Innovative technology for smart rail freight logistics

Intermodality leads to Sustainability
30 November 2015 Palais des Nations, Geneva
Presentation

1. Innovatrain Ltd
2. Transport Volumes
3. Megatrends
4. Combined Transport today
5. Switzerland
6. Some intermediate conclusions
7. Modern commuter transports
8. Swiss COOP Group
9. Implemented innovations
10. City Cargo Geneva
11. New developments
Innovatrain Ltd (AG)

I. Competence centre for intermodal train and transhipment concepts to help facilitate a shift from road to rail of time sensitive cargo on short routes.

II. Supplier of smart logistical solutions to facilitate the introduction of combined rail/road networks in highly populated urban regions.

✓ Founded: May 2010
✓ Where: Basel, Switzerland
As our focus is on highly populated urban regions, we know we have to cope with restrictions on:

1. available surface for transhipment and intermediate storage,
2. available time slots on rail and in urban locations,
3. sizes of local railway sidings and tracks.
Transport Statistics

Continental Cargo Transports in Europe:

There is a big volume, but what volume is transported over what distance?
Austria

**Austria Cargo 2012**

<table>
<thead>
<tr>
<th>Type of cargo-traffic</th>
<th>Mio tkms</th>
<th>%</th>
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<tbody>
<tr>
<td>National cargo traffic</td>
<td>14'100</td>
<td>53%</td>
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<tr>
<td>Import traffic</td>
<td>4'600</td>
<td>17%</td>
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<tr>
<td>Export traffic</td>
<td>4'800</td>
<td>18%</td>
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<td>Transit</td>
<td>1'900</td>
<td>7%</td>
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<tr>
<td>Other intern. traffic</td>
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<td>5%</td>
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<tr>
<td><strong>Total</strong></td>
<td>26'800</td>
<td>100%</td>
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**tkm = tons x km:**

- 2 tons over 1'000 km = 2'000 tkm
- 200 tons over 10 km = 2'000 tkm
## Holland cargo traffic 2011

<table>
<thead>
<tr>
<th>Type of cargo-traffic</th>
<th>road</th>
<th>rail</th>
<th>Total Ktons</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>National cargo traffic</td>
<td>492'700</td>
<td>5'550</td>
<td>498'250</td>
<td>76%</td>
</tr>
<tr>
<td>International traffic</td>
<td>124'724</td>
<td>31'779</td>
<td>156'503</td>
<td>24%</td>
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<tr>
<td>Total</td>
<td>617'424</td>
<td>37'329</td>
<td>654'753</td>
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*source: CBS*

### Inland shipping

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Traffic jam on the A13
83% of the total road transports in Germany, performed by german-owned trucks is inland transport.
72% of all transports in Germany is done by road. Interesting is the fact that these transports on German roads only had an average German distance of 138 km.
The largest share of the road transports in Germany consists of daily consumer products.
National Swiss Cargo Volume

In Switzerland 2/3 of the total transported cargo-volume is national transported cargo (19’543 mio tonkm*). From this national transported cargo;

74% is transported on the road

26% is transported by rail

(*transit /imp-export= 11’446 mio tonkm: 40% by road / 60% by rail)
Megatrend Urbanisation

Figure 2.
Urban and rural population of the world, 1950–2050

A majority of the world’s population lives in urban areas

Quelle: UN Department of Economic and Social Affairs
Urbanization has occurred in all major areas, yet Africa and Asia remain mostly rural.
Figure 8.
Global urban population growth is propelled by the growth of cities of all sizes

source: UN Department of Economic and Social Affairs,
todays Combined Transport road/rail
todays Combined Transport road/rail
Combined Transport road/rail versus direct road

Road transport A to B:

A → B

Transport chain combined transport A to B:

A → [Image] → [Image] → [Image] → B

(5 Players)
Costs: The basic comparison: road versus rail

A 40’container per road or per intermodal-transport?

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<tr>
<th>km</th>
<th>pre haul</th>
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<table>
<thead>
<tr>
<th>km</th>
<th>road</th>
<th>comb. traffic</th>
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<tr>
<td>100</td>
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Costs pro 40’ Container

- **road**
- **comb. traffic**
Dogma on Combined Transport

„Combined Transport Road/Rail only makes sense on distances over 500km“

This assumption stems from the 1970-ties, when combined transports with sea-containers and trailers (Huckepack) started.

From this moment on, this assumption has been in the heads of many (EU)-politicians.

The question is: Is this assumption still valid?
Main transport routes in Switzerland (national traffic)
**Description of a problem**

**daily traffic jams:**
- North – South: A2 Basel- Gotthard Highway Tunnel-Chiasso

**At the same time, the Industry needs reliable logistics ...**
- Wholesalers: COOP / Migros / Lidl / Aldi / Spar
- Food suppliers: Heineken / Feldschlössen / Nestlé / Coca Cola
- Postal Services (Swiss Post): 400’000 parcels per day

**... and high quality transports:**
- Within 2 – 6 hours
- Fixed distribution patterns
- Temperature controlled
## Trying to solve the problem

- **on short distances, costs of rail transport are not really the problem**

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<th>% other costs</th>
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- **on short distances, the “other costs” are the problem,**
- **so we have to look at pre-haul, shunting and transhipments**
5 ascertainments

1. The combined transport road/rail has developed well in Europe on long distances and from ports. The typical appearance is „mass production“: big Terminals, heavy trains on long distances (ship on wheels)

2. This “mass production” works well where transport volumes are big (see ports and big industries) and big areas for big terminals are available.

3. Volumes on short distances, especially in urbanised areas are very big (supermarket and shop distribution)

4. Traffic jams in the urbanised areas are getting worse by the day, also adding to the environmental problems

5. In highly urbanised areas, there isn’t much room for big container terminals
Every day, in highly populated areas around the world, well organized passenger commuter train systems bring hundreds of thousands of people punctually to their work places in an ecologically sound and safe way.

- No transhipment costs
- Very low costs of the last mile (by foot, tram bike)
- No costs calculated ...
It must be possible to deliver goods by cargo train into these same urban areas, with the same efficiency and effectiveness, over the same short distances.

But how can this be done?
A first attempt: what again was the problem?

✓ on short distances, costs of rail transport are not really the problem

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✓ on short distances, the “other costs” are the problem,

✓ so we have to look at **pre-haul**, **shunting** and **transhipments**
Transhipment and last mile

- How can we lower the cost of the last mile?
  - to lower the trucking cost per km is a mission impossible, but
  - you can try to lower the trucking distance

- How can we simplify the transhipment of containers, making it smaller, smarter, faster, and cheaper?
COOP is the largest retail and wholesale company in Switzerland (2013: 28 bld CHF turnover, 1'933 sales points)

In 2008 COOP decided on their strategy to become a CO₂ neutral company latest per 2023 (reduction of 50% on the 2008 CO₂ level which can be affected by COOP)

As transports to regional distribution centres are already done by rail, good potential for an additional shift to rail was to be found with the transports to the final shops.

However, as the final points of sale lacked appropriate railway sidings, solutions using combined transport rail-road had to be found.

COOP had had some first experience with a new service from a small private company railCare.

Mayor Player : CH-retail-company: coop-group
The pioneer developments of railCare, who used an earlier form of direct horizontal transhipment of containers instead of cranes or reach stackers. This was the key to the transfer of the final shop-distribution to the rail.

As railCare was using an old system for the horizontal transfer, for which you needed specially designed swap bodies. They asked the Innovatrain if we could find a solution to horizontally transfer standard swap bodies and standard ISO-containers between truck and railway wagon.

2010 COOP bought railCare ltd in order to be able to implement the new logistical strategy. This was the start of a very fruitful cooperation between railCare and Innovatrain for the development, testing and improvement of a new technique.
Our first innovations

Solution 1: horizontal transfer system by the truck itself:

The development of a simple, but robust horizontal transfer system for swap bodies and 20 foot containers which has low costs also at low volumes.

Container Mover 3000 for standard 20' container and standard swap bodies
ContainerMover-3000®
Our first innovations

The **ContainerMover-3000®**;

- Is compatible with standard 20 foot containers and swap bodies (C715, C745, C782)
- can be used at all locations and can be easily transferred between locations
- no costly infrastructure, just a simple railway siding and an asphalted road surface
- compatible with normal standard container wagons
- easy to control by the truck driver himself, using a remote control
- can be used for a wide range of containers and therefore products, e.g. fresh consumer products, frozen and deep-frozen products, bulk & liquid products, industrial products, timber

As the recently introduced trains in Switzerland show, real solutions for City-Logistics and wholesale distribution logistics, without the use of expensive container terminals, are now within practical reach.

**Instead of € 30.- , a container-move now costs less than € 15.-**
Our first innovations

Small and narrow infrastructure in urban regions

The containermover is able to perform on narrow infrastructures. In most cases, the available local industrial railway sidings are already sufficient.

On the other hand, the local operation and shunting of the train can be time consuming and costly, due to the fact that you need to change the loco and operate with 2 persons.
First customers of Innovatrain
The logistical network of railCare in Switzerland

railCare products

InterRegioCargo trains
Daily connections between commercial centres according to timetable, e.g. Zurich North – Lausanne

CityCargo trains
Several connections to a town/city per day over short rail distances, e.g. Aclens – Geneva 3x daily
Example: City Cargo Geneva

Aclens (Lausanne) <-> Geneva: 69 Km
- 3 fast shuttle trains per day
- capacity: 90 containers per day
City Cargo Geneva
New developments: ContainerMover

- Horizontal transfer for 20 – 45 foot containers and 13.60m SB

Ready in the spring of 2016
New developments: ContainerStation 3000

EU swap bodies:
Putting a swap body on its legs in the old way:

The new way:
With the ContainerStation:
New developments: ContainerStation 3000
New developments: ContainerStation 3000

What is the idea:

For our mayor client COOP, its just a matter of time. With the Container Station, the loading up of a swap body on a HGV just takes 3 minutes. Taking up two swap bodies by at the same moment is done in 5 minutes.

**ISO Containers** don’t have any legs, and can also be heavy (32 tons). When the container is on the truck, you are dependent on a crane or reach stacker to get it off. At the delivery point (loading-bay), the container blocks the HGV or the trailer. It needs to stay there until the container is (un)loaded.
First efforts for the ISO Containers 2014:
New developments: ContainerStation 3000

requirements to the Container Station:

✓ Accessible for any truck with normal pneumatic suspension (adjustable)
✓ High stability up to 35 tonnes container weight
✓ Easy positioning of the container due to horizontally and vertically adjustable support heads on the supporting legs
✓ Special designed guiderails which are gentile to the truck tyres
✓ Very robust construction
✓ Affordable
ContainerStation 3000

➢ Newest Prototype for Container Station 3020/3040:  
   ❘ 20 or 40/45 Foot  35 tons capacity
ContainerStation 3000

The ContainerStation 3020/3040 will be available in the beginning of 2016
Thank you very much

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