

Design, Analysis and Manufacturing of Double Scissors Lift Elevated by One Hydraulic Cylinder

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Abstract - The following paper describes the design, analysis and manufacturing of a hydraulic scissor lift having two levels elevated by one hydraulic cylinder. Scissor lifting machine is hydraulically operated with makes lifting simple by sliding bending onward to lift manually because the table is regulating to be lifted at a preferred height. There are predominantly hundreds of workers for lift tables in industrial, warehousing and delivery services. The addition of this device (lift table) makes job quicker, harmless and easier. The overall objective of this paper is to design and manufacture a double scissors lift device elevated by one hydraulic cylinder that can be used in the automobile sector. The machine is tested by lifting different weights and it is successful and can lift up to the recommended weight of 270kg efficiently without any problem. Drafting & drawing of hydraulic system scissor lift is done using solid works.

Key words - Scissor lifting; lift table; hydraulic cylinder automobile sector; Solid works

I. INTRODUCTION

A scissor lift is a vertical lifting device that consists of a platform. The mechanism incorporated to achieve this function is the use of linked, folding supports in a crisscross pattern, known as a pantograph [1]. A scissor lift provide the most economic, dependable and versatile methods of lifting loads, it has a few moving parts, which may only require lubricated. This lift table raises the load smoothly to any desired height. This mechanism is incorporated with a hydraulic cylinder and the top of the scissors is attached a table platform. This device will make use of the power generated from a hydraulic cylinder to raise or lower a platform. The scissor lifts can be classified as follows: Hydraulic lifts, pneumatic lifts and mechanical lifts.

Hydraulic scissor lifts are very powerful tool for applying a ton of force on the platform plate of component which is equally distributed on scissor arms [2].

A properly designed and equipped scissor lift enhances the logistic infrastructure, improving facility's competitiveness. They are provide optimum solution for lifting awkward shaped objects to comfortable working heights with least worker fatigue and physical strain. It also reduces back and muscle injuries by avoiding inappropriate manual lifting techniques. Besides these it helps to save time. The beneficiaries are those who are working directly on lifting parts in automotive assembly and repair sector. This paper

presents the design and manufacturing of a scissors lift elevated by one hydraulic cylinder for the automotive industry.

The drawing of hydraulic scissor lift was done using solid works. Figure 1 shows the 3D modeling of double hydraulic scissor lift.



Fig.1. 3D modeling of hydraulic scissor lift

II. DESIGN ANALYSIS

Concept selection

The design was selected from an already made product in the market with modification in various parts and section to further enhance the functionality of the design.

Design considerations

Considerations made during the design and fabrication of a portable work platforms being elevated by one hydraulic cylinder is as follows:

- Functionality of the design
- Manufacturability
- Economic availability, that is general cost of materials and fabrication techniques employed.

Research carried out in the automotive industry reveals that one of the heaviest components of the automobile car is the car engine which is of average weight of 272 kg. By this factor, the control weight would be 280 kg for safer design of the scissor lift table platform for assembly purposes in the automotive industry.

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Design and analysis of a universal hydraulic scissor lift Rashem Pandit, Prashant Misal, Mayur Khillare, 2017-11-23 Bachelor Thesis from the year 2015 in the subject Engineering Mechanical Engineering grade 3 0 Savitribai Phule Pune University formerly University of Pune Pune Vidyarthi Griha s College of Engineering and Technology course Mechanical Engineering language English abstract The position of center of gravity of a vehicle plays a very important role in the dynamics of the vehicle It needs to be balanced in the lateral direction Its position in the longitudinal direction and its height has an important role in the design of the braking system It also has an effect on the suspension geometry of a vehicle Now for finding out the Center of gravity of any vehicle it needs to be lifted at some required height from one end A vehicle has tremendous weight and therefore a huge lifting force is required To be able to carry out such a task hydraulic systems are generally used Out of the various hydraulic systems hydraulic scissor lift is the best suitable option for carrying out this function Nowadays scissor lifts are being used for various applications such as aerial work platforms lift tables etc Our project is an innovative application of scissor lifts to find out the Center of gravity of a vehicle

Progress in Engineering Technology V Muhamad Husaini Abu Bakar, Tajul Adli bin Abdul Razak, Andreas Öchsner, 2023-05-27 The book contains a selection of peer reviewed papers from the 2022 conferences which took place at the Universiti Kuala Lumpur Malaysian Spanish Institute UniKL MSI Kedah Malaysia This book contains twenty two papers written by researchers participating in the conferences Topics covered in this book include composite materials thermodynamics vibration dynamics of structures manufacturing processes computer aided manufacturing CFD analysis design and optimization of devices and procedures The topics are commonly encountered in industries and become an interest in the academic world The learning of engineering technology s curricular across universities is now an essential topic covered in various higher learning institutions Therefore it is hoped that this book serves as an excellent reference for researchers and graduate students working with on multidisciplinary engineering technology

Recent Advances in Mechanical Engineering Seshadev Sahoo, Natraj Yedla, 2024-05-14 This book presents select proceedings of the fourth International Conference on Recent Advances in Mechanical Engineering Research and Development ICRAMERD 2023 The contents focus on latest research and current problems in various branches of mechanical engineering Some of the topics discussed include fracture and failure analysis fuels and alternative fuels combustion and IC engines advanced manufacturing technologies powder metallurgy and rapid prototyping industrial engineering and automation vibrations and control engineering automobile engineering fluid mechanics and machines heat transfer composite materials micro and nano engineering for energy storage and conversion and modeling and simulations The book is useful for researchers and professionals in mechanical engineering

Proceedings of the 2022 International Conference on Smart Manufacturing and Material Processing (SMMP2022) Anand Nayyar, 2022-11-15 Smart manufacturing is a broad category of manufacturing that employs computer

integration high levels of adaptability and rapid design changes together with digital information technology and a technically trained workforce This book presents the proceedings of SMMP2022 the 2022 International Conference on Smart Manufacturing and Material Processing held on 12 and 13 August 2022 as a virtual event due to continuing restrictions related to the COVID 19 pandemic and hosted from Shanghai China The conference provides a platform for researchers and scientists from smart manufacturing and material sciences to come together with researchers from various other application areas to discuss problems and solutions identify new issues and shape future directions for research The conference received 60 submissions These were submitted to a rigorous peer review process by a committee of experts from various disciplines after which 23 were accepted for presentation at the conference and publication here The topics covered include materials processing and product manufacture sensors and smart material systems functional materials industrial automation and process control and discussion of the state of the art and future direction of smart manufacturing and material sciences Providing an overview of current developments in smart manufacturing and material processing the book will be of interest to all those working in the field

Proceedings of Mechanical Engineering Research Day 2020 Mohd Fadzli Bin Abdollah,Hilmi Amiruddin,Amrik Singh Phuman Singh,2020-12-01 This e book is a compilation of 170 articles presented at the 7th Mechanical Engineering Research Day MERD 20 Kampus Teknologi UTaM virtual Melaka Malaysia on 16 December 2020 **Advances in Engineering Research and Application** Duy Cuong Nguyen,Ngoc Pi Vu,Banh Tien Long,Horst Puta,Kai-Uwe Sattler,2022-12-01 The International Conference on Engineering Research and Applications ICERA 2022 held on December 1 2 2022 at Thai Nguyen University of Technology in Thai Nguyen Vietnam provided an international forum to disseminate information on latest theories and practices in engineering research and applications The conference focused on original research work in areas including mechanical engineering materials and mechanics of materials mechatronics and micro mechatronics automotive engineering electrical and electronics engineering information and communication technology By disseminating the latest advances in the field the Proceedings of ICERA 2022 Advances in Engineering Research and Application assists academics and professionals alike to reshape their thinking on sustainable development

Energy And Mechanical Engineering - Proceedings Of 2015 International Conference Steven Y Liang,2016-03-03 The International Conference on Energy and Mechanical Engineering brought together scientists and engineers from energy and engineering sectors to share and compare notes on the latest development in energy science automation control and mechanical engineering This proceedings compiled and selected 156 articles organized into Energy Science and Technology Mechanical Engineering Automation and Control Engineering Amongst them are the results and development of Government sponsored research projects undertaken both in universities research institutes and across industry reflecting the state of art technological know how of Chinese scientists **Manufacturing Facilities** Dileep R. Sule,2008-12-22 Fierce global competition in manufacturing has made proficient facilities planning a mandatory issue in industrial engineering and

technology From plant layout and materials handling to quality function deployment and design considerations Manufacturing Facilities Location Planning and Design Third Edition covers a wide range of topics crucial to Mechatronics and Automation Technology Jinyang Xu, 2024-02-15 Mechatronics and automation technology has led to technological change and innovation in all engineering fields affecting various disciplines including machine technology electronics and computing It plays a vital role in improving production efficiency reducing energy consumption and improving product quality and safety and will be central to the further advancement of technology and industry bringing convenience and innovation to even more areas This book presents the proceedings of ICMAT 2023 the 2nd International Conference on Mechatronics and Automation Technology held as a virtual event on 27 October 2023 The aim of the conference was to provide a platform for scientists scholars engineers and researchers from universities and scientific institutes around the world to share the latest research achievements in mechatronics and automation technology explore key challenges and research directions and promote the development and application of theory and technology in this field A total of 121 submissions were received for the conference of which 77 were ultimately accepted after a rigorous peer review process The papers cover a wide range of topics falling within the scope of mechatronics and automation technology including smart manufacturing digital manufacturing additive manufacturing robotics sensors control electronic and electrical engineering intelligent systems and automation technology as well as other related fields Providing an overview of recent developments in mechatronics and automation technology the book will be of interest to all those working in the field

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An Introduction to Design Engineering M. A. Parameswaran, 2004 Presents an overview of these two major

activities expanding however in more detail on the engineering activity that plays a greater role in ensuring the well being of modern industry In this book the initial chapters deal with engineering products their life cycle and how they are designed

British Technology Index ,1979 **Mechanical Equipment Mechanism Design** Hao Zhang,Adrian David Cheok,Yujun Zhang,Tianyong Zhang,2025-08-12 In recent years many new products have emerged in machinery and electronics necessitating innovative designs As a result the mechanism designs of mechanical equipment are facing greater challenges The mechanical mechanism is a crucial component of machines An ideal mechanism design plays a pivotal role in the development of new products Using their vast experience in technical designs the authors have compiled a collection of 100 design cases in this volume The volume aims at assisting technicians engaged in mechanism design and innovation in developing their own unique design concepts and becoming more proficient in the innovative design of mechanisms The cases presented in this book are all drawn from practical production experiences and each case study clearly outlines the details of the mechanism in question While they may not be optimally designed all achieve their intended functions

Trends and Applications in Mechanical Engineering, Composite Materials and Smart Manufacturing Padhi, Surya Narayan,2024-08-14 The fields of Mechanical Engineering Composite Materials and Smart Manufacturing find themselves at the heart of a pivotal predicament As these industries grapple with the demands for efficiency sustainability and innovation a need arises for a unified exploration of the transformative solutions within these domains At this crucial moment researchers academics and practitioners worldwide need to focus on understanding and solving the complex issues that are hindering progress Trends and Applications in Mechanical Engineering Composite Materials and Smart Manufacturing delves into solutions that propel industries economies and societies into a future defined by progress and resilience At its core this book strives to examine the disciplines of mechanical engineering composite materials and smart manufacturing With the collaborative efforts of diverse experts it attempts to create a comprehensive resource that not only identifies emerging trends but also unveils their impact on the real world By acting as a driving force for advancing current research bridging knowledge gaps and presenting innovative solutions the publication contributes significantly to the collective understanding of these disciplines The goal is to empower scholars educators and professionals with the knowledge and insights required to sculpt the future of these increasingly complex industries *Furniture Manufacturing Management* ,1977 **Furniture**

Production ,1972 *The Architects' Journal* ,1994 **NASA Tech Briefs** ,2002 Encyclopedia of Business ideas
Mansoor Muallim, Content updated Agri Tools Manufacturing 1 Market Overview The Agri Tools Manufacturing industry is a vital part of the agriculture sector providing essential equipment and machinery to support farming operations Growth is driven by the increasing demand for advanced and efficient farming tools to meet the rising global food production requirements 2 Market Segmentation The Agri Tools Manufacturing market can be segmented into several key categories a Hand Tools Basic manual tools used for tasks like planting weeding and harvesting b Farm Machinery Larger equipment

such as tractors Plows and combines used for field cultivation and crop management c Irrigation Equipment Tools and systems for efficient water management and irrigation d Harvesting Tools Machinery and hand tools for crop harvesting and post harvest processing e Precision Agriculture Tools High tech equipment including GPS guided machinery and drones for precision farming f Animal Husbandry Equipment Tools for livestock management and animal husbandry practices 3 Regional Analysis The adoption of Agri Tools varies across regions a North America A mature market with a high demand for advanced machinery particularly in the United States and Canada b Europe Growing interest in precision agriculture tools and sustainable farming practices c Asia Pacific Rapidly expanding market driven by the mechanization of farming in countries like China and India d Latin America Increasing adoption of farm machinery due to the region s large agricultural sector e Middle East Africa Emerging market with potential for growth in agri tools manufacturing 4 Market Drivers a Increased Farming Efficiency The need for tools and machinery that can increase farm productivity and reduce labour costs b Population Growth The growing global population requires more efficient farming practices to meet food demands c Precision Agriculture The adoption of technology for data driven decision making in farming d Sustainable Agriculture Emphasis on tools that support sustainable and eco friendly farming practices 5 Market Challenges a High Initial Costs The expense of purchasing machinery and equipment can be a barrier for small scale farmers b Technological Adoption Some farmers may be resistant to adopting new technology and machinery c Maintenance and Repairs Ensuring proper maintenance and timely repairs can be challenging 6 Opportunities a Innovation Developing advanced and efficient tools using IoT AI and automation b Customization Offering tools tailored to specific crops and regional needs c Export Markets Exploring export opportunities to regions with growing agricultural sectors 7 Future Outlook The future of Agri Tools Manufacturing looks promising with continued growth expected as technology continues to advance and the need for efficient and sustainable agriculture practices increases Innovations in machinery and equipment along with the adoption of precision agriculture tools will play a significant role in transforming the industry and addressing the challenges faced by the agriculture sector Conclusion Agri Tools Manufacturing is a cornerstone of modern agriculture providing farmers with the equipment and machinery they need to feed a growing global population As the industry continues to evolve there will be opportunities for innovation and collaboration to develop tools that are not only efficient but also environmentally friendly Agri tools manufacturers play a critical role in supporting sustainable and productive farming practices making them essential contributors to the global food supply chain

195 Business Reports for Automobile Spare parts

Mansoor Muallim, Airbag Manufacturing 1 Market Overview The global airbag manufacturing industry has witnessed substantial growth in recent years primarily due to increased awareness about vehicle safety stringent government regulations and a growing automotive market worldwide Airbags are a crucial component in vehicle safety systems as they are designed to reduce the risk of injury during accidents The market s growth can be attributed to rising safety concerns and technological

advancements in airbag manufacturing

Global Market Size 2022

The global airbag manufacturing market was valued at approximately 18.7 billion in 2022 and it is expected to exhibit a compound annual growth rate (CAGR) of around 6.5% from 2023 to 2028.

2 Market Segmentation

The airbag manufacturing market can be segmented based on the type of airbags, vehicle type, and technology used.

a Types of Airbags

- Front Airbags
- Side Airbags
- Curtain Airbags
- Knee Airbags

b Vehicle Type

- Passenger Cars
- Commercial Vehicles

c Technology

- Pyrotechnic Airbags
- Stored Gas Airbags

3 Regional Analysis

a North America

North America, particularly the United States and Canada, has a significant market share due to strict safety regulations and high vehicle ownership. The region is characterized by well-established automotive manufacturers and a mature market.

b Europe

Europe is another key market for airbag manufacturing, with countries like Germany, France, and the UK being prominent players. Stringent safety standards coupled with a strong automotive industry drive growth in this region.

c Asia Pacific

The Asia Pacific region is witnessing rapid growth driven by the increasing adoption of airbags in emerging economies like China and India. The region's robust automobile industry and the rising middle-class population contribute to market expansion.

d Rest of the World

Other regions including Latin America, the Middle East, and Africa are also experiencing growth, albeit at a slightly slower pace. This can be attributed to the gradual adoption of safety standards and regulations.

4 Market Drivers

a Safety Regulations

Stringent government regulations mandating airbag installations in vehicles to enhance passenger safety are a major driver of the market.

b Technological Advancements

Innovations in airbag technology, such as smart airbags and advanced sensors, are increasing the market's appeal.

c Increasing Vehicle Ownership

The growing number of vehicles on the road, especially in emerging economies, is boosting the demand for airbags.

d Consumer Awareness

Rising awareness of vehicle safety and the importance of airbags among consumers is driving demand.

5 Market Challenges

a Cost Constraints

Airbags, especially advanced ones, can be expensive to manufacture and install, which can pose a challenge in price-sensitive markets.

b Counterfeit Products

The market faces challenges from counterfeit and substandard airbag products that can compromise safety.

c Supply Chain Disruptions

Global supply chain disruptions, as seen during the COVID-19 pandemic, can affect production and distribution.

6 Opportunities

a Electric Vehicles

The rise of electric vehicles presents an opportunity for airbag manufacturers to develop specialized safety systems tailored to the unique needs of EVs.

b Autonomous Vehicles

The development of autonomous vehicles may open new avenues for airbag manufacturers as safety remains a paramount concern in autonomous driving.

c Emerging Markets

Further penetration into emerging markets offers significant growth prospects.

7 Future Outlook

The airbag manufacturing industry is poised for steady growth in the coming years. With the ongoing focus on vehicle safety, technological advancements, and expanding automobile markets in emerging economies, the market is expected to reach new heights. As more governments implement stringent safety regulations and consumers become increasingly safety-conscious, the demand for airbags is likely to surge. Additionally, innovations in airbag technology, such as adaptive airbags and autonomous vehicle integration, will continue to shape the

industry's future Conclusion The global airbag manufacturing industry is on a growth trajectory with a bright future ahead Market players should continue to invest in research and development to create advanced cost effective airbag solutions Moreover they should explore opportunities in emerging markets and stay vigilant against challenges such as counterfeit products and supply chain disruptions As the world continues to prioritize safety on the roads airbag manufacturing is set to remain a vital component of the automotive industry and an integral part of vehicle safety systems worldwide

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Table of Contents Design Manufacturing Analysis Of Hydraulic Scissor Lift

1. Understanding the eBook Design Manufacturing Analysis Of Hydraulic Scissor Lift
 - The Rise of Digital Reading Design Manufacturing Analysis Of Hydraulic Scissor Lift
 - Advantages of eBooks Over Traditional Books
2. Identifying Design Manufacturing Analysis Of Hydraulic Scissor Lift
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Design Manufacturing Analysis Of Hydraulic Scissor Lift
 - User-Friendly Interface
4. Exploring eBook Recommendations from Design Manufacturing Analysis Of Hydraulic Scissor Lift
 - Personalized Recommendations
 - Design Manufacturing Analysis Of Hydraulic Scissor Lift User Reviews and Ratings
 - Design Manufacturing Analysis Of Hydraulic Scissor Lift and Bestseller Lists
5. Accessing Design Manufacturing Analysis Of Hydraulic Scissor Lift Free and Paid eBooks
 - Design Manufacturing Analysis Of Hydraulic Scissor Lift Public Domain eBooks
 - Design Manufacturing Analysis Of Hydraulic Scissor Lift eBook Subscription Services
 - Design Manufacturing Analysis Of Hydraulic Scissor Lift Budget-Friendly Options
6. Navigating Design Manufacturing Analysis Of Hydraulic Scissor Lift eBook Formats

- ePub, PDF, MOBI, and More
- Design Manufacturing Analysis Of Hydraulic Scissor Lift Compatibility with Devices
- Design Manufacturing Analysis Of Hydraulic Scissor Lift Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Design Manufacturing Analysis Of Hydraulic Scissor Lift
 - Highlighting and Note-Taking Design Manufacturing Analysis Of Hydraulic Scissor Lift
 - Interactive Elements Design Manufacturing Analysis Of Hydraulic Scissor Lift
- 8. Staying Engaged with Design Manufacturing Analysis Of Hydraulic Scissor Lift
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Design Manufacturing Analysis Of Hydraulic Scissor Lift
- 9. Balancing eBooks and Physical Books Design Manufacturing Analysis Of Hydraulic Scissor Lift
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Design Manufacturing Analysis Of Hydraulic Scissor Lift
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Design Manufacturing Analysis Of Hydraulic Scissor Lift
 - Setting Reading Goals Design Manufacturing Analysis Of Hydraulic Scissor Lift
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Design Manufacturing Analysis Of Hydraulic Scissor Lift
 - Fact-Checking eBook Content of Design Manufacturing Analysis Of Hydraulic Scissor Lift
 - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
- 14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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