DESIGN AND FABRICATION OF LOADING AND UNLOADING SYSTEM FOR TWO WHEELERS

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ABSTRACT :- The goal of this study was to apply the knowledge obtained from studying in the university and solve the substantial task of creating a design and fabrication of loading and unloading system for two wheelers
This paper deals with the design as well as analysis of a vehicle ramp. Conventionally a scissor ramp or jack is used for lifting a vehicle for various purposes, to lift the body to appreciable height, and many other applications also such ramps can be used for various purposes like maintenance and many material handling operations. It can be of mechanical, pneumatic or hydraulic type. The design described in this is developed keeping in mind that the ramp can be operated by mechanical means by using wire ropes with the help of electric motor. In our case our lift was needed to be designed a portable and also without any pneumatic or hydraulic means. Also such design can make the ramp more compact and much suitable for medium scale work.

I. INTRODUCTION

Lifts are generally use for loading or lifting and unloading of goods, vehicles or a person. Lifts are most commonly used mode of vertical transformation in modern buildings having more than three stories. In present system of loading and unloading there is used ramp system ,these is very risky and time consuming for loading and unloading vehicles , at time only one vehicles can loading and unloading with help of labor, vehicles can unbalance and damage occurs. Lifts are generally powered by electric motors that either drive traction cable and counterweight system like a hoist, or pump hydraulic fluid to raise a cylindrical piston like a jack. In agriculture and manufacturing, and lift is any type of conveyor devise used to lift materials in a continuous streams into bins or silos. Several types exist, such as the chain and bucket elevator, grain auger. More than a decade ago, it was estimated that there were more than half a million passenger elevators in the United States transporting people day and night everyday of the year. Many of these elevators are located in urban area in high seismic region.

A lift is essentially platform that is either pulled or push up by a mechanical means. A modern day lift consist of cab (also called a cage or car) mounted on a platform within an enclose space called a shaft or sometime a "hoist way". In the past , lift drive mechanism where powered by steam and water hydraulic piston .In a traction lift ,cars are hold up by mean of rolling steel ropes over a deeply grooved pulley, commonly called a sheave in the industry the weight of car is balanced with a counter weight sometimes to lifts always move synchronously in opposite direction , and they are each other counter weight.The lifting machines are the complex dynamic systems that include steel elements, bearing, wheels ,hoisting mechanisms, shafts and control system. The calculation procedures for lifting machine are continually improved, tending to accurate and complete assessment of dynamic effects, occurring during the lifting operation. The bearing pulley is the compulsory element of lifting machine. In the loading and unloading mechanisms, the bearing pulleys are used to decrease the tension force of rope and driving torque.

Procedures for loading and unloading will be developed to maintain high safety standards, minimize damage or loss, and establish consistent routines. In this process ,one side of platform is attached to both column with flexibly arrangement and other end of platform is supported with rope arrangement, the rope arrangement is flexible by using pulleys, motion of ropes are given by electric motor with the help of gearbox, rope controls to the platform according to given command of motor and gearbox.

II. WORKING PRINCIPLE

The lifting mechanism used in the project is based on elevators and cranes. The mechanism used in these machines is generally wire rope drive. The wire rope drive can lift large amount of load. Wire ropes are composed of independent parts - wires, strands and cores -that interact with each other during service. For our purpose of lifting vehicles wire rope drive is best suited.

To lift the load a platform is used. The platform is attached on a movable frame on which it slides in vertical motion. To provide this vertical motion wire rope drive is used. When the motor is switch on for forward movement rope drum rotates and it pulls the rope in one direction. Thus sheaves are rotated in one direction with the help of the rope, the platform moves upward up to the required height. If the platform reaches the required height, a lowering control brake is used to stop the movement. When the motor is switched on for reverses movement rope drum rotates and it pulls the rope in other direction.

III. FABRICATION

In the conventional system had several problem but some engineers considerable to be acceptable first of all develop dimensions and designs which mainly used while fabrication process ,considering the all element which are used in fabrication process . Fabricates the frame for mounting electric motor, gearbox and rope drum. The frame is made up in cast iron. C-bracket are mounted on both side of frame, No of pulleys and sheave s are located with proper position on body structure for smoothly operation of rope drive , three wheels are adjusted on both side to slide freely up and down direction and the pallet does not displace.

IV. DESIGN CALCULATION

Design Parameters Considered
1. Load acting (w) of four heavy weight bikes= 1500 kg. (Considering FOS)
2. Height to which load is to be lifted = 15 feet (4.572 m)
3. Velocity = 50 feet / min (0.381 m/s)
1N = (1/g) kg= 0.1019 kg
Hence, 187.5 KN =19106.25 kg = 20 tones (approx.)
Reference of velocity:-Wikipedia(how elevators works)
Average speed of freight elevator = 50-100 feet/min
For capacity = 2300 –4500 kg
g = acceleration due to gravity.

1)Selection of wire rope type
Select a wire rope (6 x 19) based on the type of application.

2)Calculation of design load
Let,
Design load is to be denoted by W.
Design Load = 2.5 * Load to be lifted * Assumed factor of safety
(From pg. no.9 PSG Data book)
Load to be lifted = 15000 N
Factor of safety = 5 (select factor of safety from PSG Design Data Book P. No: 9.1based on the rope application)
W = 2.5 *15000* 5
W=187500N.
Design Load of the system is obtained = 187500 N

3) Selection of wire rope diameter(d):
Assuming the design load as breaking load select the wire rope diameter from PSG Design Data Book P. No: 9.4 to 9.5.
1N= (1/g) kg= 0.1019 kg,
Hence, 187.5KN = 19106.25 kg = 20 tones (app). (Nominal breaking strength of rope)
For 20 tones (nominal breaking strength),
Rope diameter d=20mm(PSG Data book,pg.9.4)

4)Calculation of wire diameter(dw)
Let, wire diameter is denoted by dw
i=Number of strands∗ number of each strands=6∗19
dw = D/1.5√i
dw = 20/1.5√6∗19
dw =1.24mm

5) Selection of weight of rope (Wr):Ford=20mmapprox.weight=1.47kgf/mapprox.weight=1.47∗9.81=18.05N/mNow,for 5 m height=18.05∗5=90.25NWr=90.25N

V. CONCLUSION

The detail review of this paper will lead one to understand that essentially a new loading and unloading design was proposed to decrease the Time consuming work, fatigue during work etc. The proposed lift is an assembly unit made up of simple and easy to manufacture parts. The Machining cost will be reduced as compared with other loading, unloading lifting machines like hydraulic machines. The Existing machines were not proving stress full at providing loading at cheaper rates. The maximum stress was is very compatible according to the industrial or goods service provider taken in. The proposed lift showed high Carrying stresses and displacement as compared with the previous case this is due to the some analyzed and strengthen components of the lift like wire rope, motor, and pallet. According to the Indian industry standard of goods loading and unloading this proposed lift is considered as a fit to the rule to service it at the very cheaper rates and east to handle. Even better results are possible after precisely following the guidelines formulated for the easy flow of work for volunteers.

FIGURE :

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