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Scissor hydraulic lift

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Abstract: *A scissor lift is a tool used to lift items to a higher level. Considerable precision is required in the design of the frame structure to avoid limitations imposed by safety factors and strength. However, establishing a structure requires a layout that adheres to certain specifications. His second hydraulic cylinder with two pistons is also used to balance the lifting load. Once you understand the value and strength of your frame structure, you should validate it using a safety factor comparison. If the comparison results do not match, the design process must be restarted. Therefore, layout and structure assumptions have a significant impact on achieving good results. oil, pump, motor.*

Key Word: *hydraulic, scissor, Student information, force, Assignment, Department.*

I.INTRODUCTION

Mechanical scissor lifts are used in a variety of applications to lift loads to a specific level or height. A combination of pneumatic, hydraulic, mechanical, and other applications are all available for scissor lifts.

A scissor lift with hydraulic cylinders will be used as the application date for this final project design. Before starting this construction, determine the specifications of the scissor lift, including platform size, load capacity, maximum height, minimum height, ride height, arm lift, hydraulic cylinders, and lift speed. Calculations for frame structure strength, motor specs, pump specs, and hydraulic cylinder sizing should be done with an understanding of the desired spec values. When creating a structure in software, it is necessary to calculate its size and material thickness as needed.

The result of this design is a static calculation of the scissor lift based on the specifications. and the specifications of the motor, pump, oil tank and hydraulic cylinder.

II. REVIEW OF LITERATURE

This chapter describes studies, including literature reviews, side-by-side comparisons, research designs or previous or recent developments on the research topic. As such, there are underlying theories for identifying, explaining, and discussing research questions.[1]

A scissor lift is a device for lifting workers, materials, objects, etc. to a required height. However, if scissor lifts are properly designed, manufactured and maintained, they will improve work efficiency, productivity and safety factor. Unfortunately, many accidents still occur due to lack of safety elements in the design. These factors include shear rate, inadequate heavy loads, and material thickness. A very good design must be developed to determine the size and strength of this device

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III.PROBLEM STATEMENT

It has been discovered that there are various issues with the hydraulic scissor lift, including the fact that the weight of the current lift is excessive and that the heavier jobs to be lifted produce more deformation in the hydraulic lift frame, which may lead to failure at the loading point. There are also additional vibrations caused by lifting when working.

IV.PROPOSED SYSTEM

The study's objective is to construct a hydraulic scissors lift with a lifting capacity of 700 kilos and a height of 1.2 meters. A hydraulic cylinder must be the lift's driving mechanism. The interior stresses must be calculated, and a 3D model must be made. The material must be chosen as well.

main technical talents

1. The automatic device that blocks mechanisms for safe operation in any circumstance.
2. The valves that switch when hydraulic actuators are damaged.

3. The valve that controls the rate of descent.
4. The electro-hydraulic device that stops the descent in the event that the elevator's foundation is destroyed.
5. The electrically switched-on device for protection.

V. SYSTEM DESIGN

Scissor arms, hydraulic cylinders, a platform construction, a base frame, and pinned joints make up the system.With its crisscrossing base supporting beneath the platform as the platform pulls itself together, moves upright in the vertical direction, and pushes the platform in line with the height and weight, a scissor lift, also known as a table lift, is typically used to carry people higher. For height expansion, these lifts can be controlled using hydraulic, pneumatic, or mechanical power. It was conceived and constructed as an industrial lift and was initially offered in a variety of sizes and shapes. It has since been modified for extensive and commercial uses. Scissor lifts are primarily suited for applications where persons and material only require up and down movement in two dimensions.

For a scissor lift Force required to lift the load is dependent on
Angle of link with horizontal
Mounting of cylinder on the links
The length of the 111k.
Formula used
Where W = Load to be lifted S=a2 + 1.2 -2aL*cos u
S = Length between end points of the cylinder.
L— Length of Scissor arm; 42 m
u = angle of cylinder with horizontal

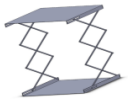

Fig ; diagram of scissor lift

The bulk of the scissor lift is not insignificant. The actuator will use considerable force in order to raise the scissor lift's mass to any given height h. As a result, this work needs to be justified. This section will arrive at an equation to describe the effort required to raise the scissor lift's weight to any height h. We will use an arbitrary cuboidal mass m, a weight B = mg, and axial dimensions to describe the mass of the scissor lift. (B is used to prevent confusion with any other letters. We'll look at how the mass behaves as the height rises, but the mass stays the same (as is the case with a scissor lift extension). For ease of understanding, the density

So, if the block's height changes but its weight stays the same, the effort done to modify the block's height is provided by the formula: AVVB = W2 - WI *AW2 =B/2 (IQ-hi) The result of force and displacement is work. The effort done to hold the weight of this arbitrary mass at height h2 is equal to the work done to bring half of its weight to height 112, according to equation I above, where displacement is h2—hl and force is B/2. Hence, the weight of the scissor lift can be ignored by adding half of its weight to the load, or by placing half of its weight at the top. Hence, the weight of the lift will be taken into account for the remainder of the paper.:

$$LE=L+B/2$$

VI.CONCLUSION

a) Scissor lifts are designed with a safety factor in mind**.**
b) The scissor lift is designed to the required specifications.
c) The design and manufacture of a portable work platform lifted by two hydraulic cylinders was successfully implemented and met the required design criteria**.**
d) The portable workbench is powered by a hydraulic cylinder powered by a hand pump.

Recommendation

- There are still many issues with this study, and it is still possible to conduct more research, among other things;
- Because there is a retention force when the scissor lift descends, double acting hydraulic cylinders would be preferable.

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