

1. INTRODUCTION

Readers' Guide: Chapter 1

This is a complex report, so we have provided a readers' guide to show the relationship between the different parts of the report, and highlight major conclusions. This guide takes the form of a series of boxes at the beginning of each chapter.

For an overview the reader is also referred to the Executive Summary on pages i to vi.

This initial chapter provides an introduction to the project described in the report, and a description of the roles of the team members, NERA, AEA Technology, and the Transport Research Laboratory.

To continue reading this guide, turn now to page 4.

This report presents the results of Phase 2 of a study into lorry track, environmental and other costs. This study has been co-ordinated by National Economic Research Associates (NERA), and has also involved AEA Technology Environment (whose team was led by Dr Paul Watkiss), the Transport Research Laboratory (whose team was led by Dr Vijay Ramdas), and Professor Alan McKinnon of the Department of Business Administration at Heriot-Watt University.

The Phase 1 study, in 1998, consisted of two separate, but closely co-ordinated projects led by NERA (dealing primarily with track costs) and by AEA Technology (dealing primarily with environmental costs).¹ One of the main results of these projects was the construction of an Excel model of the HGV fleet. In this model the HGV fleet is split into 33 different types of vehicle, classified by gross vehicle weight and axle configuration, and sixteen different vintages. This model allocated track costs by four types of road, while emissions covered were NO_x, PM_{10S}, and carbon dioxide. It was then possible to determine the average annual track and environmental costs that would be imposed by each of the (33x16) combinations of vehicle type and vintage identified in the model.

Following completion of the Phase 1 work in January 1999, DETR invited further work to develop the approach.

¹ The main outputs of the research were two reports: AEA Technology **Review of Environmental Damage of Lorries** (ESPC/20641001/R.02/Issue 2 AEAT 4266) December 1998; and NERA **Reviewing Methodologies for the Determination of Road Track Costs** January 1999. In addition, a separate NERA report dealt with goods vehicle operating costs: NERA **Goods Vehicle Operating Cost Model** December 1998.

TRL bring their highway and vehicle engineering skills to assess the methods used to estimate track costs and allocate them to different vehicles. In this project TRL have reviewed the impact of long-life pavements, and have also provided estimates of optimal long-run maintenance expenditures over the different parts of the English road network. They have also provided preliminary advice on the costs of bridges and the ways in which the costs of bridges should be allocated to particular vehicles. TRL have then considered a range of important issues affecting the extent to which HGVs contribute to road damage: the measurement of standard axles; the impact of road-friendly-suspension; the wear caused by wide single tyres; the impact of lifted axles; the effect of axle configuration, as experienced in other countries; the way in which allocation rules might be varied according to the type of road; and the implications of the use of PCU values in road track cost allocation.

AEA Technology have considerably expanded the model's coverage of environmental costs, extending the model to include not only NO_x, PM_{10s} and carbon dioxide, but also hydrocarbons (NMVOCs), carbon monoxide, benzene, butadiene, and sulphur dioxide. Monetary valuations are applied to these emission rates to identify health and non-health impacts. In addition the model includes estimates of noise costs associated with HGVs.

The Phase 1 model has been updated to incorporate 1998 data on vehicle registrations, vehicle kms, fuel consumption and operating costs, together with 1998 estimates of expenditure on the road network. More particularly, the model has been extended and converted into the Access database format. In addition, the model now also incorporates accident and congestion costs, though the user needs to exercise care in drawing conclusions from these numbers in regard to appropriate tax treatment.

Chapters 2 to 6 describe the development and results of the model. Chapter 7 presents a separate analysis of road haulage vehicle taxation in selected EU Member States. The detailed contents of the chapters are as follows.

- Chapter 2 provides an overall description of the main features of the HGV model.
- Chapter 3 presents TRL's work on long-life pavements, optimal maintenance, and the costs of bridges.
- Chapter 4 consists of TRL's analyses of relevant factors determining track cost allocation rules for HGVs.
- Chapter 5 describes the methods used by AEA Technology to measure and cost atmospheric emissions from goods vehicles, and the noise created by goods vehicles.
- Chapter 6 presents the results from running the model to estimate track, and environmental costs of HGVs in 1998. These results need to be interpreted in the light of the assumptions made to derive them.
- Chapter 7 reviews annual licence and other fees for goods vehicles in Belgium, Denmark, France, Germany, Ireland, the Netherlands and Sweden.

- Appendix A explains how we have estimated accident costs per vehicle km for HGVs on different types of road.
- Appendix B provides a brief review of issues related to congestion costs imposed by HGVs.
- Other appendices provide more detailed statistics on material in chapters 3, 5 and 7.