The Importance of Ropeways in Urban Transportation

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Urban Transportation has so far made little use of the many advantages of ropeways, despite the fact that already in the 1980’s a number of conferences were held in order to promote such systems. What are the reasons for the so far modest success of all these efforts?

In this paper we will try to demonstrate the main reasons, such as lack of information and know-how in the heads of urban planners, the lack of information and incorporation in the respective education at universities, the amusement type image of the systems as well as the fact, that the systems have made an tremendous development in the last 15 years in terms of travel speed and capacities.

Some very positive examples of the use of ropeways in urban transportation will be shown, examples of Aerial Tramways, Funiculars, Cable Liners, 3S-Systems and Monocable Gondolas. A special focus will be pointed at the integration of ropeways into other modes of transport. Instead of the question being asked "Ropeway or another form of transport", the discussion should be about “Integrated systems”. Here we see the big potential of ropeways.

At last we will show the CO² – Emissions from Ropeways compared to conventional busses.
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1. Historical

Looking back in history we find that the first ropeways invented and built were used for the transportation of materials. Simple installations were built to transport goods across rivers, canyons or in the mountains. Logging was a typical application of ropeways.

The second application of ropeways was public transport to remote areas, historically using funiculars. Many villages in the Alps still have funiculars being the only way to connect to the environments. In the list of references of the Doppelmayr/Garaventa Group, you can find more than 30 funiculars built in public transport between 1885 and 1914.

The oldest ones were driven by water ballast, one example from 1899, the funicular in the city of Fribourg by waste water. And it is still running after a complete renovation in 1998 for its 100th Anniversary. (Film)
2. Development

Funiculars have had quite a long period of "sleep" in the 20th century until their revival in the 1980's. Revival means that a number of existing funiculars have been rebuilt, but really new installations in a pure public transportation application, we can only find very little.

One of the most modern installations in this regard is the funicular in Istanbul, that links one of most important Bosporus-Ferry Terminals in Kabatas to the subway station Taksim right in the heart of the city. With a capacity of 7'500 persons per hour it transports some 30'000 people per day. (Film)

Also in the 1980's lots of attempts were undertaken to make the overhead Transportation viable with Detachable Monocable Gondolas. Up to then however, within 4- and Max. 6-seater gondolas, speeds of 4m/s, capacities of max 1'200 pph were achieved. Handicapped access was an issue as well as many other features essential for public transport. The development in recent years has changed the picture completely. Gondolas can take up to 15 passengers a time, speeds have reached 6 m/s, capacities in excess of 3'000 pph and features such as P/A-systems, handicapped access, lights and climatisation at the cabins have been resolved.

3. Now days

The use of ropeways in public transportation is still today's limited to occasional unique situations. Especially in industrialized countries we find very little activities. Why? The Doppelmayr/Garaventa Group has made big efforts over the last 3 to 4 years to promote their systems for such applications. In many discussions, seminars and related conferences we have found that the following reasons play an important role:

1. There are no Universities or Technical High Schools found, where ropeways form part of the tuition for urban- and/or traffic planners. "Ropeways simply do not exist".
2. Architectural concerns and protection of historical and/or heritage areas prevent the construction of overhead systems.
3. Concerns about intrusion into privacy are a major issue in highly developed countries.

On the other hand we see that mainly emerging countries begin to consider such a form of transport to be viable. The best examples are Columbia, Venezuela and Algeria. (Film)
4. The different Systems

The following chart shows the typical ranges of application for different systems in public transport, depending on capacity requirement and distances to be covered. As you can see from this chart, the question is not only one system or another system, but how can the different systems be usefully integrated.

In Algeria the relevant Authorities have planned integrated solutions for different cities. The following graph shows the case of the capital Algiers with the different systems.
5. Benefits of Ropeways

In emerging countries the traffic problems are accentuated in a much faster and concentrated way than in the industrialized countries. The first development step is the introduction of TV.

The next step is to buy a Tata Nano for $2'200.-- and from then on the narrow streets are full of cars and look like a huge parking lot.

The only available mode of public transport, the busses are caught in the middle of the congestions. It is impossible for these areas to resolve the problem with the construction of new roads. The only way is to go to the third Dimension either underground or above ground. High capacity requirements have to be covered with train systems, medium capacities and feeders to the trains can be achieved with ropeway system.

A significant benefit lies also in the reduction of CO²-Emissions. A conservative comparison of the CO²-Emissions for the 5 planned ropeways in Algiers with the CO²-Emissions of the busses used to achieve the same transportation capacity shows a reduction of more than 50%.

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<th></th>
<th>Const.</th>
<th>Skikda</th>
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<tr>
<td><strong>Hourly Capacity</strong></td>
<td>2'400</td>
<td>2'000</td>
<td>1'500</td>
<td>3'000</td>
<td>3'000</td>
<td>3'000</td>
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<tr>
<td><strong>Power Cons. / year (kWh)</strong></td>
<td>1.6 M</td>
<td>2.0 M</td>
<td>2.0 M</td>
<td>2.8 M</td>
<td>3.4 M</td>
<td>1.5 M</td>
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<tr>
<td><strong>Therm. PP CO2 (t/a)</strong></td>
<td>528</td>
<td>660</td>
<td>660</td>
<td>924</td>
<td>1'122</td>
<td>495</td>
</tr>
<tr>
<td><strong>No. Busse</strong></td>
<td>24</td>
<td>13</td>
<td>15</td>
<td>30</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td><strong>Cons. Diesel (1'000 lt/a)</strong></td>
<td>876</td>
<td>475</td>
<td>548</td>
<td>1'095</td>
<td>1'460</td>
<td>730</td>
</tr>
<tr>
<td><strong>CO2-Emission (t/a)</strong></td>
<td>2'190</td>
<td>1'188</td>
<td>1'370</td>
<td>2'738</td>
<td>3'650</td>
<td>1'825</td>
</tr>
<tr>
<td><strong>Difference (t/a)</strong></td>
<td>1'622</td>
<td>528</td>
<td>710</td>
<td>1'814</td>
<td>2'528</td>
<td>1'400</td>
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The last and one of the most important benefits was demonstrated in the case of Constantine in Algiers, where the 15 passenger Gondola transported about 4.5 Million passengers in its first year of operation. Even at the very low price of about 22 cents US, this system can easily pay the operation and maintenance costs, which is quite seldom in public transportation.