iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 12 **Issue:** III **Month of publication:** March 2024

DOI: https://doi.org/10.22214/ijraset.2024.58735

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue III Mar 2024- Available at www.ijraset.com

Design of Multipurpose Scissor Lift

Sangameswaran U
P. G: M.E[Engg Design], M.B. A[Gen], Dept of Mechanical Engg Chennai India

Abstract: A scissor lift is mechanical device used for various application to lift load to certain height, raise or lower, transfer material one place to desired place. In this project design to reduce work time and increase productivity in market single design format is available in this design multi tool has attached to single scissor design to complete multi work to reduce error and increase productivity.

I. INTRODUCTION

Scissor lift design used for reduce work, easy movable and reduce damage of goods. In this project scissor lift design model is multipurpose method it can easily alter and inter change structure to easy movable, reduce time, damages in goods. We can reduce cost of scissor lift to buy in individual design structure. Normally in market scissor lift design scissor lift design lift or move upward prefer height it has tilt or rotating object in prefer position to place. In this project single scissor lift model, we can extend height, rotation table or slide extend table can be used work has been done by use of hydraulic energy force. The frame is very durable and strong sufficient with structural design.

II. CONSTRUCTION AND WORKING OF SCISSOR LIFT

Scissor elevator device work with help of hydraulic cylinder inside hydraulic oil to move inside object to lift in vertical plane. Mechanism allows to vertical movement of load support in cross section 'x' pattern upward motion is applying force by actuator with help of pneumatic, hydraulic, mechanical support to move object vertically

A. Hydralic Actuator

The lubricant oil is used to operate fluid pressure to lift load hydraulic cylinder pressurizes hydraulic oil speed variation is possible to temperature fluctuation that can alter viscosity of hydraulic oil.

B. Pneunamtic Actuator

The pneumatic method air pressure is compressing form atmosphere in cylinder. the pressurized air in move to cylinder to object. the pressure has to be maintained if it not any damage or leakage in air pressure object can't be move or lifted.

C. Mechanical Actuator

The mechanical method rack and pinion or gear method to used object to lift or move or rotation. Benefit in mechanical method slipper or loss in pressure has reduce. This method easy and effective.

III. MATERIAL SELECTION

Material selection is designing the component in performs in any damage in product and also to avoid accident occur the proper selection material selection is must. Different part of mechanism applies different material used mostly selection based on load apply in area and cost depend on it. normal force is applied in shear force cause bending properties such as strength, hardness and stiffness are should be consider. Main component of material selection is used mild steel it applies in base, frame, arm hence hardness and stiffness are required.

S.no	Mechanical composition of mild steel	
1.	Tensile strength, yield	370Mpa
2.	Elongation at break	15.0%
3.	Reduction of area	40.0 %
4.	Modulus of elasticity [typical of steel]	205Gpa

©IJRASET: All Rights are Reserved

A large group of alloying components improves the compound physical/synthetic application. Compound might be added chromium (Cr), cobalt (Co), phosphorus(P), sulphur(S) manganese (Mn) chromium will reduce corrosion and increase steel hardness. Chromium oxide reduce corrosion and increase life of material. different component is added to reduce wear and tear, rigidity, durable end goal is to be when force apply in components it should withstand and transfer goods in certain position. Force apply in the area segment are

1) Scissor arm.
2) Hydraulic cylinder.
3) Top platform.
4) Base platform.
5) Supporting arm.
6) Wheels.

A. Scope Of Project

1) Raise and lower lifting object.
2) To reduce time wastage.
3) To reduce damage in object.
4) Scissor lift accident can be control.
5) Safe work area.

B. Market Research

In market availability of scissor lift is single purpose only because of easy and depends on space and load factor of product moving or fixed base is set in area. Here project is chosen on four different type of scissor lift in design

1) Movable base with extended platform.
2) Vertical moving scissor lift.
3) Rotating platform base.
4) Removable with roller platform.
5) Support arm to reduce damage of load.



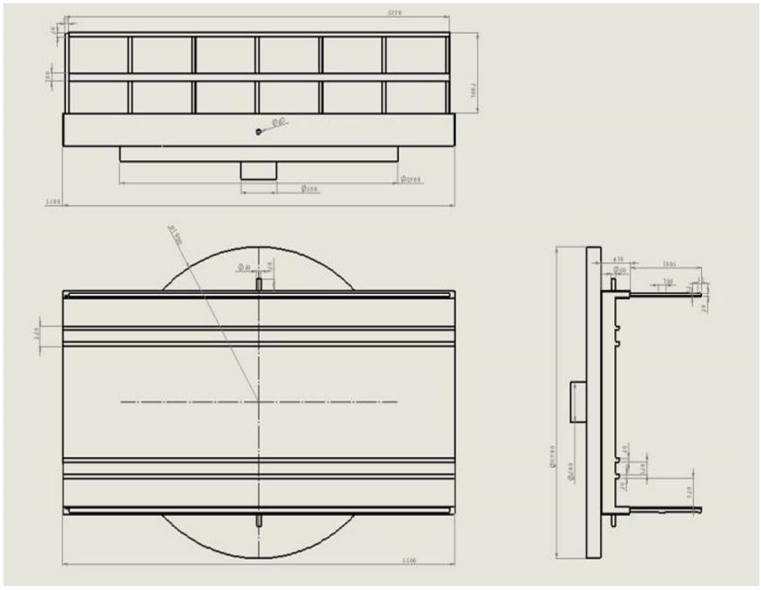
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue III Mar 2024- Available at www.ijraset.com

IV. DESIGNING SCISSOR LIFT USING SOLID WORK SOFTWARE

Solid work software is used for this design in market many platforms software to create object in this design solid work software platform is used for easily crate and modelling product and easy convert file analysis design platform software.

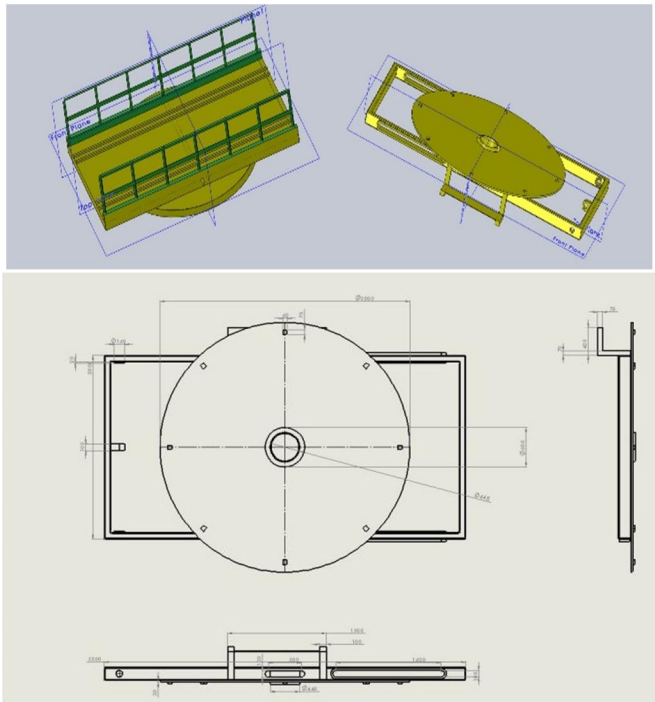
A. Base Platform

The base platform where product is place and object can be easily movable and transport form one place to another place. Normally design base came in market fixed in this design included extended platform.



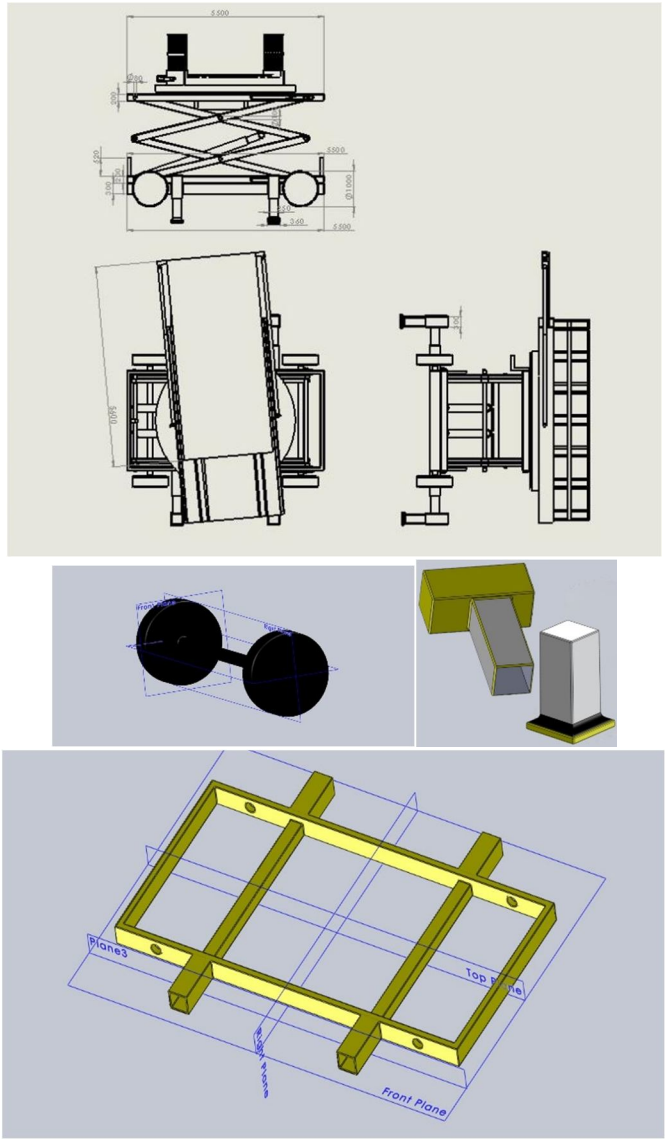
B. Swivel Base

The base area is fixed in market but in this design, swivel is placed [360°] rotation. Manual method locking is place for swivel but we can fix electric motor with help of worm gear rotation can be controlled.



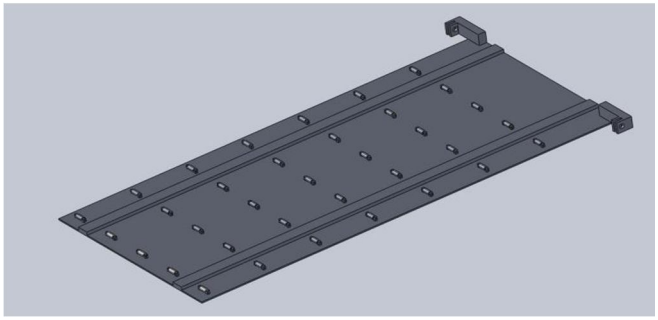
C. Movable Base With Support Arm

The movable base is place to easy movable object and also easy moving scissor lift to reduce wastage of time and increase productivity four supporting arm is place to support object and easy load transfer can be manage to avoid accident and damage in product.



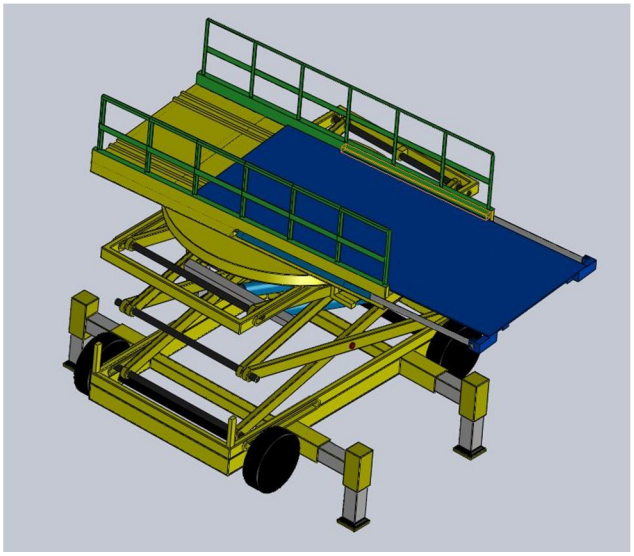
D. Roller Base

The roller base is placed on top of base platform it can be attach and detach on purpose of usage of material movement. roller base fixed in the one end of base platform and other end is self-weight it can easily operate and extend base also available in this method.



E. Multipurpose Attachment

The multipurpose attachment is shown below its easy and reduce time moving material handling and reduce wastage of product to increase productivity.



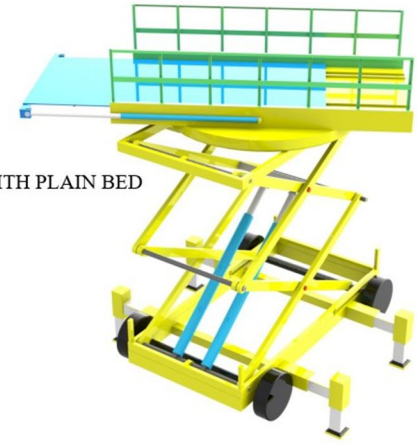


TABLE WITH PLAIN BED

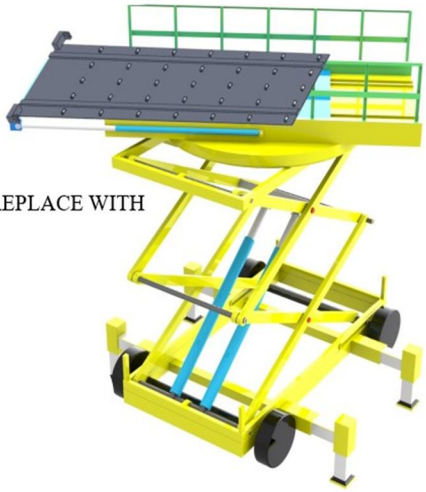


TABLE CAN BE REPLACE WITH ROLLER BED

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue III Mar 2024- Available at www.ijraset.com

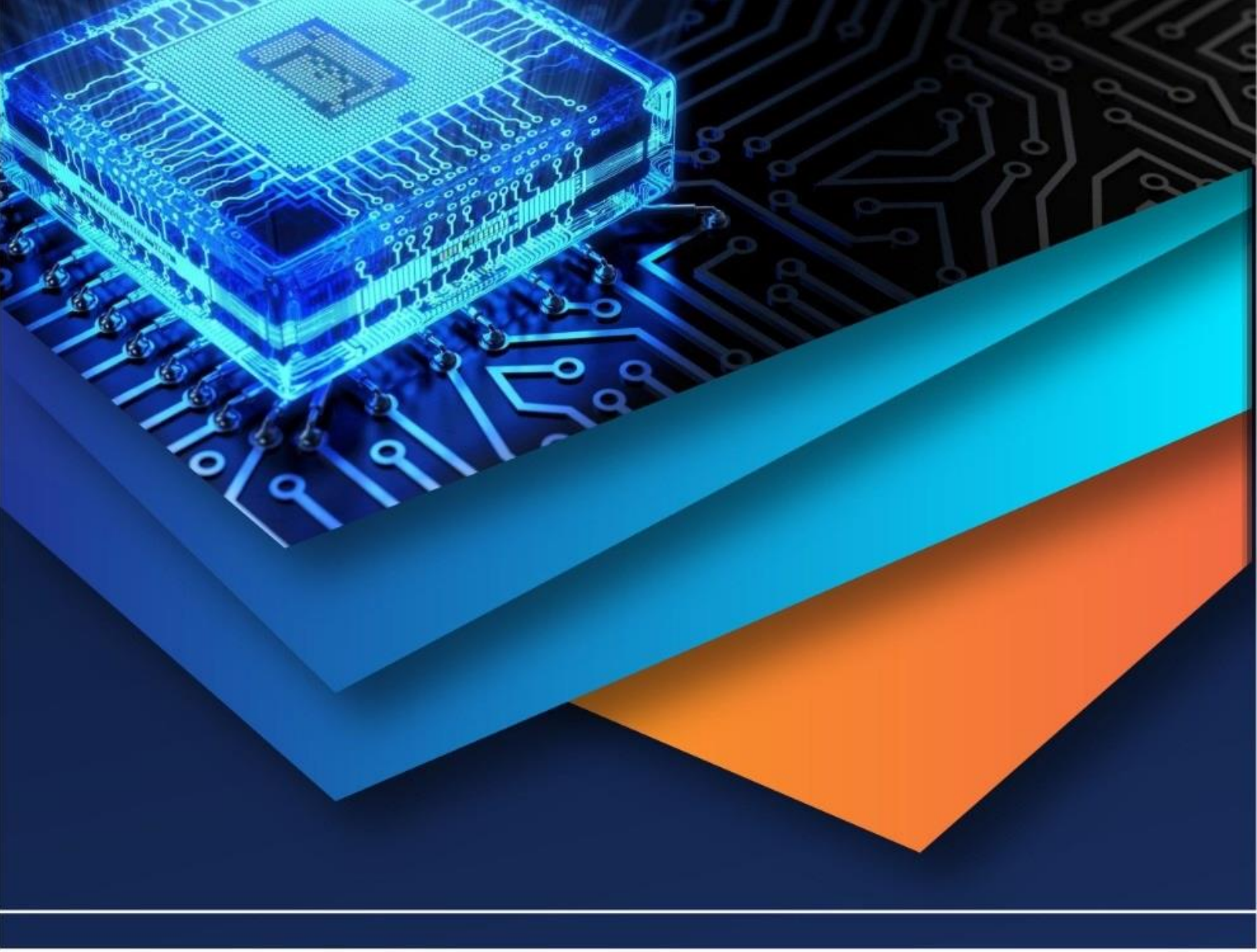
III. CONCLUSION

The hydraulic scissor lift is vertical movement of object design on the purpose reduce time and material handling process multifunction method is used in this method of design. Load transfer and material handling methos can be easily done by this scissor lift design is easy to understand the process of working how to reduce damage and increase productivity cost wise scissor lift is buying reduce because of multipurpose function.

REFERENCES

[1] Barsel, R.K., 'Fluid Mechanics', 2nd Edition, John Wiley & Sons, 1998.
[2] Gupta, R.K., 'Machine Design', 4th Edition, Eurasia Publishing House, Ltd., 2006.
[3] Franklin Mill, 'Aerial Lift Safety: Operating Requirements' retrieved online: 21/04/2011.
[4] Hedge, R.K., 'Mechanical Engineering Science', 3rd Edition, John Wiley & Sons, 1995
[5] Khurmi, R.S. and Gupta, R. K., 'Theory of Machines', 2nd Edition, Chaurasia Publishing House, Ltd., 2006.
[6] Understanding Scissor Lift Deflection, retrieved online at www.Autoquip.com, 21/04/2011.
[7] WCB Standards: A324 Forklift Mounted Work Platforms Retrieved Online 21/04/2011.
[8] Elevating Work Platform, Retrieved online at www. Wikipedia, 21/04/2011

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)