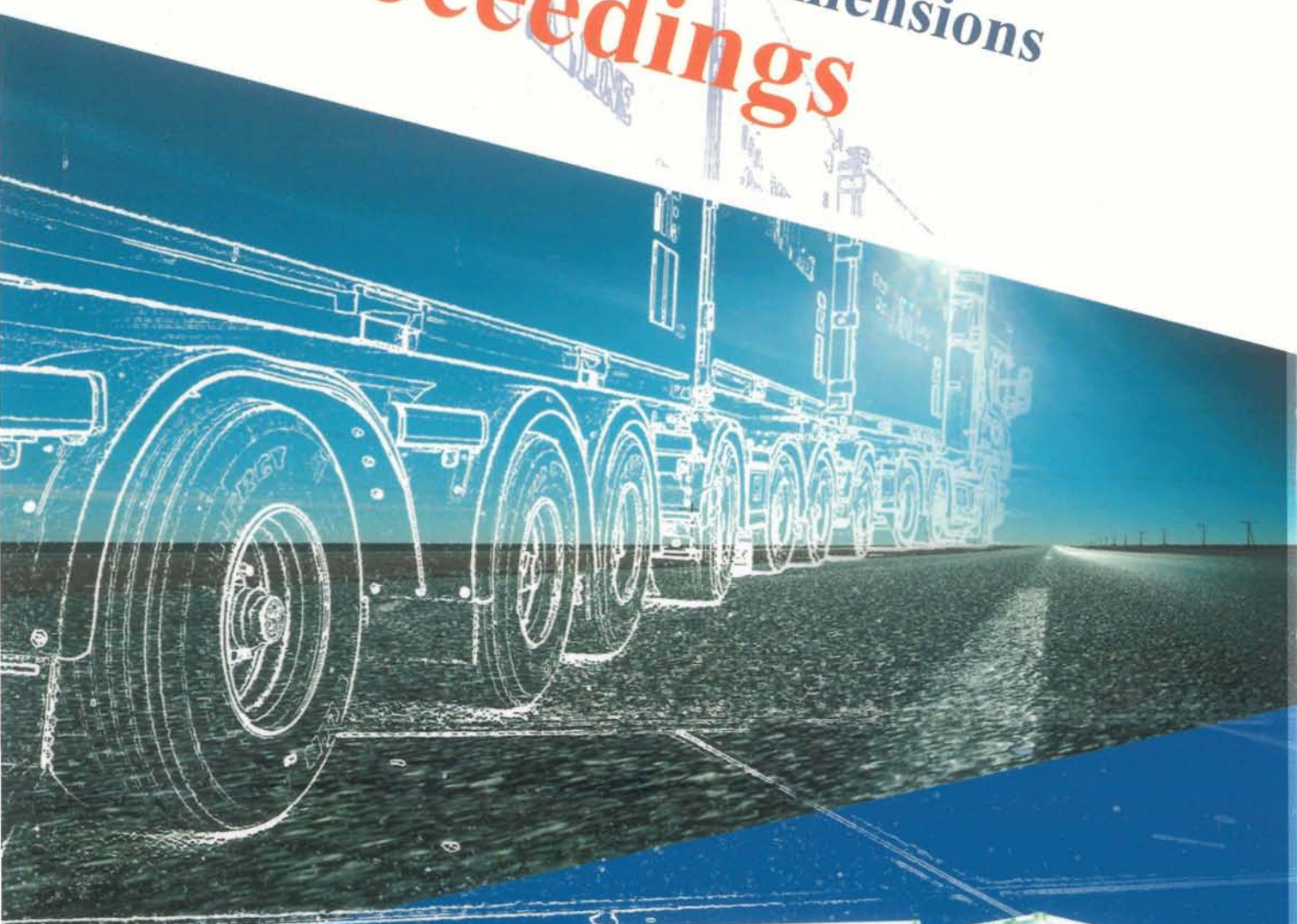


WOODROOPE



7th International Symposium
Heavy Vehicle Weights & Dimensions
proceedings



Challenges in the 21st century

June 16 – 20, 2002, Auditorium Technical University, Delft, The Netherlands

PROCEEDINGS

'7th International Symposium on Heavy Vehicle Weights and Dimensions'

Challenges in the 21st century

June 16 – 20, 2002

Auditorium Technical University, Delft, The Netherlands

The 7th International Symposium on Heavy Vehicle Weights and Dimensions is an intercontinental forum for researchers, policy makers and industry leaders in the field of freight transportation by road. The specific goal of this symposium is to bring together the worlds of vehicle technology, vehicle-infrastructure interaction, safety, regulations and policy and to listen and to discuss the challenge of economic, safe and environmental friendly transport in the 21st century.

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Preface I

Road freight transport by heavy vehicles.

In Europe 80% of the total freight transport is by road, 16% is by rail and 5% is over water. In The Netherlands these figures are considerably different: 55% is road freight, 41% is over water and 4% is by rail. Of course this is to be expected in a country with so many waterways. The need for transport of goods keeps growing as a consequence of the growing population, increased luxury, etc. The EU expects that this growth will be 29% from 2000 until 2010 and up to 42% in the year 2015.

The numbers of heavy vehicles and road freight transport movements are not the major part of the total traffic but their impact is considerably high. This applies both to the positive and to the negative aspects. Positive is the contribution to the economic development. This kind of transport is fast, efficient and almost every place is reachable. The dark side includes the effects on the environment (emissions and noise), safety and road damage through e.g. overloading. The accident risk of heavy vehicles is more or less equal to the accident risk of passenger cars and light trucks, but the consequences of the accidents involving heavy vehicles are considerably larger. The fatality risk of a heavy vehicle accident is three times higher than that of an accident involving passenger cars only. Also the damage to the infrastructure is an important issue. It can be observed in recent years that the attention from the government increases for the negative aspects of road freight transport.

The introduction of longer and heavier vehicles is currently under consideration. The acceptance of the use of these vehicles might improve the efficiency of the available roads, and is attractive from both the economic and logistic points of view. On the other hand the impacts on the environment, infrastructure and road safety have also to be considered.

Road freight transport is in fact a combination of three main sub-systems: the driver, the vehicle including its load, and the infrastructure. There is a lot of research going on to understand the driver's behaviour and to improve his/her driving performance. The heavy vehicle industry is very active in research and development on the necessary improvements and also pavement and bridge engineers spend quite some time to find solutions to improve the infrastructure.

Most of the problems associated with safety, economy and other mentioned aspects are affected by the characteristics of both infrastructure and vehicles and by the manner in which these interact. In spite of the complex interaction between infrastructure and vehicles, there has been rather limited interaction and flow of information between the infrastructure engineers and the vehicle engineers. Multi-disciplinary meetings like this '7th International Symposium on Heavy Vehicle Weights and Dimensions', where vehicle industry, transport organisations, politicians, consultants and research organisations meet, are an excellent opportunity to improve the whole road freight transport system. A variety of interesting papers on heavy vehicle performance and infrastructure interaction was produced and published in this book. May these papers be a source of information in meeting 'The challenge of the 21st Century for heavy vehicle transport' and may these papers inspire all parties to work closely together.

Ir. Gerrit. Tanis
Managing director of TNO Automotive

Preface II

The Netherlands is a low-lying country in the delta of three main European rivers: the Rhine, Meuse and Scheldt rivers. More than half of the country lies below sea-level. Fifteen percent of the surface area consists of water. Half of this water is fresh, inland water: rivers, lakes, pools, canals, brooks and marshes, bearing testimony to the fact that The Netherlands is dominated by water.

This country is also one of the world's most populated nations. The highest population density is located in the so-called 'Randstad' area, which includes the cities of Amsterdam (capital), The Hague, Rotterdam and Utrecht. It is situated in the western part of the country, in typical Dutch polder landscape (land claimed from water and below sea-level) along the coast of the North Sea. On average, there are 454 inhabitants per square kilometre in The Netherlands. This figure rises to some 900 inhabitants in the Randstad.

A dense population demands an extensive infrastructure. The total road network comprises over 125,000 kilometres, of which about 2,300 kilometres constitute the main motorway network operated by Rijkswaterstaat, one of the Directorates-General of the Ministry of Transport, Public Works and Water Management.

Rijkswaterstaat is responsible for development, maintenance, upgrade and reconstruction of the Dutch main road and water network as well as the defence of the country against river and sea floods. The Road and Hydraulic Engineering Institute (DWW) is one of the advisory institutes of the Rijkswaterstaat and covers the dry as well as the wet infrastructure and plays a leading role in development and implementation of new techniques, methods and systems.

To design and maintain the infrastructure, knowledge of the loading of the infrastructure and the corrosive effects on pavements of heavy traffic is required. Here is found the relation to heavy vehicle technology, especially in the vehicle-infrastructure interaction. DWW is involved in this subject, also on international level through national and European and even global projects (DIVINE, COST-323, COST-334, WAVE, TOP-TRIAL).

The series of symposia on Heavy Vehicle Weights and Dimensions that was initiated by the DIVINE project proves an excellent platform for exchanging and sharing knowledge in the field of vehicle-infrastructure interaction, and therefore DWW took the opportunity to organise the 7th International Symposium on Heavy Vehicle Weights and Dimensions. The more so, since our institute celebrates its 75 years anniversary in 2002.

Besides, it emphasises the role of our institute in supporting initiatives that improve the interaction between existing technology fields and underlines the importance of integrated solutions for the traffic and infrastructure problems that we are facing today.

The content of the symposium deals with both technical and policy issues as expressed in the working title:

'The challenges of the 21st century'. We are facing both technical and institutional challenges in the field of transport of goods. Globalisation as well as being part of the European Union underlines the importance of coordination and cooperation between researchers and policymakers on an international level. The proceedings and the opportunity given during the conference to discuss the various subjects are a small but important step forward towards joining together the efforts for solving the problems of the transport of goods by road and reaching for optimal solutions for economy and environment.

Ir. Luuk Bosch

Head of Infrastructure Department of the Road and Hydraulic Engineering Institute
Ministry of Transport, Public Works and Water Management

Preface III

On behalf of the International Forum for Road Transport Technology, we are indebted to TNO Automotive and The Road and Hydraulic Engineering Division of The Dutch Ministry of Transport, Public Works and Water Management for hosting our seventh international symposium. What better location than The Netherlands, with leading edge road transport and intermodal practices already in place?

The Forum has been fortunate to sponsor previous successful symposia in North America, Europe and Asia Pacific, fostering important research into heavy vehicle behaviours affecting infrastructure and safety. While many issues confront the road transport industry in all our countries – with important challenges of reducing traffic accidents, congestion and emissions and maintaining a skilled workforce – it is vital to focus on the role of technology in solving some of these problems.

Perusal of the program for our seventh symposium reveals that the research is now being put into practice. In this important stage of innovation in road transport and its regulation, it is even more critical for us to come together to exchange, monitor and inspire.

It is particularly pleasing to see that landmark international scientific collaborations on infrastructure effects will be presented at this symposium, along with new scientifically-based methods of truck regulation which are becoming dynamic and targeted rather than static and monolithic.

On behalf of the International Forum for Road Transport Technology Board, I welcome all members of the Forum and colleagues from around the world to this unique gathering generously supported by transport agencies and companies of The Netherlands.

Dr. Peter Sweatman
President
International Forum for Road Transport Technology

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This book could not have been published without the input of papers for the '7th International Symposium Heavy Vehicle Weights & Dimensions'. We would like to express our sincere appreciation to the authors and co-authors of the papers.

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We are also very grateful to the following organisations for sponsoring the symposium.

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National Road Transport Commission

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The European Vehicle Passive Safety Network

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