RAILTRACK
Safety & Standards

SAFETY JUSTIFICATION **ISSUE: ONE**

PART A - DOCUMENT INFORMATION

Document Title:	**Controlling the Operation of the Tilt Systems on Tilting Trains to Maintain Clearances**	
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PART B - EXECUTIVE SUMMARY

This Safety Justification describes the rationale behind the introduction of a new Railway Group Standard specifying the requirements for tilt authority and supervision, to ensure that clearances are maintained when tilting trains are operating in tilting mode. The Standard requires the deployment of a 'Tilt Enable and Supervision System' on routes which require the prohibition of tilt on one or more sections. The requirements for the system are specified at a relatively high level, providing latitude in the detailed design, whilst ensuring consistency at the interface between train operating companies and the infrastructure controller.

PART C - BACKGROUND

The need for new Controls

Tilting trains are to be introduced on Railtrack controlled infrastructure. The tilting systems give the potential for a higher speed of operation around curves than is possible with non-tilting trains, providing reduced journey times.

Tilting trains are subject to the explicit clearance requirements specified in Refs. 1 & 2, which are generic to all train types. On sections of route where the requirements cannot be satisfied for the whole route, it is necessary to ensure that the tilting trains are only able to tilt where the clearances will be maintained. The proposed controls ensure that the required clearances are achieved by requiring the deployment of a Tilt Enable and Supervision System. The purpose of the Tilt Enable and Supervision System is to provide a "tilt enable" authority where tilt operation is permitted and to supervise the operation of the Tilt Control System to ensure that the train does not tilt on the approach to and over Tilt Prohibited Sections.

Proposed Controls

The proposed controls are concerned principally with identifying the sections of route along which tilting is permitted/prohibited, and with specifying the general system requirements for ensuring that the tilt mechanism is only enabled where permitted. The controls fall into four main categories as summarised below.

Route analysis: Requires the identification of Tilt Prohibited Sections for each tilting train design and the locations where restrictions on trackside staff are required. The relevant Sectional Appendix is required to document the route sections along which tilting is permitted and prohibited respectively.

Infrastructure requirements: Specifies that the infrastructure component of the Tilt Enable and Supervision System shall be provided along the complete route where the route analysis identifies Tilt Prohibited Sections. The controls mandate a standard protocol for the information transmission between the infrastructure and train.

Train requirements: Specifies that train based components of the Tilt Enable and Supervision System shall be provided where the route analysis identifies Tilt Prohibited Sections. Additionally the Standard requires that safety related data associated with the operation of the Tilt Enable and Supervision System shall be recorded on the train to support post incident investigations.

System requirements: Specifies the general requirements of the Tilt Enable and Supervision System including the criteria for tilt enable authorisation and removal, the tilt supervisory requirements, the information presented to the driver and the ergonomics of the driver/system interface.

Part D – COSTS AND BENEFITS

Taken as a whole, the controls provide a comprehensive set of high level requirements for (a) identifying the situations in which a Tilt Enable and Supervision System will be required and (b) the provision of such a system, including the general infrastructure and train requirements, the operational requirements of the system itself, and the interface between the infrastructure, train and driver.

The detailed design and implementation of the Tilt Enable and Supervision System is not specified, enabling the development of the most effective application to be pursued through a collaboration between the operators of the tilting trains and the infrastructure controller. However, the degree of prescription is sufficient to ensure that the main functional requirements are comprehensively covered and that there is compatibility between the train based and infrastructure equipment.

A formal cost benefit assessment of particular designs is therefore not appropriate. However the mandated requirements for maintaining clearances are explicit and the requirement for a Tilt Enable and Supervision System is specified only where the route analysis identifies Tilt Prohibited Sections, and only where other measures to provide the required clearances are not possible. The Standard may therefore be viewed as mandating the minimum functional requirements for situations in which control of the tilt is clearly required.

Part E – CONCLUSIONS

Railway Group Standard GE/RT8019 specifies controls concerned with ensuring that clearances will be maintained with the introduction of tilting trains. A Tilt Enable and Supervision System is required to be deployed where route analysis identifies sections along which tilt prohibition is necessary to maintain the clearances. Where the route includes Tilt Prohibited Sections, the Standard mandates the functional requirements of the system, including the interfaces between the infrastructure, train and driver. The proposed measures are justified on the basis that they will ensure compliance with explicit clearance requirements, whilst enabling the most effective solution to be developed by those responsible for implementation.

Part F - REFERENCES

1. Infrastructure Requirements for Personal Safety in respect of Clearances and Access. Railway Group Standard GC/RT5203
2. Structure Gauging and Clearance. Railway Group Standard GC/RT5204