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Design & Fabrication of Hydraulic Jockey for Changing Die Set In Pipe Production

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ABSTRACT: In this paper, a movable hydraulic jockey was design for changing pipe die set system in KUNDAN PIPES, Coimbatore. In the pipe industry various machines are used for making different set of pipe production. Producing different size of pipe in single machine is the currently used method in the manufacturing unit. In this proposed work, a jockey and fixed base bearing wheels are used for transmitting the die set and a wide surface panel is used for mounting the die set in jockey. Here the hydraulic jockey is used to change & transmit die set from pipe machine to store room

KEYWORDS: Hydraulic jockey, Die set, Pipe, Bearing wheel.

I. INTRODUCTION

Die is an important material to make a pipe in pipe machine, a die has play an vital role for various size of pipe production. In the pipe industry various machines are used for making different set of pipe production. The hydraulic jack is a device used for lifting heavy loads by the application of much smaller force. It is based on Pascal's law, which states that intensity of pressure is transmitted equally in all directions through a mass of fluid at rest. A jack or jackscrew is a mechanical device is used as a lifting device to lift heavy loads or to apply great forces. A mechanical jack employs a screw thread for lifting heavy equipment. A hydraulic jockey uses hydraulic power. Jacks are usually rated for a maximum lifting capacity for example 1.5 tons to 3 tons.

II. LITERATURE REVIEW

P.S. Rana et al. (2012)

In this research paper they have come up with the idea of Integrated Automated Jacks for 4-wheelers in which the jack is provided on both the sides of the vehicle and can be easily operated with the help of a button placed at the dashboard of the vehicle. This jack is specially designed to overcome the difficulties faced by the senior citizens and ladies who find it difficult to manually operate the jack.

Mohammed Abuzaid et al. (2013)

In this research paper they have focused on an inbuilt hydraulic jack system which is attached to automobile vehicle on front and rear part of the chassis. There is a front suspension hydraulic jack that is mounted centrally to the front suspension of an automobile between its front wheels. There is also a rear suspension hydraulic jack that is mounted centrally to the rear suspension of the automobile between its rear wheels. The system operates from a compressed fluid reservoir tank that has connections for the front and rear car jack outlets.

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Mayank Agrawal et al. (2018)

This paper represents a study over in- built hydraulic jack system and shows its benefits over traditional mechanical jack system. The design of inbuilt hydraulic jack is also studied and modified to require extent which can be seen by analyzing design of prototype. An Inbuilt hydraulic jack system can be easily operated by buttons provided on the dash board of the vehicle. The jack will be installed on chassis of the vehicle. The motive behind using this system instead of a conventional mechanical system is the more power produced by the system and simple in design as compared to a conventional design. As the hydraulic oil is incompressible so the lifting capacity is more in comparison with the pneumatic system which operates on air which is compressible.

Parth M. Patel et al. (2013)

This paper describes Implementation of Automatic hydraulic jack Mechanism in a four wheeler itself. The jack will be powered by the battery. So at a time of puncture to replace the wheel one has to just press the button and the jack which is fitted in the car itself will lift the car.

III. EXISTING MODEL IN KUNDAN PIPES

In Kundan pipes, they are using mechanical crane for using changing and transmitting of die set to the store room. In that way it will take much time ,need more space and labours are required during changing die set that shown in below figure.



Fig (3.1) :Conventional crane in Kundan pipes

IV. OBJECTIVE OF PROPOSED WORK

1. To construct the die changer in pipe machine.
2. To introduce the jockey for changing & transmitting the die set.
3. And also reduce the maximum space and labours.
4. To reduce the time of changing die set.

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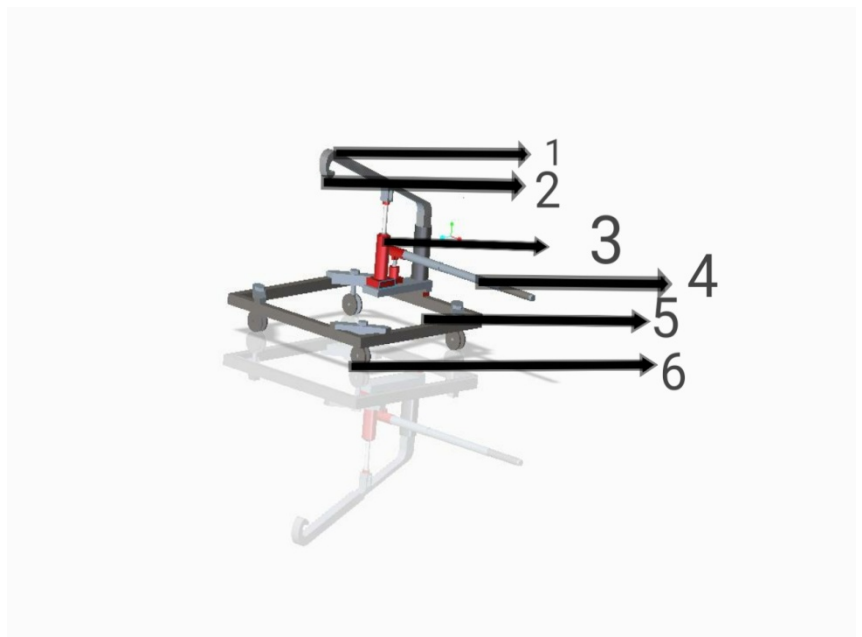
V. DESCRIPTION OF MOVEABLE HYDRAULIC JOCKEY

Capacity of hydraulic jockey = 2 Tons

Weight of the hydraulic jockey = 1.5KG

Height of the hydraulic jockey = 180mm

S.no	Components
1	Steel rod
2	Link chain
3	Hydraulic jockey
4	Connecting shaft
5	Supporting base
6	Bearing wheel



Fig(5.1):Design of fabricated model

VI. EXPERIMENTAL RESULT

WHEEL BEARING

Inner diameter = 35mm

Outer diameter = 50mm

$$\Theta = 4 / 350$$

$$\Theta = 0.0144 \text{ rad}$$

$$\text{Cross section} = 175 * \Theta = 1.995 \text{ mm}^2$$

$$1.995 * 30 = 59.85 \text{ mm}^2$$

$$4 * 30 = 120 \text{ mm}^2$$

$$= 0.6163 \text{ N / MM}^2$$

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$$= 6163.1 \text{ N}$$



Fig(6.1 & 6.2): wheel bearing

HYDRAULIC_JOCKEY

A system for transfer die set from pipe machine to the equipment store section for the various size of pipe production. A moveable hydraulic jockey is used for changing a Die set. Dies set. various process of hydraulic wheels play major role and brief explanation about it.

Pressure at load section = pressure at force section

$$1421.4 / (3.14 * (0.15)^2) = F_2 / (3.14 * (0.05)^2)$$

$$F_2 = 564.225 \text{ N}$$

$$\text{TORQUE } T = F_2 * 0.05$$

$$= 28.213 \text{ NM}$$

Force to be given

$$= 28.213 / 0.5$$

$$F = 56.4 \text{ N}$$

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Fig (6.3): fabricated model of moveable hydraulic jockey



Fig(6.4 & 6.5) : Jockey and Link chain

VII. CONCLUSION

In this paper a hydraulic jockey is suggested in replacement of mechanical crane. Hydraulic jockey can minimize the time and space. They are used to lift, elevator and medium rise building and they are used in loading along with unloading of major parts.

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