

ISSN: 2582-7219



International Journal of Multidisciplinary Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.206

Volume 8, Issue 4, April 2025

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206 | ESTD Year: 2018 |



International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET) (A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Design and Fabrication of Android App Controlled Automobile Screw Jack

Dr. R. Samuel Hansen, Dr. S. M. Rajkumar, S.M.K. Sri Chanthru, K.K.Mohammed Kader, K.Suriya

Assistant Professor, Dept. of Mechanical, Francis Xavier Engineering College, Tirunelveli, Tamil Nadu, India

UG Student, Dept. of Mechanical, Francis Xavier Engineering College, Tirunelveli, Tamil Nadu, India

ABSTRACT: A water-powered scissor lift is a mechanical gadget utilized for different applications for the lifting of the heaps to stature or level. A lift table is characterized as a scissor lift used to stack, raise or lower, pass on and additionally move material between at least two heights. The principal objective of the gadgets utilized for lifting designs is to make the table customizable to ideal tallness.

I. INTRODUCTION

A Screw Jack pallet lift is a mechanical device used for different presentations for lifting of the loads to an elevation or level. A lift table is well- defined as a scissor lift used to stack, raise or lesser, carry and/or move one place to other material among two or more rises. The important objective of the devices used for lifting intentions is to make the table flexible to a preferred height. A scissor lift conveys maximum economic reliable & resourceful procedures of lifting loads; it has few moving parts which may only require lubrication. This lift table raises load efficiently to any preferred height. The scissor lift can be used in grouping with any of presentations such as pneumatic, SCREW JACK, mechanical, etc. Lift tables might include rotating platforms; tilt platforms, etc., as a part of the design.

Scissor lift design is used for the reason that of its ergonomics as related to other heavy lifting devices existing in the market. The frame is very durable & strong sufficient with rise in structural integrity. A various height scissor lift is made up of two or more leg sets. These types of lifts are used to attain high travel with comparatively short platform.

1.1 APPLICATIONS OF SCISSORS LIFT

Industrial scissor lifts & filters are used for a varied variety of applications in various industries which contain manufacturing, warehousing, schools, grocery distribution, military, hospitals and printing.

1.2 CONSTRUCTION AND WORKING PRINCIPLES OF SCISSOR LIFT

The scissors elevator is an elevator with a construction of devices and SCREW JACK cylinders on which the metal platform is capable of moving in the vertical plane. This is completed by using of connected, folding supports in a crisscross pattern, called scissor mechanism.

1.3 MECHANISM OF SCISSOR LIFT

A scissor lift is a vertical lifting device that involves of a platform. The mechanism combined to achieve this function is the use of linked, portable supports in a criss-cross pattern, known as a pantograph. A scissor lift convey the extreme economic, dependable and versatile methods of lifting loads, it has a little moving parts, which may only need lubricated. This lift table increases the load smoothly to any preferred height.

SCREW JACK scissor lifts are very powerful tool for relating a ton of force on the platform plate of module which is similarly distributed on scissor arms. A suitably designed and prepared scissor lift increases the logistic infrastructure, improving ability's competitiveness.



II. PROCEDURE FOR DESIGNING SCREW JACK LIFT

This is the top of the lift table where they lifted hefty workpieces. It very well may be accessible in an assortment of sizes. This part is exposed to the heaviness of the workpiece and its hardware, consequently, strength is required. SCISSOR LEG These are the parallel members that allow the platform to vary elevation. This component is subjected to buckling load and also bending load causes breaking or cause bending of the components. Hence based on strength, stiffness, plasticity, and hardness requirement the suggest material is stainless steel or mild steel. The longer the scissors legs are, the harder it is to control bending under heavy load. Increased leg strength via increased leg material height also better resistance to deflection.

SCREW JACK cylinder: Modern scissors lifts are for the most part worked by one, two, or three single-acting waterdriven chambers. These permit the scissor lift table to lift and lower the heap to the necessary stature. This segment is known as a swagger with the two closures stuck. So they are exposed to coordinate compressive power which would cause bowing pressure which can cause clasping of the segment. It is exposed to an inside compressive pressing factor which produces circumferential burdens and longitudinal anxieties all around the divider thickness.

Subsequently, the essential material property should incorporate strength, pliability, durability, and hardness.

2.1 MOTOR OR POWER SOURCE

For the most part, SCREW JACK scissor lifts are fueled by an electric engine or air engine. These give the capacity to the water-powered siphon which impels the lift table to move upward or descending.

SCREW JACK scissor lift chips away at the guideline of Pascal Law. The guideline of transmission of liquid pressing factor or Pascal Law is the standard in liquid mechanics that clarify that the pressing factor applied anyplace in a limited incompressible liquid is sent similarly every which way all through the liquid to such an extent that the pressing factor varieties stay consistent.

During the 20th century, planners and designers have utilized inventive and novel techniques to create ideal types of constructions and figures. While the methods utilized by these trendsetters created proficient and stylishMinimal assumptions are used in arriving at the slope of nonlinear force- displacement relationship, i.e., element target stiffness hence; they are also called consistent formulations.

2.2 GENERATIVE DESIGN

Generation design is a repetitive design process which is a program generates a selective number of outcomes according to the constrains given.

Where designs can be selected according to the material, factor of safety, stress and strain, weight, volume, deformation and manufacturing method etc.

In this project the mass optimization are performed for parts of SCREW JACK scissor lift is Scissor Rod.

2.3 SETTING UP THE PART

In generative design process numerous components are dependent on agreeing to plan part to run this cycle. First, the part setting should be with a predefined model. At that point place the mountings in the model so the heaps are been set. The current math highlights assists with characterizing the load point.

The generative design process consists of 3 steps :

- Part modeling
- To create obstacle and preserve geometry model
- Model configuration

2.4 FINITE ELEMENT ANALYSIS

FEA or finite element analysis is a commonly used method for physical problems using numerical techniques, since SCREW JACK Scissor Lift is a heavy mechanism it is hard to tackle in a hypothetical way. It is utilized to tackle exceptionally troublesome continuous engendering or liquid stream. Any nonstop item in space has different levels of



opportunity which makes it hard to tackle ordinarily the result of the arrangement is a long way from the constant examination.

In FEA, the article is should have been addressed can be platted the surface body into a discrete number of components for which the arrangement can be determined and tackled. The component can be spread its limit condition all through the entire domine. FEA increases the value of the item plan process it gives critical understanding and plan that assists with making better items. A portion of the particular advantages and result of utilizing FEA increase the accompanying:

- It can predict the performance of the plan to be used
- It can predict the failure accusation for the case study
- It is used to evaluate and correct observed failures
- It is used to evaluate the design and improve the performance and safety

2.5 MESHING

It is an important process to obtain results accurately in finite element analysis. The smaller the mesh size the more resolution of the design solutions as samples across the physical domains for higher accuracy the mesh size to be very fine result in an increase in time taken for processing.

Thereafter, we have compared the parts before and after optimization of scissor lift, after the comparison, the top, base platform and scissor rod show better results but the rod has a complicated design. The design of the optimized scissor lift shows excellent results, and the material Stainless Steel 304 is used to make the SCREW JACK scissor lift more strong.

From this, we can conclude that the optimized parts (top, base platform and scissor rod) have got improved than the existing design because the parameters show improved results

III. CONCLUSION

The SCREW JACK scissor lift was basic being used. It can likewise lift heavier burdens. Material dealing with and giving solace to the administrator was our primary inspiration driving the improvement of this lift. With such a plan of scissor lift, the intricacies in a plan and manufacture time were decreased. Yet, the restriction of this lift is the high introductory expense. The analysis and simulation on AUTODESK FUSION 360° programming has additionally shown that the plan was protected under certain acknowledged boundaries.

In this paper, we did a definite analysis of scissor component joins against bowing and clasping disappointment and furthermore centered around different plan viewpoints. In this, the lift was just fit for lifting the load up to 200kg with the least exertion.

In this paper, we have discussed the important points for optimizing the design and analyzing the SCREW JACK Scissor Lift performance in various scenario. From the simulation results, it is clear that using generative design and topology optimization technique has been reduced according to the kerb weight of the the scissor lift. Since, mass is one of the important criterion in the racing and cruiser bikes, as mass gets reduced the vehicles gets to travel faster, hence generative design and topology optimization are helpful to reduce mass up to 38% of the SCREW JACK Scissor Lift.

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|



International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

REFERENCES

- 1. BekirCirak, Dynamic Analysis of the SCREW JACK Scissors Lift Mechanism, International Journal of Science and Research (IJSR), Research Gate Impact Factor (2018).
- 2. Divyesh Prafulla Ubale, et al, International Journal of scientific research and management(IJSRM), Volume-3,Issue-3,Pages-2405-2408,2015.
- 3. Doli Rani, Nitin Agarwal, Vineet Tirth, Design and Fabrication of SCREW JACK Scissor Lift, MIT International Journal of Mechanical Engineering, Vol. 5, No. 2, August 2015.
- 4. Enoch L.Newlin, Scissor lift mechanism employing telescopable electro- mechanical based lift actuations arrangement.
- Gaffar G Momin, Rohan Hatti, Karan Dalvi, Faisal Bargi, Rohit Devare, Design, Manufacturing & Analysis of SCREW JACK Scissor Lift, International Journal of Engineering Research and General Science Volume 3, Issue 2, Part 2, March-April, 2015.
- 6. GhangalePrashal and Mr Ambare Rahul,Design analysis and manufacturing of portable SCREW JACK scissor lift,Global journal of engineering science and research,2017,92-95
- 7. Hongyu, T.,Ziyi, Z. 2011."Design and Simulation Based on Pro/E for a SCREW JACK Lift Platform in ScissorType"ProcediaEngineeringno.16,p.772-781.
- H.Tian, and Z. Zhang, "Design and simulation based on pro/E for A SCREW JACK lift platform in scissor typ," Journal of SciVerse ScienceDirect, Vo.16pp.772-781,2011.





INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

| Mobile No: +91-6381907438 | Whatsapp: +91-6381907438 | ijmrset@gmail.com |

www.ijmrset.com