CABLE CAR IN URBAN INDIA
SCOPES AND OPPORTUNITIES

Dr. Pawan Kumar, Associate TCP
Town & Country Planning Organization,
Ministry of Urban Development, Govt. of India, New Delhi

E-mail: pawan612@gmail.com
Introduction

- Cable Car: Ropeway, Aerial Tram, Sky Tram, Aerial Tramway
- Cable Car/Ropeway: Aerial Ropeway Transit (ART)
- Cable Car/Ropeway is known as Udan Khatola (उड़न खटोला)

Ropeway in Deoghar, Jharkhand
- It is called as Gagan Khatola (गगन खटोला)
• Cable Car vehicles transport both passengers and materials in carriers suspended from cable (rope) and another moving cable (rope) provides propulsion and whole system is supported by a series of towers.

• Further, it is motor-less and engine-less vehicles and pulled by a cable (rope) that is rotated by a motor off-board.
Cable Car/Ropeway Technologies

i. Aerial Ropeway

- **Cable Configuration**: Cabins are suspended from fixed cables (Track ropes) and pulled by another cable (Haulage rope).

- **Detachability**: Cables cannot be detached from the moving cable.

- **No. of Passenger Cabins**: 02

- **No. of Stations**: Multiple

- **Distance between Towers**: Less than 1000mt.
• **Capacity**: 2000-2800 pphpd @100-200 passengers/cabin

• **Speed**: 25-30 km/hr

• **Cost**: $10-30 million (US) / km.

• **Example Countries**:
  - Portland Aerial Tram, Oregon, (USA),
  - Aerial Tramway in Engadin (Switzerland),
  - Port Vell Aerial Tramway in Barcelona (Spain),
  - Cable cars Tramway in Albuquerque, New Mexico.
  - Manali Ropeway, Himachal Pradesh
ii. Detachable Gondolas (Cable Propelled Transit)

- **Cable Configuration**: Cabins are suspended and pulled by the same cable (a moving loop of cable).

- **Detachability**: Cables are set at regular intervals and can be detached from the cable at the terminal for loading and unloading.

- **No. of Passenger Cabins**: Depends on line length & Headways. (No. may be up to 100 cabins)

- **No. of Stations**: Multiple

- **Dist. between supporting Towers**: 300mt to 3000mt
• **Capacity**: 3600-6000 pphpd @ 15-35 passengers/cabin
• **Speed**: 20-30 km.hr
• **Cost**: Depends on location, situation, and customization, etc. Cost for MDG is between $5-20 million (US) / km.
• **Countries**: Algeria, Brazil, Colombia, England, India, Singapore, Venezuela, etc.

*Gulmarg-Gondola Ropeway, Jammu & Kashmir*
Uses of Cable Cars

i. Tourism Purposes

Cable Car is attractions for pleasure trips to see 360 degree panoramic view. To visualize natural beauty /natural scenery.
Opened in 1974, **Connectivity**: Mount Faber to Sentosa, **Purpose**: Tourism

**Pioneer**: First to span a major harbour on Singapore South Shore.

Sentosa Island Gondola, Singapore
Pioneer: First to implement Intermediate Station within a skyscraper.

Intermediate Cable Car Station within Skyscraper, Sentosa Island, Singapore
ii. Religious Purposes

Religious Purposes to reach Mountain tops / Mountain Temples for worship. 

*Mansa Devi Udankhatola, Haridwar*

It carries devotees to Mansa Devi Temple that sits at a top of hill.

Source: Wareholidays
Nainadevi Ropeway, Himachal Pradesh

- Located in Bilaspur.
- Operation was started for convenience of the devotees to Nainadevi Temple.
Ropeway to Shrine of Makhdoom Sahib, Kashmir

It is Kashmir Valley’s first ropeway and State’s second tourist-carrier.
Source: The Hindu
iii. Material Transportation

- Initially, a ropeway was used as a lifting device across the valley, rivers, canyons, etc. and get accessibility in high terrains.
- Later, the same was started to use in construction across the rivers and along the sea.
Ropeway conveyor for Limestone transportation in Sweden
iv. Use as Mass Transit

Example 1: Roosevelt Island Tramway, New York USA

- Opening Year: 1976 but modernized in 2010 as dual-haul aerial tram
- Purpose: provide connectivity between island to Manhattan as island was redeveloped to accommodate low-middle income housing project.
- Mode: Mass Transit Service for Commuters

- Line Length: 960
- Line Speed: 26 km/hr
- Cabin capacity: 110
- Peak Headway: 8 minutes
- PPDPH: 1500

Integration: Ropeway is integrated with New York’s Metropolitan Transit Authority Metro Card with metro and bus transfer.
Example 2: Medellin Metro-Cable, Colombia

- **Purpose**: Medellin located in Valley surrounded by hills. To provide connectivity to barrios (rural Settlements), gondola system was developed to connect Medellin hill residents to Metro.

- **Opening Year**: 2006.

- First gondola line (**Line K**) was opened as complementary mode of transport to Medellin Metro.

- **Mode**: Mass Transit Service
Line Length
Line K = 2789 mt
Line J = 2072 mt
Line L = 4595 mt

Line Speed : 18-22 km/hr
Cabin capacity : 10
Peak Headway : 12-65 seconds
PPDPH : 550-3000
Cable Cars in India

Ropeway of Rajgir, Bihar

It runs to the top of Ratnagiri Hill and passes over 40mt high Vishwashanti Stupa.

It is single-person ropeway (one person at a time can take the ride).
• Asia’s largest and highest cable car which connects Gulmarg to Apparwath Peak.

• Aerial Length: 5000 mt (approx.)  Height: 4200 mt (approx.)

• Two-stage ropeway:
  1\(^{st}\) Leg connects Gulmarg resort to Kongdori station (3747m) and
  2\(^{nd}\) Leg connects Kongdori Station to Apparwath Peak.

• Hourly Capacity: 600-1500 PPHPD

• Joint Venture: Ropeway project is a joint venture of the Jammu and Kashmir Govt. and French firm Pomagalski.
Ropeway in North Eastern States

- Damovar Ropeway in Gangtok is a cable car located at Deorali.
- It has a ride from Deorali to Tashiling over the city of lower and upper Gangtok.
# Selected Cable Cars in India

<table>
<thead>
<tr>
<th>S.N.</th>
<th>NAME OF ROPEWAY</th>
<th>STATE</th>
<th>CITY/TOWN</th>
<th>CAPACITY (PPHPD)</th>
<th>NO. OF CABINS</th>
<th>CABIN CAPACITY</th>
<th>PURPOSE</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Narmada Ropeways</td>
<td>M.P</td>
<td>Jabalpur</td>
<td>800 PPH</td>
<td>10</td>
<td>6</td>
<td>Tourist</td>
<td>535 M</td>
</tr>
<tr>
<td>2</td>
<td>Mansapurna Ropeway</td>
<td>Rajasthan</td>
<td>Udaipur</td>
<td>200 PPH</td>
<td>4</td>
<td>6</td>
<td>Tourist</td>
<td>362 M</td>
</tr>
<tr>
<td>3</td>
<td>Sanhati Park Ropeway</td>
<td>Rajasthan</td>
<td>Udaipur</td>
<td>200 PPH</td>
<td>4</td>
<td>6</td>
<td>Tourist</td>
<td>135 M</td>
</tr>
<tr>
<td>4</td>
<td>AMBY Valley Ropeway</td>
<td>Maharashtra</td>
<td>Lonavala</td>
<td>150 PPH</td>
<td>2</td>
<td>6</td>
<td>Tourist</td>
<td>135 M</td>
</tr>
<tr>
<td>5</td>
<td>Bhopal Ropeway</td>
<td>M.P</td>
<td>Bhopal</td>
<td>250 PPH</td>
<td>2</td>
<td>9</td>
<td>Tourist</td>
<td>360 M</td>
</tr>
<tr>
<td>6</td>
<td>Nainital Ropeway</td>
<td>Uttarakh</td>
<td>Nainital</td>
<td>150 PPH</td>
<td>2</td>
<td>11</td>
<td>Tourist</td>
<td>750 M</td>
</tr>
<tr>
<td>7</td>
<td>Kempty fall Ropeway</td>
<td>Uttarakh</td>
<td>Mussoorie</td>
<td>400 PPH</td>
<td>6</td>
<td>6</td>
<td>Tourist</td>
<td>125 M</td>
</tr>
<tr>
<td>8</td>
<td>DRV Ropeway at Darjeeling</td>
<td>West Bengal</td>
<td>Darjeeling</td>
<td>400 PPH</td>
<td>15</td>
<td>6</td>
<td>Tourist</td>
<td>2300 M</td>
</tr>
<tr>
<td>9</td>
<td>Dongargarh Ropeway</td>
<td>Chhattisgarh</td>
<td>Dongargarh</td>
<td>120 PPH</td>
<td>2</td>
<td>8</td>
<td>Tourist</td>
<td>650 M</td>
</tr>
<tr>
<td>10</td>
<td>Salkanpur Ropeway</td>
<td>M.P</td>
<td>Sehore</td>
<td>200 PPH</td>
<td>4</td>
<td>8</td>
<td>Tourist</td>
<td>790 M</td>
</tr>
</tbody>
</table>
Scope & Opportunities

1. Suitable in geographical & topographical barriers such as mountains, valleys, water bodies, etc. where very large infrastructure costs associated with to overcome these barriers may not permit conventional public transportation systems.

   • Eastern States and Mountainous States may use such System.

   __________________________________________________________

2. Construction of road / rail infrastructure is capital intensive & Challenging task in hilly terrain.

   Limited availability of land, steep slopes, rocky terrains, cost of cutting for tunnels, etc.

   • May be opted as a mode of transport with updated Technologies.
3. Aerial Ropeway Technology is economical with compare to BRT/MRT.

Comparative Capital Cost of Construction

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Modes</th>
<th>Av. Cost/Km (Rs Crore)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i.</td>
<td>MRTS</td>
<td>250-400</td>
</tr>
<tr>
<td>ii.</td>
<td>BRTS</td>
<td>30-50</td>
</tr>
<tr>
<td>iii.</td>
<td>Cable Car</td>
<td>15-25</td>
</tr>
</tbody>
</table>

Source: Seminar Proceedings on Cable Car, Shimla, 2014 organized by IUT(India).
4. Considered as Environmentally Sustainable Transport (EST)

- Relatively Low Carbon footprints.

- Electric Engine/Motor used at Stations.

- Greenhouse Gas emissions credit (Medellin Cable Car, Colombia).

- Cable car vehicles have no motors and therefore no noise and air pollution along the route.

- Little disturbance in Micro environment both during construction and operation.
5. Mass Transit

- Cable Car as Unconventional Technology (not like BRT/MRT) used as mass transit. Its route design has little consideration for horizontal and curve alignment. It is comparatively easy in operation.

- It follows a dedicated route having 5,000 passengers per hour per direction.

- Modern technology provides spacious cabin having capacity @ 30 - 50 persons.

- Comparatively safer mode of transport.

- Direct connection between two points in spite of physical barriers and obstacles.

- Demands low space for towers & stations and are environmentally and cost effective mode of transport.

- Less capital, maintenance, construction time, operating costs, etc.
RFP: Cable Car as Public Transport in Gangtok

Cable Car Mass Transit, to Launch in Lagos (2015)

Development of Cable Cars at 4 Locations in Karnataka

Urban Development & Housing Department
Government of Sikkim, Gangtok
Request for Proposal (RFP)

On behalf of Governor of Sikkim, proposals are invited from firms/agencies for selection as consultant for preparation of "Techno-economic feasibility report of cable car as public transport for Gangtok". The RFP document will be available for download at www.sikkimudhd.org from 07.03.2016.

R.O. No.: 403/IPR/PUB/Classi/15-16 Date: 04/03/2016

Tourism Projects for Investment Opportunities
Invest Karnataka 2016
January 2016
6. Selection of Technologies and Purposes

- Purpose: Tourists to Mass Transit

- Selection of suitable Cable Car Technology/ART Technology may provide viable and feasible transit mode.

- Development of urban ropeway fulfills all three criteria of smart city:
  
  i. Creation of infrastructure,
  
  ii. Smart solution for smart mobility in undulating terrains
  
  iii. Suitable for area based development. (Retrofitting/New Development)

- Planning of ART Corridor may promote implementation of transit oriented development in newly developed or redeveloped areas.
THANKING YOU
FOR
YOUR KIND ATTENTION