Cableways as urban transport systems

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plan

- french context

- the advantages as urban transport mode

- some constraints

- main results and discussions points
Technology and developments of aerial cable systems well known because of major constructors in Europe

Doppelmayr – Garaventa:
- head office in Switzerland and Austria

Pomagalski – Leitner:
- head office in Italy and France
French context

A law voted in 2009 (Grenelle Law):

- Identifies cable ways as systems which have to be promoted
- Because they can provide an effective service in the field of urban transport
- And so be part of tools to reduce greenhouse gas emissions
A lot of projects of cable cars, aerial or not, in France

Projets et réflexions intégrant les transports par câble téléportés
A global analysis in 2010/2011 conducted by the French ministry of sustainable development and:

- CERTU – Centre for studies on urban planning, transportation and public facilities

- STRMTG, in charge of safety for ropeways and guided transport systems
Advantages as urban transport mode

Cross over rivers, mountains, wide roads, railways..
Advantages as urban transport mode

**Capacity** depends on:

- Speed of the cable
- Number and capacity of the vehicles
- Way to get in and out vehicles
Advantages as urban transport mode

Capacity is similar to tramway's

Hyp : 4 passengers/m² and frequency of 3min.

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Advantages as urban transport mode

The level of service:
A frequency between a few seconds and several minutes

Excellent regularity because of the dedicated lanes

Availability similar to subway

Example of Medellin (Colombia): a vehicle every 12 seconds
Advantages as *urban* transport mode

The level of service:

One of the safest transport mode in the world: example of french data

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<tbody>
<tr>
<td>Number of pass. (millions)</td>
<td>84</td>
<td>88</td>
<td>83</td>
<td>77</td>
<td>66</td>
<td>71</td>
<td>82</td>
<td>73</td>
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<tr>
<td>Serious accidents</td>
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<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>included serious injured</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Included people killed</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
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</table>
Advantages as urban transport mode

Short delay of works – with few inconvenience on residents

Maintenance with no impact on residents

Automation possible for boarding and delighting
Some constraints

Because of technology, necessity of straight line between two stations/ pylons (intermediate stations)

To corner, need more pylons ---> increase costs

Example of Constantine (Algeria) :
a station to corner
Some constraints

Urban integration of Stations:

• May be huge and high: how to integrate them?

A cable car station in New York
Some constraints

Dimensions of stations:

A cable car station in Medellin
Some constraints

Stations:

A cable car station in Grenoble (France)
Some constraints

A system hardly adaptable to higher demand:

--- The increase of the demand has to be forecasted before the implementation

→ The number of passengers carried per vehicle can't be exceeded
Some constraints

Visual intrusion:

- Impact the value of the property: Myth or reality?
- A useful argument for opponents

Example: an association against a project in France named:

ACTEVI
Action Citoyenne pour les Transports et l'Environnement de la Ville d'Issy-les-Moulineaux
surnommée “TOUCHE PAS A MON CIEL”

Don't touch my sky
Main results

Cable systems as urban transport mode are suitable to:

- Serve isolated inhabited areas
- Cross over rivers, mountains, wide roads, railways...
- Carry between 2 and 4 000 pass/h/direction and not any more

- Cable systems are not similar to light trams .... but can feed them, complete them and be a real part of the transport network
Need of further studies

A few items need further studies/discussions

- Urban integration of stations and pylons
- Accessibility for disabled persons
- Comfort
- Energy consumption
- Noise
- ...
**Need of further studies**

**Investment costs**: the weight of

- urban design?
- And Safety policy

Example of London (UK):
a pylon = 12 M€
Need of further studies

Operating costs: the weight of

- Staff in station (no drivers but 2 persons/stations)?
- And Safety policy (impact on maintenance costs)?
A lack of data/ Costs

Estimated costs

<table>
<thead>
<tr>
<th>Transport system</th>
<th>monocable</th>
<th>bicable/ tricable</th>
<th>aerial tram</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average estimated investment costs of a 1st one section-line – basic &quot;mountain&quot; design</td>
<td>€7-8 M/km</td>
<td>€15 M/km</td>
<td>€18 M/km</td>
</tr>
<tr>
<td>Additional cost for hardened and &quot;urbanized&quot; electro-mechanical equipment</td>
<td>+ 20%</td>
<td>+ 20%</td>
<td>+ 20%</td>
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</tbody>
</table>
Thank you for attention

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3 categories of aerial cable systems

Gondolas: small vehicles, moving around a loop in one direction
Several vehicles for one system,
Not obliged to stop at station

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3 categories of aerial cable systems

1. monocable gondolas: supported and propelled by 1 cable
   Vehicle capacity: 6-16 passengers
   Example: Saragossa (Spain)
3 categories of aerial cable systems

2 bi or tri-cable gondolas: supported by 1 or 2 cables and propelled by 1 cable, allows larger vehicles (around 40 passengers)

Example: Bolzano (Italy)
3 categories of aerial cable systems

3 aerial tramways:
Vehicle shuttles back and forth between two stations
Vehicle capacity: between 50 and 200 passengers
1 ou 2 vehicles
Always stop at stations
Intermediate stations limited to single mid-points along the line
3 categories of aerial cable systems

3 aerial tramways

Example: New York (U.S.)
3 categories of aerial cable systems

3 aerial tramways

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