Rubber tyred Tram: another solution to urban mobility?

Bombardier TVR
City of Nancy

TransLohr
City of Clermont-Ferrand

Plzen, April 6th, 2011

By Hervé MAZZONI
Deputy Director Transport System Department
Systra S.A. – world leader in urban and railway transport engineering

Our teams support our Clients in all project phases:

✓ Advice and Expertise
✓ Civil engineering and project services
✓ Organisation, planning and coordination of all Client’s projects
✓ Training, support in maintenance and operation

Trams, tram-train, Automatic Guided Transit, Bus Rapid Transit, metro, High Speed Railway, Conventional Railway
Rubber tyred Tram solution
Clermont-Ferrand case (France)

In 2001 the Union of Public Transport of Clermont-Ferrand (SMTC) appointed SYSTRA to provide assistance to the owner in:

✓ drafting tender documents and bid analysis
✓ preparing specifications for the selection of project manager
✓ the definition, supervision and inspection of contracts, and drawing up applications for authorisation (DUP planning consent, licence application and grant application documents)

SYSTRA also had a general organizational role, providing technical advice, particularly with regard to the implementation of safety procedures.
Rubber tyred Tram solution
Clermont-Ferrand case (France)

- 31 stations
- Operates from 5:00 am to 1:00 am
- 45 minutes between terminal stations
- Road intersection priority

Bonuses:
- 9 km of additional bicycle lanes
- 6 Park & Ride (P+R)
- Several intermodal exchanges poles
Rubber tyred Tram solution
Clermont-Ferrand case (France)

TransLohr vehicles:

- Length: 32 m
- Weight (empty/full): 25t / 32t
- 4-segment vehicle
- $1.08 \text{m/s}^2$
- Width: 2,20 m
- Height: 2,95 m
- Bidirectionnal
- Integral low floor: height 25 cm above ToR
- Electric propulsion
- Capacity: 170 p @ 4p/m$^2$; 225 p @ 6p/m$^2$
Rubber tyred Tram solution
Clermont-Ferrand case (France)

A single rail for guidance
- The rollers grip the rail
- The rail is drowned in resin: reducing vibration and squealing
- The rollers are covered with a composite binding: no contact iron onto iron but significant worn-out rate
- Continuous guidance including in maintenance center
Rubber tyred Tram solution
Clermont-Ferrand case (France)

- Possibility of using prefabricated concrete plinths
- Need for preventing from rutting
- Running surface to be renewed every 10 years
- Possibility of partial grass covering or concrete covering – allowing bus and cars running (not specific to TransLohr)
Rubber tyred Tram solution
Clermont-Ferrand case (France)

The Translohr:
• accepts a very short rail turning radius (10.5m)
• needs less ground surface
  (5.41 m instead of 6.50 m) but very narrow carbody
• can theoretically run on slopes up to 13% (8% tested) while steel wheel tramways can accept up to 9 to 10% slopes
• requires less space for depots than a conventional tram but for narrower vehicles
• requires a hard running surface (rutting effect)
Rubber tyred Tram solution
Clermont-Ferrand case (France)

- This transport system is not compatible with conventional tramways
- Proprietary system
- Cost per passenger is about 12k€ while conventional tramways range from 8k€ to 10k€ / passenger
- Narrow vehicles while the trend in Germany is to widen existing infrastructure to accommodate for wider vehicles
- Comfort
- Safety (sensitivity to derailment)
- Maintenance costs
- Adherence on snow and ice
Rubber tyred Tram solution
Clermont-Ferrand case (France)
Total cost of the project: M€ 290 (Euros 2002), being M€ 20.7/km but other sources say M€ 378, being M€ 27/km.

Funding
Three banking conventions with the European Investment Bank (30 million Euros),
The Bank of the deposits and consignments (32 million Euros)
a banking pool composed by
- Dexia Crédit Local,
- The Crédit Agricole Centre France
- and the Caisse d’Epargne d’Auvergne et du Limousin (140 to 200 million Euros).

Subsidies
20 million Euros from FEDER (Regional European Development Funds).
a financial assistance on work of infrastructures, the studies and the rolling stock
6 + 12 million Euros of the State (instead of the 64 million Euros considered),
15 million Euros for each local authority: The regional Council, the General Council and Clermont Community.
<table>
<thead>
<tr>
<th>Authority</th>
<th>City size (thousands inhab)</th>
<th>Length (km)</th>
<th>Nbr. of stations</th>
<th>Nbr. of vehicles</th>
<th>Global cost M€ Taxes excluded 2008</th>
<th>Cost/ km M€ Taxes excluded/km</th>
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### Cost of French Tram projects
(conditions @ 1/1 2008)

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<th>Authority</th>
<th>City size (thousand inhab)</th>
<th>Length (km)</th>
<th>Global cost (M€ Tax excluded)</th>
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Source: GART - Données au 18.12.2006
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THANK YOU FOR YOUR ATTENTION