Aerial Tramway from Aliyar to Valparai

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Abstract
In this modern world the public transportation has been remarkable, one of the most different transit modes which is called aerial tramway system to deal various demand levels, natural constraints and barriers. Conventional transit modes faces great challenges to rise above geographical and topological barriers such as water bodies, mountains, valleys can be prevailed by introducing aerial tramway which needs investments and charges to the sustain natural topography.

The current study area Valparai is a hill station which attracts tourist. An aerial tramway execution will leads to reduce the emission of combustion gases from the vehicles in turn reduce the air pollution to the environmental and to reduce the cost of travel in carrying goods and peoples from the current travel routes and also increase the number of tourism. Implementation of this to the study area will reduce the distance 43km to 18km around and duration from 2 hours to 30 minutes around.

Keywords: Aerial tramway, topographical barriers, economic way, sustain renewable resource, less pollution.

Introduction

Organization for passenger and cargo carriage, Aerial ropeway transportation (ART) system sis broadly adopted as continuous transport worldwide. For the terrain which are difficulties access with difficult, passenger aerial ropeways are mostly used for rapid and convenient movement of people. For transporting different cargos, ropeways were used in various sectors. The Study area Valparai is a hill station near to Aliyar in Coimbatore district attracts many tourist and hub for tea, fresh vegetables. So, requirement of transportation for carrying goods from and to hill station is a daily activity. Introducing the tram way helps in easy and economical way of transportation. The terrain elevational details were studied for locating the towers for tram path as shown in fig. 1 and 5.

Methodology

The study was carried through open source to get an idea about the data collection and design of the structure. The data like Census, electricity and vehicles rate were collected. Method of installations were studied and analyzed by, bicable method. Components are designed derived for the installation using Latticed construction. The tower was designed and analyzed using STAAD Pro software for the Latticed construction is shown in fig. 2 and 3.

Design Components

Towers: To support the track and haulage ropes between terminal towers are used as an intermediate. Predominantly steel frames are used with pylon shaped sometimes. The primary function of the tower is to get hold of and to allow the haulage rope movement through wheels. For maintaining the safety of towers, carriages must also have guidelines to avoid get hitting. The tower model was shown in fig. 4.

Fig. 1

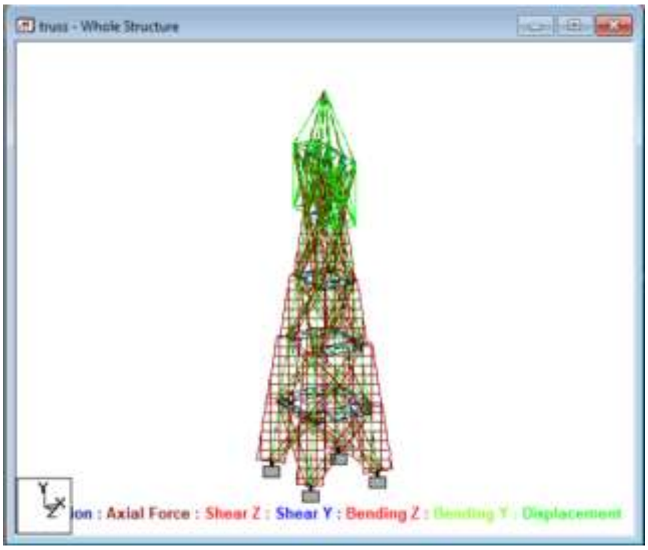

Fig. 2

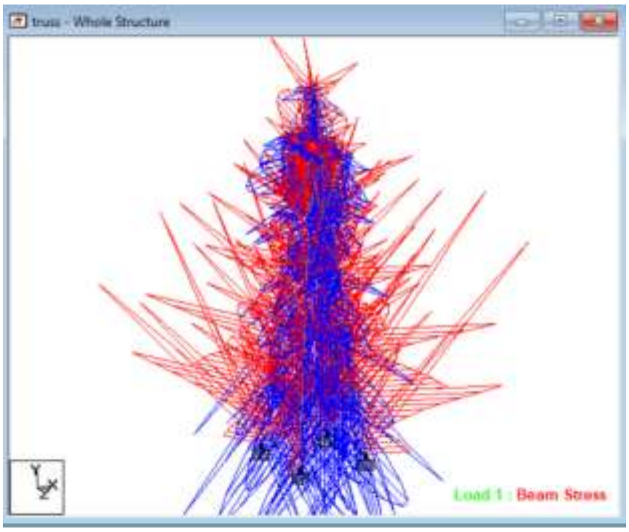

Fig. 3

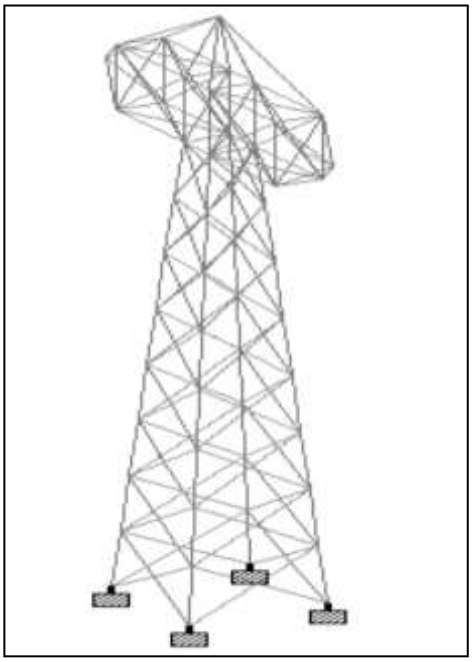

Fig. 4

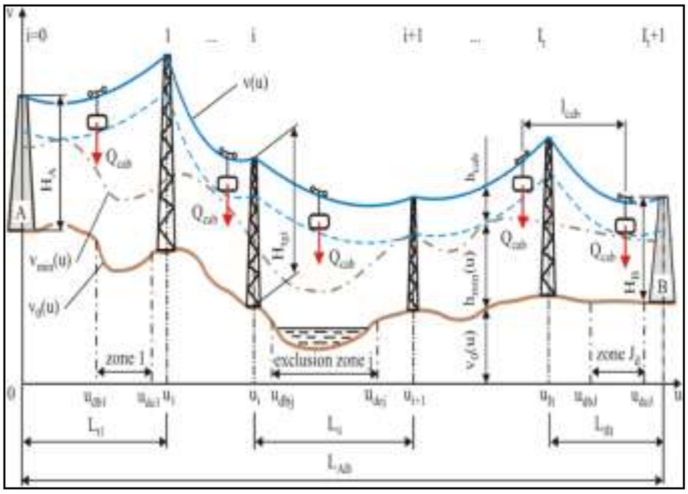

Fig. 5

Rope (cable): Next crucial one in ART system is the rope (cable). The methodology followed is to form a strand, intertwining individual wires and then the strands to form a rope. Rope selection is based on accepted norms of ropeway engineering practice, available standards, manufactures code of practice and our experience in designing similar passenger ropeway. Rope shall be 34mm diameter of construction, polypropylene core, which has 1770 N/sq.mm tensile strength.

Cabin: The passengers using a ropeway system are transported with the help of Cabins which is the structural and mechanical assemblage. The parts of the carrier are grip or carriage, hanger and the passenger cabin. The carriers are usually described by capacity of passengers or materials. Top portion of the cabin shall be fitted with transparent sheets for viewing.

Terminals: Basically, a drive terminal and a return terminal are the two terminals in ART systems. If a vertical change takes place, the terminals are called the upper and lower terminals. For detached grip gondola operations, electronically monitoring separate area for slow down and loading is needed in the terminals for safety. There are two types of terminal stations.

1) Lower terminal station (Aliyar)
2) Upper terminal station (Valparai)

Tension Gear: Hydraulically operated tension unit with twin cylinders complete with acceptable capacity power pack.

Type of Ropeway	**Bicable System**
Length of Ropeway	18.5km
Level difference between terminals	Aaliyar – Attakatti = 307 m Attakatti - Iyerpadi = 1431 m Iyerpadi – Valparai = 1150 m
Cabin Capacity	15 passengers
No. of Cabins	33
Speed of the rope	12.6 km/h
Number of Towers	6
Type of towers	Latticed construction
Type of Grip	Fixed Grip.
Rope diameter	34 mm

Communication: Communication between terminal stations should be through the modern technologies which are available now a days and public address system etc.

Cabin and Carriage: As per IS 5229:1998 – recommendation 17 to 33 passengers per cabin allowed for bicable ropeway system. The requirement of the design criteria the cabin was designed about 15 passengers per cabin was provided.

Line Speed: A maximum speed of the cabin is 12.6 km/h for bicable ropeway system.

Design wind speed: The following relationship will provide the design wind pressure on towers, conductors, and insulators.

$P_d = 0.6\ V_d^2$

where P_d = design wind pressure in N/m^2, V_d= design wind speed in m/s, To get the design wind speed, the following effects.

a) Risk coefficient K_1 and
b) terrain roughness coefficient K_2

may be expressed as follows:

$V_d = V_R \times K_1 \times K_2$

Conclusion

If this tower was implement at this location the optimization of fuel charges, accidents, public environmental pollution to be controlled. Due to this infrastructure development approximately 40% of the cost will be gained by the government from the tourist people and reduce the vehicle fuel nearly about 60% by using Aerial tramway from Aliyar to Valparai.

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