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GM/GN2685

Guidance on Lifting, Jacking, Recovery and Emergency Movement of Rail Vehicles

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Rail Industry Guidance Note for GM/RT2100 Issue Four (Part 9)



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Guidance on Lifting, Jacking, Recovery and Emergency Movement of Rail Vehicles

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Superseded documents

This Railway Group Guidance Note does not supersede any other Railway Group documents.

Supply

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Part 1 Introduction

1.1 Purpose and structure of this document

This document gives guidance on interpreting the requirements of Railway Group Standard GM/RT2100 Part 9. It does not constitute a recommended method of meeting any set of mandatory requirements.

Relevant requirements in GM/RT2100 are reproduced in the sections that follow. Guidance is provided as a series of sequentially numbered clauses prefixed 'GN'.

Specific responsibilities and compliance requirements are laid down in the Railway Group Standard itself.

1.2 Copyright

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1.3 Approval and authorisation of this document

The content of this document was approved by:

Rolling Stock Standards Committee on 03 September 2010.

This document was authorised by RSSB on 06 October 2010.

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Part 2 Guidance on Lifting, Jacking, Recovery and Emergency Movement of Rail Vehicles

GN01 For emergency movement, adaptor couplers may be required. The requirements for these are set out in GM/RT2100 Part 8, in particular 8.4. See also GM/GN2689, in particular 2.6.

2.1 Design for safe lifting of rail vehicles

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Section 9.1 Design requirements for safe lifting of rail vehicles

9.1.1 General requirements

9.1.1.1 All rail vehicle body structures shall be designed with clearly identifiable jacking and lifting points or combined jacking and lifting points to enable maintenance and recovery to take place.

9.1.1.2 On bogie vehicles, it is permissible for lifting and jacking points to be provided additionally on the bogies, for recovery purposes.

GN02 During a rail vehicle's life a significant number of vehicle lifts will be required for maintenance and repair, whereas many vehicles will never require to be recovered after a derailment or collision. When designing the arrangements for lifting and jacking, the ease with which vehicles can be prepared and then lifted on a routine basis as well as for the purposes of re-railing and recovery should be considered. From a maintenance perspective the design should also carefully consider the implications for subsequent access to vehicle equipment.

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Section 9.1 Design requirements for safe lifting of rail vehicles

9.1.1 General requirements

9.1.1.3 The vehicle design shall allow for safe and efficient recovery in the event of a derailment, where the vehicle remains essentially upright, taking into account the effect of displacements from rail level to track bed of one or more wheelsets or bogies.

9.1.1.4 All jacking and lifting points or combined jacking and lifting points shall be clearly identified with symbols, as set out in Appendix J.

GN03 The risks associated with vehicle recovery should be assessed to identify potential hazards, measures available to mitigate the risks and quantities where appropriate. Each rail vehicle design should be assessed to identify potential risks to recovery staff, for example:

- a) Payload.
- b) Fuel.
- c) Oils (for engines, gearboxes and transmissions, hydraulic systems, transformers etc.).
- d) Compressed air.
- e) Electricity (batteries, stored electric charge).
- f) Effluent.
- g) Water.

GN04 The railway undertaking should update the recovery risk assessment as necessary when a vehicle is modified.

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- GN05 The jacking and lifting points or combined jacking and lifting points on vehicles, as well as the local adjacent structures, should be designed to take into account a wide range of reasonably foreseeable conditions for jacking and lifting when recovering a derailed vehicle. Recovery of vehicles which are only derailed but essentially upright should not require any equipment, bodyside packing or procedures other than for a straight lift. See GN33 for guidance on the symbols to be applied for the identification of jacking and lifting points.
- GN06 For recovery after severe collisions or accidents where vehicles may have rolled, overturned or have been significantly displaced or pitched vertically, recovery operations may place additional loads on a vehicle structure which are difficult to anticipate and which could result in significant permanent deformation or failure and therefore place recovery staff at risk.
- GN07 Limits for additional transverse, vertical and longitudinal forces should be determined for lifting and jacking points and related to weight transfer due to vehicle attitudes such as vehicle roll or pitch and appropriate guidance included in instructions for re-railing and recovery. It is recommended that a lifting and jacking point can withstand as proof loads at least a lateral load of $\pm 25\%$ of the nominal vertical force and a longitudinal load of 5% of the nominal vertical force. In addition, where other parts of a vehicle structure could see significant loads due to recovery, for example bodysides, limiting conditions should also be considered.
- GN08 Where lightweight or novel forms of construction are used in a vehicle's primary structure, the potential consequences of a safe and otherwise satisfactory recovery operation should be considered in terms of how the recovery might affect a vehicle's subsequent repair and return to traffic. In particular consideration should be given to any potential for localised crushing of thin walled extrusions which may be very difficult to return to a satisfactory condition.
- GN09 Where damage during recovery could be a significant issue, consideration should be given to the placement of additional emergency lifting points where suitable features (for example lugs or tapped holes for eyebolts) could be located without materially increasing weight or unduly increasing the complexity of the vehicle structure.

2.2 Lifting and jacking points

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Section 9.2 Lifting and jacking points

9.2.1 Design of lifting points

- 9.2.1.1 The locations of the lifting points shall enable the rail vehicle, or constituent part in the case of articulated vehicles, to remain level when fully suspended from one crane.
- 9.2.1.2 Lifting points shall be provided using either permanent built-in pockets for removable brackets or permanent built-in lifting points.
- 9.2.1.3 In the case of wagons only, it is permissible to manufacture specific areas on the vehicle to enable the use of endless polyester fibre round slings for lifting purposes.

- GN10 The majority of GB passenger rolling stock and locomotives are equipped with permanent built-in pockets to accept standard brackets which can be used for lifting or jacking operations. The ruling dimensions are set out in Appendices A and B of this document. For details of the standard brackets please refer to British Rail drawings PS-A1-2368 for the standard 17.5 tonne lifting / jacking bracket and PS-A0-3995 for the standard 35 tonne lifting / jacking bracket.
- GN11 It should always be ensured that only compatible lifting brackets are used for lifting and jacking operations. In particular the effective length of lifting brackets should never exceed