Conveyor & Ropeway Service Pvt. Ltd.

TYPES OF ROPEWAY SYSTEM

This chapter offers a detailed discussion on the available areal Ropeway transportation (ART) technology's and service characteristics.

ART is an aerial public Transportation technology in which cabins (also called carriers, vehicles or cars) are suspended and propelled from above by ropes. The underlying technology of ropeway has been around for almost a century, where it has been applied mostly in terrain-challenged hills for pilgrim transportation and also, in recreational/ adventure sports contexts (e.g in ski resorts) to transport skiers and tourists from the bottom to the top of the mountains and vise-versa. In recent year, however, the same technologies used in these hills have also been adopted and implemented in urban regions as a mode of urban Transportation in geographically- constrained urban areas as well, where conventional Transportation service was deemed very difficult or infeasible to implement.

There are various types of Ropeway Systems as described below :-

CHAIR LIFT SYSTEM

This system is widely used in hilly areas. In the winter resorts, all over the world, one can find a number of them. Their capacity range between 50 to 1200 passengers per hour.
It is a monocable endless system. One continuously

circulating rope serves the dual purpose of supporting as well as hauling the chairs clamped to the moving rope at specific intervals. In between the terminals, the rope is supported on sheaves mounted on towers. The most common on Chair Lift system are the Twin Seater Chair Cars. With more modern developments, Chair Lifts with cars for 3, 4, or 6 passengers have also come in use. They normally have detachable type Grip, whereas the ones with twin passenger chairs have mostly Fixed type Grips.

Advantages

- Continuous transportation of passengers.
- Low Capital Cost.
- Simple in construction.
- Low operation and maintenance cost.
- Flexibility in the system design, i.e system can start with a low transport capacity vis-à-vis less investment and then expanding the capacity with growth of demand.

Disadvantages

- For Fixed Grip type system, boarding / deboarding operation is carried out while the carriers are on motion which calls for low speed and consequently long travel time. For detachable type Grip, although speed can be made faster, but cost would go up.
- Fixed Grip type carriers normally cannot negotiate any deviation en-route, i.e Angle Station. For negotiating angles, Detachable type grip is required.
- Maintenance of large number of Towers and Carriers.
- Large Spans between the towers are prohibited.
- System is more sensitive to high wind.

MONOCABLE GONDOLA SYSTEM

For aerial passenger transportation, this system has the widest use in the world both in flat and hilly terrain.

One can see them in Disneyland, all over the Alpine Region and also other parts of world.

The maximum capacity achieved in this system is in the region of 2500 PPH. Its flexibility to

adapt length, terrain conditions and capacity normally gives it preference while making a choice.In this system, a single endless continuously moving rope supported on intermediate tower rollers carry the Gondola Cabins, spaced at equal intervals.The cabins are fully enclosed as shown in the illustration, and because of this fact, the passengers inside, feel quite comfortable, even if the cabin travels at a considerable height from the ground profile.The recent development have come up with 12 passenger Cabins, most suitable for high capacity. The Gondola Cabins have Detachable type Grips.

Advantages

- High transport capacity.
- Comfortable boarding / deboarding operation.
- Adjusting speed and number of cabins as per demand.
- Comfortable ride. Passengers within cabin feel secured.
- Low ground clearance not required. Hence less number of towers and towers mechanicals.
- A moderately high speed possible.

Disadvantages

- High capital investment
- High operation and maintenance cost.
- Maintenance of large number of cabins and towers.
- System more sensitive to high wind.
- Large span between Towers are prohibitive.

BICABLE GONDOLA SYSTEM

There are a number of Bicable Gondola systems in operation for transportation of passenger all over the world. But like Monocable Gondola, their use is not that widespread. They only have an advantage over the Monocable Gondola System where the profile justify

exceptionally large span, as in case of Monocable System for long span under maximum loaded condition, the sag becomes excessive.
In Bicable system, there are tensioned stationary Track Ropes both on the outward and inward journey sides, and a second endless rope attached to each cabin at equal intervals, when driven, carry the Gondola Cabins along the alignment in inward and out ward directions. The Bicable Gondola System, because of special locked coil type track ropes are more complicated carriages are always more expensive than the Monocable Gondola and Chaircar System.

The recent development in Bicable Gondola is the use of 2(two) Track Ropes in lieu of one. Thus is can support large capacity cabins (25 – 30 psgr.) and thereby achieve higher capacity.

Disadvantages

- Very high capital investment.
- Limited possibility of capacity expansion.
- System being sophisticated requires qualified operation and maintenance staff.

JIG BACK TYPE BICABLE TRAMWAY

For Aerial passenger transportation in large capacity, this system also has a wide use in the world, particularly, in hilly terrain.

Alpine Region is full of such type of Tramways. These Tramways can negotiate very high speed. The maximum achieved so far is 12M /sec and the most modern Tramway in the Jigback system has a capacity of 160 passengers, in a single cabin.

In hilly areas for negotiating large valleys, this is the ideal system as it can comfortably negotiate a span of more than 1.0 KM. There are a lot of installations, where, but this system, nothing would have been feasible.

In the Jigback system, 2 tensioned track ropes support the cars which are hauled by a separate rope fixed to the cabin.

Such installations in India could be seen in Mussourie, Nainital and Joshimath.

Advantages

- High Transport capacity.
- Very high speed compared to other system possible.
- Can negotiate extra large span.
- System not much sensitive to high wind.

Disadvantages

- High capital investment, highest of all systems.
- System very sophisticated and requires qualified personnel for operation and maintenance.
- Capacity limited and cannot be expanded.

JIGBACK MONOCABLE SYSTEM

System is similar to Bicable Jigback but the difference is one endless haulage rope serves the dual purpose of carrying as well as hauling the cabin.

Two Cabins are firmly attached to the rope, one at each terminal station but in opposite direction. On driving, while the No. 1 shall proceed to the other station, No. 2 at the opposite end shall progress to the former station. Upon arrival at respective station, drive is reversed and the cabins change places.

Advantages

- Simple system.

- Low operation and Maintenance cost.
- Comfortable boarding / deboarding and ride.
- Low ground clearance not required.

Disadvantages

- Low transport capacity.
- Limitation in capacity expansion

FUNITEL / DMC (DOUBLE ROPE MONOCABLE) TYPE ROPEWAY

This is the latest system developed for aerial passenger transportation in large capacity (6000 PPH) and a number of such systems have already come up in Alpine region in Europe and also in Rocky Mountain in USA.

In this system, large capacity carriers (25 passengers) are supported on 2 numbers ropes, which serve for the dual purpose of supporting and hauling. The carriers are attached to the twin rope by Detachable type grip.

Two endless continuously moving ropes supported on intermediate tower rollers carry the cabins spaced at equal intervals.

The Grips and cabins in this system are of real sophisticated type, and only serve for high capacities in hilly terrain.

Advantages

- Very high transport capacity.
- Flexibility of expanding capacity with the demand.

- Comfortable boarding / deboarding and ride.
- Low ground clearance not required.
- Cheaper than Bicable Tramway.

Disadvantage

- High capital investment.
- High operation and maintenance cost.
- Sophisticated system – requires very skilled personnel for Operation and Maintenance.

MONOCABLE Non-liner CURVO SYSTEM

This is the latest system developed on non-linear, unique and first time in the world.

Running over existing arterial roads, on steel portal frames spaced at 90-100 mtrs for rope supports. None of mighty concrete structures as for Metro and Flyovers.Free city air space, Eco- friendly and installation cost effective.

Advantages

- Easy & quick installation
- Pollution, Accident, Noise free
- Comfortable Ride
- Can negotiate angular deviation
- Flexible public transport capacities
- Can transport up to 2500 PPH per line.

Disadvantage

- High capital investment.
- High operation and maintenance cost.
- Sophisticated system – requires very skilled personnel for Operation and Maintenance.