Freight Transport Demand Management
A Contribution to Urban Traffic Management and Sustainability of Logistics

Manfred Boltze and Frederik Rühl, Chair of Transport Planning and Traffic Engineering
Hanno Friedrich, Junior Professor Commercial Traffic
WCTRS – SIG10 Workshop, Vienna, 14th-16th March 2012

Dynamo PLV – Dynamic and Seamless Integration of Production, Logistics, and Traffic

Interdisciplinary joint research project
- Technische Universität Darmstadt (nine chairs)
- European Business School (two chairs)

Funding
- German Federal State of Hessen

Project Goals
- Integrated optimisation of processes and measures in production, logistics, and traffic
- Developing policies, methods and tools which support such integrated decision-making processes towards
Rapid Growth in Road Freight Transport

Consequences are increasing capacity constraints and a growing awareness of environmental problems.

Public authorities respond with an increasing number of restrictions

General tendency:
Particularly the increasing public awareness of environmental problems leads to more and more restrictive measures for freight traffic.

Selected examples:
- Amendment of German Federal Immission Control Act due to European requirements
- Environmental zones
- Bans on trucks
- Speed limits

Database: BMVBS, Verkehr in Zahlen 2010/2011
Enterprises have a microspopic view on traffic and transport

It lacks of entrepreneurial awareness to regard own transport activities as a part of the overall system of traffic and transport.

- Traffic and transport are largely seen as an imperative of economy.
- Therefore, entrepreneurial transport decisions are usually made without consideration of the traffic condition.
- Only internal logistical parameters determine the transport optimisation.

It lacks in mutual understanding …

Decisions in production and logistics … are made without consideration of impacts on traffic and transport systems.

Decisions in traffic and transport, particularly about restrictions for road freight traffic,

… are made without a consideration of impacts on production and logistics.

… are mostly implemented as static measures although dynamic traffic management approaches could be applied.
Interrelations in the freight transport system are neglected

Despite the evident interrelationships between decisions in production, logistics, and traffic, their interdependencies are constantly not considered in the decision-making processes.

An `intelligent´ use of infrastructure is needed

- A continuation of the growth in road freight transport must be expected.
- But growth-adequate extension of traffic and transport infrastructure will not be possible due to public budget constraints and conflicts with environmental aims.

New ways for an `intelligent´ use of the existing infrastructure need to be found!
- Transport policy must consider entrepreneurial interests.
- Companies must question and modify their processes.
Traffic Management

Traffic management influences the supply of traffic and transport systems as well as the demand for travel and transport through a bundle of measures with the aim to optimize the positive and negative impacts of traffic and transport.

Avoid traffic

Shift traffic
- departure time
- modes
- destinations

Control traffic

Freight Transport Demand Management

Freight transport demand management (FTDM) as a part of traffic management aims at influencing the demand for freight transport. By implementing a bundle of measures, the impacts of freight transport on the overall system are sustainably optimised.
# Examples for Demand Management Measures

<table>
<thead>
<tr>
<th>Mobility Management</th>
<th>Freight Transport Demand Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Avoid Traffic</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Shift Traffic</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Destinations</strong></td>
<td></td>
</tr>
<tr>
<td>• Land use planning → decentralized concepts</td>
<td>• Location planning → clustering of enterprises</td>
</tr>
<tr>
<td>• Campaigns for „car-free days“</td>
<td>• Cargo transport centres</td>
</tr>
<tr>
<td>• Car-pooling agency</td>
<td>• Freight exchange agency, city logistic concepts, …</td>
</tr>
<tr>
<td>• Parking management</td>
<td>• promotions (e.g. for local products)</td>
</tr>
<tr>
<td>• Influencing choice of destination</td>
<td>• Adaptation of production processes?</td>
</tr>
<tr>
<td>• …</td>
<td>• Adaptation of supply chains?</td>
</tr>
</tbody>
</table>

- Campaigns for „car-free days“
- Cargo transport centres
- Freight exchange agency, city logistic concepts, …
- Location planning → clustering of enterprises
- Adaptation of production processes?
- Adaptation of supply chains?
- Adaptation of production processes?
- Adaptation of storage concepts?
- Promotions (e.g. for local products)
- Location planning → clustering of enterprises
- Peak pricing in public transport
- Introduction of defined delivery time slots or transition to flexible delivery time slots
- Ban on heavy vehicles (e.g. Sunday truck ban)
- Financial incentives? (e.g. road pricing in Stockholm)
- Adaptation of production processes?
- Adaptation of storage concepts?
- Parking management
- Influencing choice of destination
- …

---

15th March 2012 | WCTRS - SIG10-Workshop | Prof. Dr.-Ing. Manfred Boltze | Freight Transport Demand Management | Slide 11

15th March 2012 | WCTRS - SIG10-Workshop | Prof. Dr.-Ing. Manfred Boltze | Freight Transport Demand Management | Slide 12
### Examples for Demand Management Measures

<table>
<thead>
<tr>
<th>Mobility Management</th>
<th>Freight Transport Demand Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Modal Shift of Traffic</strong></td>
<td><strong>Priority routes for trucks</strong></td>
</tr>
<tr>
<td>• Public Transport Prioritization</td>
<td>• Truck bans</td>
</tr>
<tr>
<td>• Image campaigns for public transport, cycling, ...</td>
<td>• Speed limits (situation-responsive?)</td>
</tr>
<tr>
<td>• Job tickets, semester tickets, event combi tickets</td>
<td>• Information and routing systems (more specific services for heavy vehicles?)</td>
</tr>
<tr>
<td>• Reducing parking capacity, parking fees</td>
<td>• Road pricing differentiated by route and time? (e.g. truck pricing in Japan)</td>
</tr>
<tr>
<td>• Mobility consulting for new citizens</td>
<td>• Truck Prioritization? (situation-responsive?)</td>
</tr>
<tr>
<td>• …</td>
<td>• …</td>
</tr>
</tbody>
</table>

### Traffic Control (Route Choice, Driving Behaviour)

<table>
<thead>
<tr>
<th>Mobility Management</th>
<th>Freight Transport Demand Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Public Transport Prioritization</td>
<td>• Priority routes for trucks</td>
</tr>
<tr>
<td>• Pedestrian zones</td>
<td>• Truck bans</td>
</tr>
<tr>
<td>• Information and routing systems</td>
<td>• Speed limits (situation-responsive?)</td>
</tr>
<tr>
<td>• …</td>
<td>• Information and routing systems (more specific services for heavy vehicles?)</td>
</tr>
</tbody>
</table>

---

15th March 2012 | WCTRS - SIG10-Workshop | Prof. Dr.-Ing. Manfred Boltze | Freight Transport Demand Management | Slide 13

15th March 2012 | WCTRS - SIG10-Workshop | Prof. Dr.-Ing. Manfred Boltze | Freight Transport Demand Management | Slide 14
Needs for Action: Integrated Concept for FTDM

Many measures for freight transport demand management (FTDM) are in action already.

However, improvement of such measures and development of new measures seems to be promising.

Comprehensive concepts for FTDM are rare, which is clearly a gap in traffic management.

A promising approach to cope with the increasing challenges is an integrated concept of FTDM as a new and important part of traffic management.

15th March 2012 | WCTRS - SIG10-Workshop | Prof. Dr.-Ing. Manfred Boltze | Freight Transport Demand Management | Slide 15

Needs for Action: Institutionalisation

A FTDM institution promotes a mutual understanding and system-wide cooperation, needs institutional independence and owns decision-making power to optimise the total system.

- How to merge competences of different actors?
- Where may the new institution be settled to assure ex-officio decision-making but avoid any partisanship?

Suggestion: stepwise introduction:

- Round table for enterprises, transport authorities, police authorities, citizens’ initiatives, and others
- Freight transport demand manager

15th March 2012 | WCTRS - SIG10-Workshop | Prof. Dr.-Ing. Manfred Boltze | Freight Transport Demand Management | Slide 16
Needs for Action: Incentives for Enterprises

It can be assumed that especially material incentives may convince enterprises to contribute efficiently to a freight transport demand management (FTDM).

However, the use of immaterial incentives may support the success of FTDM.

- Which possibilities for material incentives within the freight transport system exist?
- Which immaterial incentives suit to motivate enterprises for FTDM?

Source: www.welt.de

Which possibilities for material incentives within the freight transport system exist?

Source: www.op-marburg.de

Needs for Action: Modelling of Impacts

Estimating costs and benefits of measures needs more knowledge on the impacts of decisions made in production, logistics, and traffic on the other areas.

Respective empirical studies must be conducted.

User-friendly instruments are needed for the decision support.

Linking existing models from different disciplines (production, logistics and transport).

- Which appropriate models for the linkage exist?
- How could new integrated models look like?

Source: www.welt.de
Conclusions

Various freight transport-related problems require a re-thinking of freight transport policy.

Many measures for freight transport demand management (FTDM) are in action already. Improvement of such measures and development of new measures seems to be promising.

A comprehensive concept for FTDM needs to be developed to fill the gap in traffic management.

Further research on FTDM has to focus on
- its institutionalisation,
- the identification of appropriate incentives for enterprises,
- the knowledge on and the modelling of measures’ impacts.

Freight Transport Demand Management

A Contribution to Urban Traffic Management and Sustainability of Logistics

Manfred Boltze and Frederik Rühl, Chair of Transport Planning and Traffic Engineering
Hanno Friedrich, Junior Professor Commercial Traffic

WCTRS – SIG10 Workshop, Vienna, 14th-16th March 2012