and any other construction on Railtrack's controlled infrastructure.

**REQUIREMENTS FOR THE OPERATION  
OF THE DYNAMIC TRACK STABILISER  
ON OR ADJACENT TO STRUCTURES**

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**4 DYNAMIC TRACK STABILISER OPERATING REGISTER**

A register of all lines for which the operation of the Dynamic Track Stabiliser (D.T.S.) has been considered shall be compiled and maintained on each Zone by the Railtrack Director's Nominee. The register shall be based on the Engineer's Line Reference and mileage, and for each line, the register shall list all structures along the route over or adjacent to which the D.T.S. shall not operate, and identify structures requiring a condition survey to be carried out before the D.T.S. is to be permitted to work.

Structures to be included in the register shall be as follows:

- structures categorised as category 2 or 3 in accordance with clauses 5,
- retaining walls, the toe of which is within 1 metre of the sleeper ends,
- cast iron bridges or viaducts,
- brick or masonry bridges or viaducts with major fractures,
- any other structure adjacent to the track which is within 1 metre of the sleeper ends,
- any other structures considered necessary to be included by the RDN in accordance with Appendix A.

The Zone Director shall ensure that the responsibility for the creation and maintenance of the D.T.S. operating register is clearly identified and recorded. The Zone Director shall also ensure that this responsibility is written into the safety responsibility statements of the RDN.

**5 CATEGORISATION OF STRUCTURES**

Based on the same principles used for categorisation into 'good', 'fair', or 'poor' following a detailed structures examination, structures shall be categorised as follows:

- Category 1     The condition of all key structural elements of the structure is such that the structural integrity of the structure will not be affected by operation of the Dynamic Track Stabiliser (D.T.S.) over or adjacent to the structure.
- Category 2     The condition of any key structural element of the structure is such that the structural integrity of the structure may be affected by the operation of the D.T.S. over or adjacent to the structure.
- Category 3     The condition of a key structural element of the structure is such that the structural integrity of the structure will be affected by the operation of the D.T.S. over or adjacent to the structure.

The Railtrack Director's Nominee (RDN) shall review the detailed structure examination reports and confirm the categorisation of each structure with respect to the operation of the D.T.S. taking into account the type of structure and defects present. Records to justify the decision shall be retained by the RDN.

The categorisation applicable to each structure in respect of the operation of the D.T.S. shall be recorded by the RDN in GEOGIS under 'Age of Road - Tampability' and 'Bridges and Structures - Special Conditions'.

The D.T.S. shall not be permitted to operate over or adjacent to a 'category 3' structure.

The D.T.S. may be permitted to operate without restriction over or adjacent to a 'category 1' structure.

The D.T.S. may be permitted to operate over or adjacent to a 'category 2' structure, provided that the structure over which the D.T.S. is to operate is examined by a competent person before the operation of the D.T.S. and that there is no significant deterioration in the condition of any of the structures from that recorded in the previous detailed structures examinations, or D.T.S. condition surveys.

Following operation of the D.T.S, a condition survey shall be carried out on 'category 2' structures by the same competent person who carried out the examination prior to the operation of the D.T.S. The condition survey shall be sufficient to identify any defects that would increase the risk to structural integrity in whole or part of the structure consequential of the operation of the D.T.S.

Where no adverse affect to the structure is found from the condition survey, a risk assessment shall be carried out to confirm if the structure's condition may be upgraded to 'category 1', and where the risk assessment confirms that the risk to structural integrity of the structure is satisfactory, the structure shall be deleted from D.T.S. operating register.

When an adverse effect to the structure is found from the condition survey, the structure shall be included in the D.T.S. operating register until such time as a detailed structure examination is carried out from which the RDN is able to confirm the structure is categorised as 'category 1'.

## **6 REVIEW PRIOR TO USE OF THE DYNAMIC TRACK STABILISER**

Before the Dynamic Track Stabiliser is permitted to operate on any section of a route, the condition of all structures on the section under consideration shall be reviewed by the Railtrack Director's Nominee (RDN), and the category of each structure confirmed. If necessary, the D.T.S. operating register shall be amended accordingly.

## **7 RESTRICTIONS ON USE OF DYNAMIC TRACK STABILISER**

The Dynamic Track Stabiliser shall not be operated:

- over or adjacent to structures whose condition has not been assessed in respect of the operation of the D.T.S, unless permitted by the Railtrack Director's Nominee,
- over or adjacent to structures listed in the D.T.S. operating register unless permitted by the Railtrack Director's Nominee, following the review of the condition of the structure.

In addition the D.T.S. shall not be:

- started or stopped within 20 metres of a structure,
- operated on either slab track, direct fastened track or track supported on longitudinal timbers.

Sections of lines over which the D.T.S. is not permitted to operate shall be marked on the track by each sleeper at the limits of the permitted operation being painted yellow with black lettering 'D.T.S. LIMIT' to be read on the approach from the section of line where the D.T.S. is permitted to operate.

Should the D.T.S. fail within the 20 metre zone of a structure, the D.T.S. shall not be permitted to recommence work until the RDN confirms that the categorisation of the structure is unchanged.

## **8 CERTIFICATION OF WORK BY DYNAMIC TRACK STABILISER**

So that Railtrack's track maintenance contractor may be satisfied that the necessary consolidation has taken place, details of all work carried out by the Dynamic Track Stabiliser shall be recorded and certified by the track renewal contractor and made available at Final Handback. In addition, the recording traces showing the track geometry after the final pass shall also be provided.



**APPENDIX****Principles of Operation of the Dynamic Track Stabiliser****A.1 PRINCIPLE OF OPERATION GENERALLY**

The Dynamic Track Stabiliser (D.T.S.) is a self propelled machine which is used to achieve track stability by consolidating the ballast by vibrating the track laterally at a nominal frequency of 40 Hz whilst applying a constant vertical load to the track through the rails. Settlement of the track which would otherwise occur with the passage of rail traffic is accelerated by passing the D.T.S. over the track.

The principle effect on structures from the operation of the dynamic track stabiliser is horizontal vibrations lateral to the track. Accelerations in excess of 5g have been recorded on bridge spandrel walls. The effect in the vertical direction is equivalent to no more than the effect of the heaviest rail traffic.

Ramping in or out of the work in which an increasing or decreasing vibration is applied must be carried out over a 20 metre length of consolidated undisturbed track.

**A.2 BRIDGES AND VIADUCTS**

The natural frequency of many bridges lies at the lower end of the range of vibrations produced by the Dynamic Track Stabiliser (D.T.S.). Consequently, on or adjacent to a bridge, the D.T.S. should operate only at a constant working frequency of 40 Hz.

Any ramping or operation below 25 Hz must not take place within 20 metres of a bridge, as the frequency range covered may cause the structure to resonate with consequential damage.

The occasional passage of a D.T.S. on a metal bridge is unlikely to appreciably reduce the fatigue life of the structure. For cast iron structures, however, the vibrations from a passing D.T.S. may cause propagation of cracks.

The use of the D.T.S. must therefore not be permitted on cast iron structures. Subject to the condition survey, the D.T.S. may, however, be operated without restriction on steel and wrought iron bridges.

On masonry bridges, the spandrel and spandrel/barrel interface could be adversely affected by the passage of a D.T.S. Major fractures such as a fracture of the brick arch along the line of the inner face of the spandrel wall, or signs of shear separation of the spandrel wall from the brick arch, are defects which must preclude the use of the dynamic track stabiliser until such defects are repaired.

The D.T.S. may be operated without restriction on the central tracks of a multi-track brick arch bridge.

For bridges with shallow foundations or with ballast depths less than the 250 mm, consideration should be given to not permitting the operation of the D.T.S. adjacent to or on such structures.

**REQUIREMENTS FOR THE OPERATION  
OF THE DYNAMIC TRACK STABILISER  
ON OR ADJACENT TO STRUCTURES**

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**A.3 TUNNELS**

In tunnels, vibrations from the operation of a D.T.S. may affect ground at voids behind the tunnel lining, the lining itself and the fill material in any blind shafts. This is particularly true where the tunnel wall is within 1 metre of the sleeper end or if the tunnel invert is poor or non-existent. A rock floor may be considered as a tunnel invert.

In tunnels in good condition, with ballast depth not less than 250 mm and a proven and substantial invert, the D.T.S. should be permitted to operate.

**A.4 WALLS, BUILDINGS AND OTHER STRUCTURES**

The same principles apply as for the operation of the Dynamic Track Stabiliser adjacent to bridges.

**Mandatory requirement**

## **RAILTRACK LINE PROCEDURE**

**Requirements for Operation of Dynamic Track Stabiliser on or  
Adjacent to Structures**

**MANDATORY UPON:**

<b>RAILTRACK</b>	<b>CONTRACTOR</b>	<b>LESSEE</b>
<b>X</b>		

**Although a Standard may be shown in this list as mandated upon contractors, it remains the responsibility of Railtrack to ensure that the contractor fully complies with the requirements imposed upon him by that specific Standard.**