

DESIGN OF GRIPPER FOR MATERIAL ROPEWAY

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Abstract—

The scope for the development in design of gripper was main point of attraction to the whole project. Earlier design of gripper was having number of flaws. The time required for the gripper to get disassembled from the rope was very large. Near about 45 minutes were required for removing the plates from the rope so that material from the bucket can be taken out. When the bucket is fully unloaded, the plates were again assembled for again loading the material to the required station. This whole process was really a hectic work. Large effort was required for the workers to handle the gripper. Earlier gripper model have four nut and bolts through which the gripper's plates were adhered to the rope. The nuts were behind the plate and removing them was very tough task.

All the above factors leads to redesign the gripper in a such a way that the most modified model of gripper will eliminates all this all flaws. The main motue behind the project is to reduce the assembling and disassembling time of the gripper to the least.

I. INTRODUCTION

Material Ropeway is one of the additional facility that Raigad Ropeway provides along with peoples ropeway. The project is under Millennium Drive Pvt..Ltd. Material ropeway is used to carry the additional requirements of people like their luggage ,construction material, tools etc from lower station to upper station or from upper station to lower station. The distance between the station is about 700m. Bucket is provided for carrying the load to the required station.

II. PROBLEM STATEMENT

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III. OBJECTIVES

The objective of this project includes:

1. To increase the sureness of braking Application.
2. To increase the response time of braking system.
3. To improve the pre-crash safety.
4. To avoid the percentage of passenger injury by using external vehicle safety.
5. To reduce the requirement of internal safety devices like air bags.

IV. COMPONENTS AND DESCRIPTION

A)THE STATIONS:

At least two stations are necessary for a ropeway system - one at the starting point and one at the end. In terms of technical aspects, a typical ropeway vehicle has no motor, no service brake and no control panel, as these facilities are installed directly in the station buildings.

Because of the way it is integrated into the natural environment and the differing characteristics of the area, every station is unique. There is therefore a wide choice of types of station, such as long or short, the middle station and the HCL station.^[1]



Fig:Upper station of raigad ropeway

B)THE DRIVE SYSTEM:

Depending on the requirements of the installation, the drive system can be installed at the bottom or top station, implemented as an overhead or underground drive and used as a drive or drive-tensioning station. It consists of the drive, the service brake, safety brake and the gearbox.

The lack of a complex gearbox brings significant operational benefits. The Direct Drive system provides a very quiet ride with noise levels around 15 dB lower than before. Its maintenance requirements are minimal and its operating costs are unbeatably low.^[2]



Fig: The drive unit of raigad ropeway

A. C)THE LINE:

The line is the part of a ropeway that is affected by topographical conditions. It is therefore very important to develop highly adoptable products that provide passengers with comfortable and safe rides. The lines are formed by a variable number of components, for example the towers, the roller batteries and the rope itself. The line for material and people ropeway is as shown in following figure.^[1]



Fig :People ropeway line



Fig: Material ropeway line

B. D)THE TOWERS:

The towers are built in a robust manner as they have to bear the weight of the vehicles with passengers. The cabins pass on both sides of the tower. The towers are made from tubular steel in a variety of lengths, diameters and wall thicknesses. Depending on the terrain, they can be divided into small sections, transported by helicopter and reassembled on site.^[2]

Special towers are towers more than 30 m in height that are constructed as lattice towers or tubular towers with two or more legs.



Fig:Upper station tower

C. E)THE ROPE:

Ropes are found in all ropeway systems. Steel ropes are made of strands that are twisted around the rope core. Specialized companies are responsible for manufacturing the ropes and installing them on site.

The rope used for material ropeway is made up of steel with diameter of 19mm



Fig: Gripper attached to the Rope

V. LITERATURE REVIEW

Material ropeway is one of the essential drive line of Raigad Ropeway. It is used as additional drive line to carry people luggage, construction materials and many other required things from lower station to upper station. It is a sub part of ropeway. mainly people ropeway is the main driving line of raigad ropeway where it is used for people to take them up to the fort from lower station to upper station. In people ropeway minimum of 6 people can sit and can travel. The distance between both the stations is 750m. Material ropeway carries maximum of 500kg material in its bucket which is like rectangular box in which materials are kept. The pipe is used as connection between bucket and the gripper. Gripper of material ropeway is the one which takes the centre of attraction. It is one of the important part of material ropeway. It is the one which helps the bucket to carry material in between the two stations. Material ropeway gripper consists of mild steel plates which are gripped together with the help of nut and bolt arrangement. Rope is gripped firmly in between the two plates and it is of steel material.^[1]

The Shri. Shivaji Raigad Smarak Mandal (SSRSM) was founded by Lokmanya Bal Gangadhar Tilak in 1886. The SSRSM undertook the task of making the Fort Raigad more accessible to the people. In 1990, the then Government of Maharashtra, accepted the proposal of SSRSM for the construction of a ropeway. M/s Triveni, a construction firm of Naini, Allahabad, an undertaking of the Central Government submitted a proposal of Rs. 8 Crores for the project. The project was a non-starter due to the prohibitive cost and requirement of foreign exchange.^[2]

VI. CONCLUSION

The idea of having two nuts and four bolts has been successfully considered to be the best modified design of gripper. The Catia model of plates having two bolts and two studs is been the most attractive design and had lead to reduction in assembling and disassembling time of gripper plates at the ropeway station. Objectives related to removal of ideal time, most attractive design, easy to assemble and disassemble, better life under dynamic operating conditions, able to carry the given amount of load etc. has been achieved. Ansys reports considering various aspects of mechanical engineering have been found to be safe after performing the full analysis on ansys workbench

REFERENCES

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