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DESIGN AND FABRICATION OF HYDRAULIC FLOOR CRANE

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1. ABSTRACT

Hydraulic floor cranes offer a cost-effective and efficient alternative to traditional material handling equipment. With their robust and sturdy construction, these cranes are capable of maneuvering heavy loads with ease. Consisting of a mast, boom, hook, wheels, and hydraulic pump with cylinder assembly, the crane structure is designed for durability and reliability. The box crane configuration enables effective handling of heavy loads while minimizing the risk of damage, even under rough conditions. Additionally, mobile floor cranes feature portable design elements, making them suitable for both indoor and outdoor applications in workshops, warehouses, and beyond. Key features such as adjustable boom, mast, and balance enhance versatility, allowing for the lifting of materials of various heights and sizes.

KEYWORDS: Hydraulic floor cranes, Material handling, Maneuverability, Robust construction, Portable design, Adjustable features

2. INTRODUCTION

These hydraulic floor cranes provide an efficient, low cost alternative to other material handling equipment's. Strong, robust, sturdy and built to very standard, these cranes are maneuverable in loading, unloading and shifting of heavy loads. Crane structure consists of mast, boom, hook, wheels and the hydraulic pump with cylinder assembly. The box crane can take heavy loads effectively, avoids damage under rough and unskilled handling. A mobile floor crane is equipment with portable features which makes it admirable and recommended for both indoor (workshop/ warehouse) and outdoor purposes, for the sole aim of lifting and moving heavy materials from one place to another. Some of these features found in them include; adjustable boom, mast and balance due to rest base design. These adjustable features are to accommodate various heights and sizes of materials to be lifted.

3. PROBLEM STATEMENT

The current landscape of material handling equipment poses challenges in terms of efficiency, cost-effectiveness, and adaptability to varying work environments. While traditional options exist, such as overhead cranes and forklifts, they often come with limitations such as high costs, limited maneuverability, and susceptibility to damage under rough handling conditions.

Hydraulic floor cranes emerge as a promising alternative to address these challenges. With their robust construction, including mast, boom, hook, wheels, and hydraulic pump with cylinder assembly, hydraulic floor cranes offer a versatile solution for loading, unloading, and shifting heavy loads. They are characterized by their strength, durability, and standardization, making them suitable for a wide range of applications.

However, despite their potential benefits, there remains a need to further explore and understand the specific advantages and limitations of hydraulic floor cranes compared to other material handling equipment. Additionally, there is a need to assess their effectiveness in different environments, both indoor (such as workshops and warehouses) and outdoor settings.

4. METHODOLOGY

1. Survey of Existing Lift Cranes:

Conduct a comprehensive survey of existing lift cranes to gather insights into their design, functionality, and limitations. This survey will serve as the foundation for identifying key requirements and features for the mobile hydraulic floor crane.

2. Design and Fabrication:

Based on the findings from the survey, proceed with the design and fabrication of the mobile hydraulic floor crane. This process involves detailed design of crane components such as the mast, boom, lift cylinder, and base. Utilize engineering principles and CAD software, such as CATIA, to develop accurate and efficient designs.

3. 3D Modeling:

Create a detailed 3D model of the designed crane using CATIA software. This step allows for visualization and validation of the design before fabrication, ensuring compatibility and functionality of all components.

4. Component Fabrication and Assembly:

Fabricate the individual components of the crane according to the finalized design specifications. Ensure precision and quality in fabrication processes to achieve optimal performance and durability. Once fabricated, assemble the components into the complete hydraulic floor crane.

5. Testing:

Conduct rigorous testing of the fabricated model to evaluate its performance, functionality, and safety. Testing should encompass various operational scenarios, including lifting capacity, maneuverability, and stability. Identify any potential issues or areas for improvement during the testing phase and make necessary adjustments to optimize crane performance.

By following this methodology, the project aims to develop a reliable and efficient mobile hydraulic floor crane that meets the specific lifting and handling requirements of engineering workshops, warehouses, repair garages, and industrial settings.

5. CONCLUSION

In conclusion, the objective of our research project was to develop a fully operational hydraulic floor crane mechanism capable of lifting loads up to 500 kg. We successfully accomplished our primary aim of enabling the crane to lift loads through the vertical movement of its horizontal arm.

Our project emphasized the importance of ensuring the structural integrity and rigidity of the crane mechanism. Through meticulous design and fabrication processes, we achieved a robust and durable crane design, capable of withstanding the intended load capacity.

Notably, despite its relatively lightweight of 50 kg, our hydraulic floor crane demonstrated remarkable lifting capabilities, utilizing hydraulic power efficiently to lift loads up to 500 kg effectively.

Overall, our research and development efforts culminated in the successful creation of a hydraulic floor crane that meets the desired specifications and performance requirements. This project contributes valuable insights and practical solutions to the field of material handling equipment, particularly in engineering workshops, warehouses, and industrial settings.

6. REFERENCES

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