

CEDR Technical Report 2019-01



Development of an optimised multimodal freight transport system

**‘Call 2015: Freight and Logistics in a Multimodal Context’
End of Programme Report**

May 2019

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Call 2015: Freight and Logistics in a Multimodal Context End of programme report

CEDR Technical Report 2019-01 is an output from the CEDR Transnational Road Research Programme Call 2015: Freight and Logistics in a Multimodal Context. The research was funded by the CEDR members of Germany, Netherlands, Norway and Sweden. The programme was managed on behalf of CEDR by Transport Infrastructure Ireland.

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Additional sponsorship provided by MAN Trucks

FLUXNET: TEMAH, Netherlands; Arup, Netherlands; Universiteit van Amsterdam, Netherlands; University of Applied Sciences Wiesbaden Russelheim, Germany; University of Antwerp, Belgium; WSP, Spain.

ISBN: 979-10-93321-49-3

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1. Introduction

During the period 2016-2018 three research projects in the field of Freight and Logistics commissioned by the CEDR and financed by Norway, Sweden, Germany and Netherlands were carried out under a research programme entitled “Freight and Logistics in a multimodal context”. The programme was divided into three parts: the three projects commissioned were:

- Part A: *Understanding what influences modal choice*
by the FALCON consortium
- Part B: *Logistics-Oriented Development*
by the FLUXNET consortium
- Part C: *Performance-Based Standards for Transport*
by the FALCON consortium

In this CEDR Technical Report the main findings of the projects are briefly summarised and the outputs of the projects and overall conclusions of the research programme are presented. The report also summarises the main conclusions of the end-of-programme event that was held in Arnhem, Netherlands in December 2018: this includes proposed suggestions on a follow-up to this CEDR Call to ensure that the outputs of the projects are implemented by CEDR members.

In general, all participating countries (represented by the PEB) were very satisfied with the mutual spirit of cooperation that has existed throughout the commissioning and management of the research projects – not only between the CEDR members participating in the programme but also with the support provided by the Programme Manager and the CEDR Secretariat. The members of the Programme Executive Boards would like to acknowledge the assistance provided.

2. Understanding what influences modal choice

This part of the programme was carried out by the FALCON consortium.

An increasing efficiency of freight transport is necessary in order to achieve the ambitious emission targets set by the European Commissions for the transport sector. The promotion of multimodality plays an important role in achieving these targets. For National road Administrations (NRAs) to be able to influence modal choice, they need an improved understanding of the freight market. For this reason the FALCON Handbook “Understanding What Influences Modal Choice” was created: this is available for download from the CEDR website at https://www.cedr.eu/download/Publications/2017/CR-2017-7_Call-2015-Freight-and-Logistics-in-a-Multimodal-Context_Understanding-what-influences-modal-choice.pdf.

While the Handbook is directed mainly at national road administrations (NRAs), it can be used by any authority responsible for transport and infrastructure in Europe. The Handbook is intended to provide a solid understanding of the freight sector in order to promote a competitive transport system that reduced its negative external effects.

The Handbook starts with an analysis of the freight market and describes future developments in the logistics sector which have an influence on the transport system and the infrastructure. It describes more closely the trends that influence the volume and the structure of traffic, route choice, modal choice and change demand of infrastructure and other infrastructure requirements (i.e. carrying capacity). It shows that in order to conquer future challenges different technical solutions are in development or are already developed and used in some countries. But it also points out that in some cases for a larger scale implementation several requirements still have to be fulfilled.

The subsequent chapters of the Handbook shares insights in the decision-making in the freight sector and identifies the factors that influence the choice of transport solution - knowledge that is crucial in order to promote an efficient transport system. The Handbook furthermore describes how the environment also has a huge impact on the decision for a transport solution, that the availability and accessibility of freight terminals have a huge influence on the decision between unimodal road transports and multimodal transports. It also discusses how transshipment costs, costs for pre- and post-haulage and waiting time for truck drivers and trucks impact choices between transport chains.

Based on these findings Chapter 5 of the Handbook focuses on the data that transport authorities can access on a European and national level and identified the additional data that is needed. Chapter 6 describes transport models in different countries and how they are used to show the impact of trends and transport policies. The final chapter is a compilation of the lessons learned from the previous chapters and gives recommendations for stakeholders in the transport sectors regarding collaboration, digitalisation and data as well as new technologies and infrastructure.

Appendix C provides guidelines which can be implemented by NRAs in their operations. The guidelines are based on the previous findings and serve the following purposes:

- Monitoring the development of trends relevant for NRAs
- Identifying segments in which transport modes compete as well as the modal shift potential

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- Showing how to apply price elasticities to give a rough assessment of policy measures and trends
 - Providing NRAs with an example of how to assess the availability and concentration of freight terminals
 - Example of how NRAs can utilize data to identify road transport network inefficiencies
 - Linking the main components of transport models to the data source, which can be used as a template by NRAs.

In summary, the Handbook provides a very good overview of developments in the logistics sector and shows the interrelationships that have an influence on the decision for a transport solution. It offers a series of recommendations and guidelines on how to proactively influence transport efficiency and how to better take into account the impact of logistics trends in national transport planning.

3. Logistics-Oriented Development

This part of the programme was carried out by the FLUXNET consortium and focused on multimodality integrated with land use, freight and logistics.

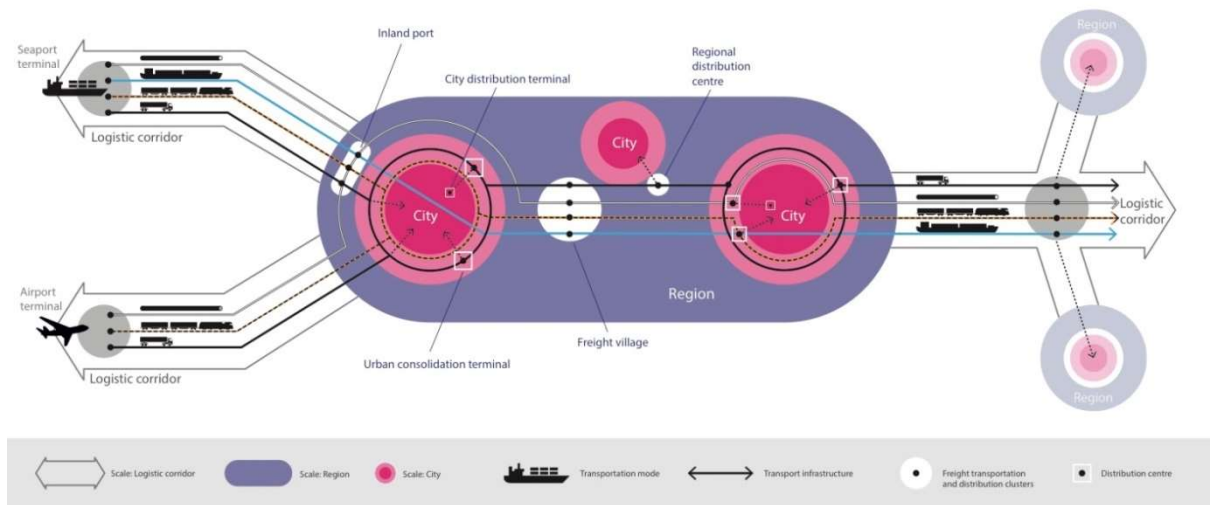
The foreseen growth of freight transport in Europe necessitates the optimisation of multimodal transport chains. To guarantee network performance and efficient investment strategies National Road Authorities (NRAs) will have to be empowered with tools to influence the modal choice by the freight and logistic sector. The traditional focus by NRAs on small scope infrastructure planning faces difficulties in meeting societal challenges and does not consider the drivers of the freight and logistic sector. In the FLUXNET research, a toolbox for NRAs has been developed based on a smart combination of tools for land use planning and infrastructure planning, taking into account the driving forces in the freight and logistic sector. The FLUXNET research puts practice-based research in the centre: an analysis of good practices has been used to construct a preliminary toolbox that was tested using several testbeds (greater urban regions) around Europe with regional infrastructure, logistics and planning experts: the testbeds consisted of the Cologne region, Norrköping, Milano and Rotterdam.

Road transport accounts for about 75% of goods transport on land today and this is projected to increase in the forthcoming decades. To align the resources of NRAs to cope with this growing demand, it is paramount that the efficiency of freight transport is increased. A part of the solution is the optimisation of multimodal transport chains, as this allows advantages of the different modes in different contexts to be used in the best ways possible.

The freight and logistics sector is strongly interwoven with the NRAs' networks. NRAs face fundamental challenges in the way their networks are being planned and operated. The traditional focus on car infrastructure and small-scope infrastructure planning faces difficulties meeting societal challenges such as globalisation, regional empowerment and a growing importance of sustainability, health and living quality. A shift towards an integrated planning approach for infrastructure and land-use planning is needed to meet these challenges and avoid inefficient investments. The integrated approach takes into account that the freight and logistic sector on the one hand and people transport on the other hand compete for the use of the same NRA networks. It also implies that attention is being paid to the fact that the freight and logistic sector acts on different scale levels: international, national, regional and local.

The FLUXNET research has resulted in a toolbox that will enable road administrations on a national level to improve multimodal use of their networks with respect to the freight and logistic sector. It is based on a smart combination of tools for land use planning and infrastructure planning, considering the driving forces in the freight and logistic sector. The research is practice-based and practice-focussed and is built on international practices. The international composition and quality of the consortium carrying out the research makes this possible. The toolbox will help NRAs to influence the multimodal choices.

The FLUXNET toolbox is available at <https://www.cedr.eu/strategic-plan-tasks/research/cedr-call-2015/call-2015-freight-logistics-multimodal-context/>.



The research was commissioned by CEDR. A research was funded and managed by the CEDR members from Germany, Netherlands, Norway and Sweden.

4. Performance-Based Standards for Transport

This part of the programme was carried out by the FALCON consortium.

The goals for this part of the research were:

- Define a concept of Smart Infrastructure Access Policy (SIAP) using principles of Performance-Based Standards (PBS), Intelligent Access Programmes and Digitalization
- Ensure a better fit between the road and the vehicles through vehicle performance and knowledge of vehicle impact on the infrastructure.

These goals were achieved as follows:

- In a table a proposed outline of the PBS was presented. The table contains the list of performance standards which were evaluated in the course of this study, the final recommendations for their inclusion/exclusion, and recommendations for how their pass/fail criteria should be reviewed for application to Europe.
 - For the road network they have outlined a generic approach to establish a match between the road characteristics and the vehicle combination through the safety assessment considering three aspects: representative vehicle states, critical infrastructure segments and varying operational conditions.
 - For the vehicles it is recommended that criteria for certain standards such as Startability, Gradeability A, and Low-speed sept path be reviewed on an individual jurisdiction level.
- It is proposed that a European PBS framework should adopt a set of supporting frameworks such as those that have been put in place in Australia and South Africa. These include systems that ensure adequate driver training, speed monitoring, vehicle maintenance, loading control and vehicle tracking like IAP (to ensure compliance with approved routes). Such systems are crucial for the long-term sustainability and impact of a PBS framework. However, Europe presents distinct differences in climate, geography, road infrastructure and existing vehicle designs to both Australia and South Africa. In this case, the PBS experience in Canada and Sweden will give additional insights with specific applicability to Europe. European-specific considerations also include a large emphasis on intermodality, existing conventional vehicles with notably smaller weights and dimensions and low friction conditions.
- These indicate that European PBS may be best implemented through a cross-border exemption system similar to EMS, or possibly could even be adopted as an upcoming revision and extension of the EMS scheme. Alternatively, or in addition, it may be incorporated as future amendments to Directive 96/53/EC, along the lines of Directive 2015/719.

The advantages of this SIAP and High Capacity Vehicles are:

- Improved road safety and societal benefits
- Contributes to reduction of CO₂ emissions up to 30%
- Minor impact on modal shift
- Traffic congestion may be reduced depending on penetration level
- Reduced wear of pavement
- Comparable load to bridges.

5. Synergies between the research projects

The main overall goal of the research project was to highlight and promote solutions for reducing CO₂ emissions in the transport sector by supporting multimodal solutions for freight transport. It was also intended to show how road transport, which has and will play a major role in freight traffic, can become more efficient. The results are intended to provide NRAs with tools to promote a more efficient use of their infrastructure in order to reach these goals.

At the final conference (held in Netherlands, December 2018), the conclusion was that the three components of the research programme complemented each other and could form part of an overall strategy that can be implemented by individual CEDR members. Part A provides a general overview on trends in the logistics sector and aspects regarding mode choices. The derived recommendations can be used as an inventory for NRAs in order to review their national freight transport models to determine whether they reflect the trends in the logistics sector sufficiently or if there is need for adaptation: the recommendations include the steps needed. Furthermore recommendations are provided on how to support multimodality choices proactively. Part B can be used to promote the understanding that supposedly small or local problems can have a larger sphere of influence and how a common solution-oriented approach can be pursued by identifying and bringing together all stakeholders.

Since the different sectors have different planning tools and different views on particular aspects of multimodality, they are often not aware of the impact that their own decisions and activities have on other stakeholders using the same space/infrastructure. This was one of the consistent findings of the workshops that were held at the four testbeds. Although part C focussed on road transport and seemed at first sight as a sole promoter for HCVs, it was made clear that a Smart Infrastructure Access Policy (SIAP) can make road transport more efficient and can identify the potential of multimodal solutions. By implementing a road classification system, SIAP could be used to identify the potential (on certain road segments) in the existing road network for more efficient utilisation. It could be used for actively influencing freight traffic on certain corridors by allowing certain types of vehicles. On road segments with a lower classification, the promotion of multimodal transport (shifting from road to rail for certain longer sections) could be discussed. This could be done with stakeholders on the basis of the Part B Toolbox and the outcome could possibly be integrated in future infrastructure planning as suggested in Part A.

All of the programme outputs are available on the CEDR website at <https://www.cedr.eu/strategic-plan-tasks/research/cedr-call-2015/call-2015-freight-logistics-multimodal-context/>.

6. Main outcome and proposed follow-up

The end-of-programme event was held in Arnhem, Netherlands on 12-13 December 2018 and was attended by approximately 30 delegates from various organisations throughout Europe. The main goal of this event was to disseminate the research results to a target audience of potential end-users, to present the main conclusions of the research and to demonstrate how the research outputs can be implemented by European NRAs. The event was also used to identify the benefits NRAs and any barriers to implementation.

In addition to the end-of-programme event, a number of other dissemination activities were also carried out within the programme. These included presentations and poster exhibitions at the TRA Conference in Vienna in 2018 (CEDR Exhibition Area, presentations, video, etc.) and the TEN-T-Days in 2018 were used as the events on which project results were shared with a relevant audience. The FLUXNET consortium also held a special morning session the Netherlands to present and discuss the results, and potential follow-up on the FLUXNET project.

The main additional suggestion for follow-up/dissemination on the research programme highlighted in the Arnhem event was to facilitate additional presentations on the research programme in different EU countries. It was emphasised that it would be more effective to focus on face-to-face presentations rather than simply making the research reports available. However, it was recognised that the possibilities to do so are limited for financial reasons.

Representatives from the European Manufacturers' Association (ACEA) suggested that a presentation on Performance Based Standards (Part C of the research programme) be made at a next AEROFLEX meeting: AEROFLEX is a project coordinated by the European Council for Automotive R&D (EUCAR) focusing on the development and demonstration of new technologies, concepts and architectures for road vehicles.

It was noted that a new CEDR programme on "Collaborative Planning", launched under CEDR Call 2017, is now in progress: this new programme is taking some of the recommendations from the FLUXNET research forward.

7. Conclusions

The overall conclusion of the research programme is that FALCON and FLUXNET have delivered satisfactory results from a content perspective and that the programme as whole has been run without any issues, and always in a good and pleasant atmosphere of cooperation. The Programme Executive Board, members of the FLUXNET and FALCON research consortia and the CEDR Secretariat held regular meetings which to ensure that the research was carried out in an efficient way and remained closely aligned with the needs of CEDR members. Overall, the Programme Executive Board were very happy with the management of the programme, the progress of the research and the quality and usefulness of the final research outputs.

In relation to dissemination of research results, while the programme has been publicised and results have been made available, the Programme Executive Board are keen to encourage further dissemination across all CEDR members.

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des Directeurs des Routes
Conference of European
Directors of Roads**

ISBN: 979-10-93321-49-3

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