Solutions for Freight Transit Transport through Switzerland

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- Main Problems in Freight Transit Transport
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Key figures of Switzerland

- **7.41 Million inhabitants** (2004)

- **Surface: 40’000 km²**
  (175 Inh./km²)

- **3.1 Million persons employed** (2005)
  - 2.0 Mio Services
  - 0.9 Mio Industry
  - 0.2 Mio Agriculture

- **Gross National Product**
  - 445’931 Mio CHF
    (2004)
  (1 USD = 1.29 CHF)
Central location within Europe
Road and Railway Freight network and volumes

- **Road Freight**
  - **Network**
    - Motorways: 1'759 km (2003)
    - Highways: 18'088 km (2003)
    - Communal Roads: 51'446 km (2003)
  - **Volumes:**
    - approx. 370 Million tons per year

- **Railway and Intermodal Freight**
  - **Network:**
    - approx. 5'200 km
    - 6 Important shunting yards
    - approx. 590 public goods stations
    - approx. 2500 private sidings
    - approx. 18 intermodal terminals
  - **Volumes:**
    - Approx. 62 Million tons per year
Development of Transalpine Freight Transport
Volumes 1981 to 2004 (road and rail)

- Strong increase of road freight transport through the alps
- Still a high share of rail/intermodal freight
Key problems relating to Freight Transit Transport

• Increasing freight transit traffic on alpine crossings and increasing share of road freight transport

• Capacity problems on road network (also affecting accessibility and reliability of road freight transport)

• Limited capacity of the railway and intermodal network (incl. priority conflicts between freight and passenger transport)

• Safety problems in road freight transport (especially road tunnels)

• Increasing share of environmental burdens of road freight (e.g. NOx, particles, CO2-emissions, noise)
Political Framework Conditions

- General freight transport Objectives:
  - The single modes should be used to their comparative advantages and combined in a suitable way.
  - The (public) land transport relieve the roads from road freight transport.
  - The high share in rail freight should be kept.
  - Modal shift from road freight transport to rail and intermodal transport
  - Improving attractivity and capacity for alpine crossing rail freight transport (including intermodal transport).

- Alpine Crossing Specific Objectives
  - Limitation of road freight vehicles through the alps to 650'000 trucks until 2009 (2004: 1'255'000) (public voting)
  - Modal Shift to rail/intermodal transport
  - Improving safety on alpine crossings

- Changing framework conditions
  - 40 t limit for trucks (since 2005)
  - Distance related Heavy Vehicles Fee for trucks > 3.5 t (approx. 0.65 € / km)
Implemented Solutions relating to Freight Transit Transport

- Metering system for Heavy Vehicles using alpine crossings
- Intermodal Cross-Border Truck Information System
- Control and Enforcement of regulation relating to working and driving hours in road transport
- New railway tunnels through the alps (in realisation)
- Supporting measures for rail and intermodal transport
  - subsidies for intermodal transport through the alps
  - terminal financing
  - reimbursement of heavy vehicles for vehicles used in pre- and endhaulage
  - Co-funding for private sidings
Heavy Trucks Metering System on Alpine Crossings (Gotthard/San Bernardino) (1)

- **Objectives**
  - Minimisation of accidents risks in tunnels
  - Improving safety
  - Homogenisation of traffic flows

- **Concept**
  - Capacity Management with metering of heavy truck traffic at tunnel entrance
    - Minimum 60 trucks/h and direction (high car volumes)
    - Maximum 150 trucks/h per direction (low car volumes)
  - Parking areas for the waiting trucks (rough metering)
Heavy Trucks Metering System on Alpine Crossings (Gotthard/San Bernardino) (2)

- Priority for vehicles with loads from/to Ticino (marked with S)
- Phase Red: Ban to use the Gotthard/Bernardino tunnels if the daily capacity of the tunnel is overstepped

Infrastructure

- Using of emergency lanes at metering points at tunnel portals
- HGV Service Centers with waiting and departure areas (rough metering)
Effects and Experiences

- Positive effects on flows
- Shifts from other alpine crossings to Gotthard
- Safety could be improved
- Acceptable capacity for trucks
- System reacts still slow

Conclusion

- System works well in general
- System should be operated real time (with this the system efficiency could be improved)
Intermodal Cross-Border Truck Information System (1)

The Swiss Federal Roads Authority (FEDRO) has set up a dedicated information system for trucks in 2001 → www.truckinfo.ch

Focus on transalpine freight traffic

Background

- Traffic management measures need to be explained to the truck industry
- Dynamic information on traffic conditions had to be enhanced in order to limit the impacts of temporary closures (snow, accidents, etc.)
- The Swiss policy of shifting goods from road to rail needed and needs to be actively promoted
Main features of the service

- Real time traffic situation on road and rail
- Weather forecasts and related road conditions
- Explanation of permanent traffic management measures, intermodal supply, policy and legal background
- Intermodal routing (introduced in 2002)
### Further features
- Timetables for intermodal services
- General driving restrictions for heavy vehicles
- Recommendations regarding impact of German LKW-Maut at Swiss borders
- etc.

### Organisational aspects
- Public Private Partnership
- Part of FEDRO homepage
- Specific contractual arrangements for data and system supply
Intermodal Cross-Border Truck Information System (4)

■ Experiences
  ♦ Very positive
  ♦ Used by transport companies

■ Success factors
  ♦ Political support
  ♦ Co-operation between public and private parties (data, systems, services supply)
  ♦ High efficiency by combining public and private activities

■ Further developments
  ♦ Integration of dynamic routing function

■ www.truckinfo.ch
Solutions in Discussion: Slot Management / Reservation System for Heavy Goods Vehicles (1)

**Background**
- Management of road freight transport on motorways to reach a better use of capacity
- Support of metering system for trucks on alpine road crossings

**Basic Idea**
- Depending on the available capacity, a number of slots for trucks are defined (considering also safety)
- Transport companies can book a slot for alpine road crossing at no cost (on first come first served basis, voluntary)
- Trucks with valid reservation are privileged against trucks without reservation

<table>
<thead>
<tr>
<th>Pass</th>
<th>Tunnel Length</th>
<th>Altitude (m)</th>
<th>Number of lanes</th>
<th>Average daily HGV traffic (Oct/Nov 02)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gd. St. Bernard</td>
<td>5 km</td>
<td>1900 m</td>
<td>2x1 2x1</td>
<td>350</td>
</tr>
<tr>
<td>Simplon</td>
<td>---</td>
<td>2100 m</td>
<td>--- 2x1</td>
<td>270</td>
</tr>
<tr>
<td>St. Gotthard</td>
<td>16.9 km</td>
<td>1200 m</td>
<td>2x1 2x2</td>
<td>3’430</td>
</tr>
<tr>
<td>San Bernardino</td>
<td>6.6 km</td>
<td>1600 m</td>
<td>2x1 2x1</td>
<td>530</td>
</tr>
</tbody>
</table>
System description

- 120 to 300 trucks per hour depending on car traffic
- Slot duration 2 hours
- Registration by the transport company
- Reservation by Internet (connection to truckinfo)
- Security to be paid for the reservation and reimbursed afterwards (to avoid overbooking)
- Control of transit passes at HGV service centers

Roadside Infrastructure

- Metering Site at tunnels (metering system)
- HGV service centers with waiting and departure areas
Solutions in Discussion: Slot Management / Reservation System for Heavy Goods Vehicles (3)

- **Operation (low traffic)**
  - Free flow for all vehicles (departure metering is not in operation)
  - Slot management without importance

- **Operation (heavy traffic)**
  - Departure metering is in operation
  - Reservation systems regulate the priorities of truck departures in HGV centers
  - Vehicles without reservation are „Stand by“ → departure as soon capacity available

- **Events**
  - In case of accidents, natural phenomenons the reservation system can be switched off
Solutions in Discussion: Slot Management / Reservation System for Heavy Goods Vehicles (4)

- **Enforcement**
  - Easy solution
  - Transit passes are controlled in the HGV center

- **Organisation**
  - Development and operation can be done by authorities or transferred to private parties

- **Effects (based on traffic simulation)**
  - Reduction of waiting times for vehicles with reservation (during heavy traffic)
  - Improvement of capacity utilisation (breaking the demand peaks)

- **System is technical and operational feasible**

![Table](image)

![Table](image)
Solutions in Discussion: Slot Management / Reservation System for Heavy Goods Vehicles (5)

- **Benefits for authority**
  - More homogenous demand
  - Better use of capacity

- **Benefits for transport company**
  - Guaranteed slot
  - Minimal waiting times
  - Benefits depend on the possibility for planning the trip

- **Investment costs**
  - Software: approx. 1 Million CHF
  - Booking terminals: approx. 1-2 Million CHF
  - Infrastructure for HGV Service centers

- **Operation costs**
  - Approx. 0.5 to 1 million CHF per year

- **Conclusion**
  - With today's traffic volume benefits too low
  - Implementation suitable if the road transit traffic increases further
Solutions in Discussion: Alpine Crossing Exchange for Heavy Goods Vehicles

- **Basic idea**
  - Management of truck freight transport using economical instruments

- **Model 1: Cap-and-Trade**
  - Mandatory transit pass which is tradeable
  - Limitation to 650'000 passages per year
  - Reduction of the transalpine traffic, modal shift

- **Model 2: Slot management scheme with dynamic pricing**
  - Voluntary reservation for a specific slot
  - Dynamic price for according to the demand
  - Tradeable slot
  - Better use of road capacity, reduction of congestion

- **Results of research project**
  - both models are feasible
  - both models are effective and efficient relating to the objectives aimed at
  - Cape-and-Trade model only to be implemented in coordination with neighbouring countries
  - Slot management with dynamic pricing could be implemented by Switzerland alone

- **Conclusions**
  - Possible solution for the future, especially if freight transport increases
  - Political acceptance to be investigated
Conclusions

- Road freight transport management is needed to deal with increasing road freight transit

- The implemented measures show positive impacts (improving safety, improving capacity utilisation, modal shift)

- The measures are transferable to other situations/conditions with high share and increasing freight transit traffic

- A comprehensive freight transport strategy is needed (framework conditions, objectives, measures)

- Further innovative measures have to be implemented in the coming years to reach the policy objectives
Thank you for your attention!

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