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Research Paper

## DESIGN AND FABRICATED PNEUMATIC OPERATED FORKLIFT

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The pneumatic powered double acting cylinders are required to operate the forks in fork truck. There is each two forks are having separate cylinder. In that cylinder makes an individual motion in the forks. In that individual motion will carry the irregular object. It is applicable for small scale and medium scale industries. 4bar pressure is used to lift the pallet of 60 kg and it can be lift up to 2 feet from the ground.

**Keywords:** Forklift, Pneumatic Cylinder, Compressor, Counter Balance

### INTRODUCTION

Forklifts are rated for loads at a specified maximum weight and a specified as center of gravity. This information is located as nameplate is provided by manufacturer, and loads must not be exceeds these specifications. It is widely used in stations, ports, airports, warehouses and other various departments of the national economy. In many jurisdictions, it is illegal to remove or tamper with the name plate without the permission of the fork lifts manufacturer. The fork-lift truck, which is one of the important equipments of modern logistics system, has become highly efficient equipment for mechanized loading and unloading, stacking and short distance transporting. The higher the racking that can be installed, the higher density of the storage can be reached. These

sorts of storage system can be popular in cities where land prices are really high, as the building they racking upto three times higher than normal and using their machines, it is mainly possible to stock a incredible amount of the material in which appeared to be a tiny space (Souvik, 2015).

Micro structural analysis and micro-hardness prole revealed that the shaft was improperly heat treated as resulting in a brittle case, where they crack was found to be an initiate from these cases in a brittle mode in contrast to ductile mode within the core. The analysis suggests that the fracture initiated from the martenstic case as brittle mode due to improper heat treatment process (high hardness). A section of fractured axle shaft made of induction hardened steel was analyzed to determine the root cause of the failure (George, 2014).

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Virtual prototyping technology and multimode dynamics are used to make simulation of dynamic performance of forklift trucks, and the test result is mainly compared with time course load that obtained from frame junction with the annex. The improved simulation and experimental verifications are carried out under the same condition, and they results can be shows that the fundamental frequency of seat of the improved fork-lift truck and vibration energy are lower (Yang, 2014).

As the forklift truck is running, the driver seat and steering wheel of a certain type of fork-lift truck vibrate strongly, virtual prototyping technology and multi-body dynamics are used to make simulation of dynamic performance of fork-lift truck. The improved simulation and experimental verification are carried out under the same conditions, and the results show that the fundamental frequency of seat of the improved fork-lift truck and vibration energy are lower. The result proves the practical value of this method in the research of the vibration characteristics of complete engineering machine (Carina, 2014).

Rear drum brakes are typically of a leading design, the shoe being moved on a single double acting hydraulic cylinder and hinged at the same points. In these designs, one of them brake shoes will always experienced by the self applying effect, irrespective whether can be the vehicle is moving forwards or backwards. Front drum brakes may be an either design in practices, but the twin leading design method is most effective. This design uses two actuating cylinders arranged so that both shoes will utilize the self-applying characteristic when the vehicle is moving forwards. The brake shoes pivot at opposite points to each other (Carina, 2013).

A forklift truck is equipped witha RFID transceiver and a pallet cage and the electromagnetic field is measured. This scenario is then modelled and simulated with the help of a FEM-Software. Therefore, an experimental scenario was investigated by electromagnetic field measurement with a known RFID reader with the help of a calibrated eldprobe. A HFSS model of the RFID-reader was available and implemented. Results show a good correspondence between measured and simulated data (Jan, 2011).

A two degree freedom of dynamic load model is a fork lift truck andit's suitable for using in an analytical floor of vibration assessment. The load model have comprises on two time varying vertical forces and that a fixed distance is apart. The every force is the product of mass matrix and they vertical acceleration vector, which is the turn function of a horizontal velocity of the truck. The fork-lift truck, experimentally determined natural frequencies, the power ratio of these frequencies and the relation between velocity and amplitude of vibration (Ehlanda, 2010).

## DESCRIPTION OF DESIGN

An important aspect of forklift operation is that most have rear wheel steering. While these increases maneuverability in tight cornering situations, it differs from a driver traditional experience on with other wheeled vehicles.

The forklift and load must be considered as unit of with a continually varying centre of gravity with every movement of this load. A fork-lift must never been negotiate a turn on at speed with its raised the load, where the centrifugal and their gravitational forces may combine to cause a disastrous tipover accident. The forklift is

designed with a load limit for the forks which is decreased with fork elevation and undercutting of the load.



Counterbalance machines are available as electric, gas or diesel powered. Electric counterbalance machines are able to operate with a smaller counterweight as the battery serves as ballast as well as a source of power. On counterbalance trucks, the forks protrude from the front of this machine without rigging legs or arms.

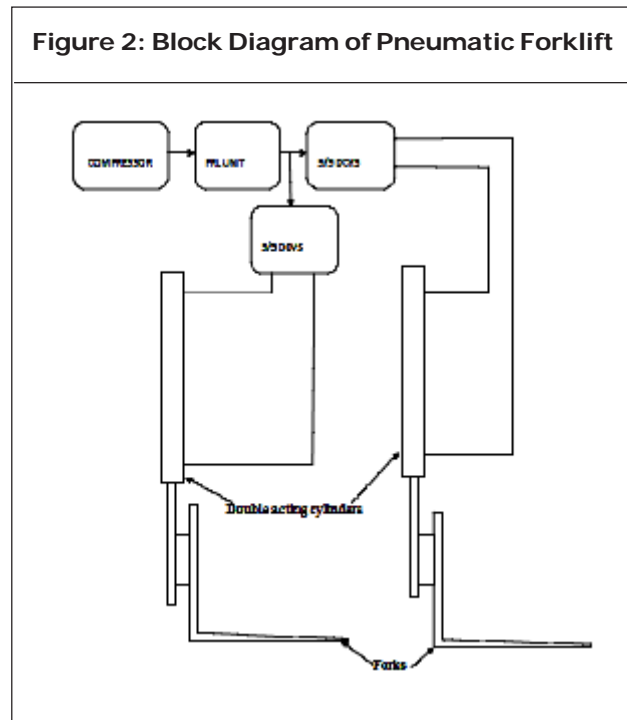
**Wheel Counter Balance**

They have the ability to ‘reach’ out beyond these stabilizing legs and therefore ‘reach’ into racking. The combination of these reaches capability and then stabilizing legs means they reach trucks it can be lift to great heights (in excess of 10 m). While operating in very tight working environments they stabilize the legs and batteries within a reach truck negate the need for any counterbalance weight within the truck construct.

**PNEUMATIC FORK TRUCK**

The proposed method of forklift truck has been

worked for an using pneumatic method. For this method the compressor has been used for supply the air of fork lift. The truck has used for counter balance. It helps to balancing the weight.



**Air Compressor**

Air compressors are utilized to raise the pressure of volumes of air. Air compressor is mainly available in a many configurations; they will operate over a very wide range of flow rates and pressures. Compressed air is expended by a primitive man to gives glowing embers, sufficient oxygen to allowing they its flare up into a fire. During this compression process, the temperatures will increases as the pressure also increases.

Base is the heavy and robust construction in which is made of mild steel. The degree of freedom of locked in two direction. The guider is powered by pneumatic double acting cylinders. It’s used to loading and un loading of the irregular object. The fork is done the main work of the fork lifter.



Figure 3: Fork Lift



### Double-Acting Cylinders

Double-Acting Cylinders (DAC) use the force of air to moves in both extends and then retract strokes. They have been two ports; allow air in one for out of stroke and one for stroke. In this design fork length is not limited; however, the fork length has varied as piston rod is more vulnerable to a buckling and bending.

Figure 4: Cylinder



### Compressor

A compressor is a device used to compress air from low inlet pressure to a higher desired pressure level. In pneumatic systems, compressors are used to compress and supply the required quantities of air. As per law of perfect gas the compressor increases the pressure of the air by reducing its volume.

### CONSTRUCTION

The guide post is mounted at frame. In that fork lift is needed four guideposts for two forks. The guide posts are fixed at vertical axis. Fork is made up of egg in that fork are mounted with guide. It's used to loading and un loading of the irregular object. The fork is done the main work of the fork lifter.

The double acting cylinders helps to a using retract the strokes. The out of stroke and one of stroke helps design the fork length. The fork lift length not fixed it may be varied on bucking and bending. Additional calculations should be performed as well Pneumatically Actuated, Both Sides5 Working ports, 3 switching positions a pneumatic signal applied to pilot port causes flow from port 1 to port 2.If there is no signal applied to the pilot ports, the valve piston is cantered in its mid-position by return spring.

### Material Selection

#### Material for Frame

The frame is made up on the mild steel, which has received the total vibration of the fork lifter

Density ( $Mg\ m^{-3}$ )	; 7.8
Melting Point $T_m$ ( $^{\circ}C$ )	; 1,537
Young's Modulus $E$ (GPa)	; 208
Yield Stress $Y$ (MPa)	; 220

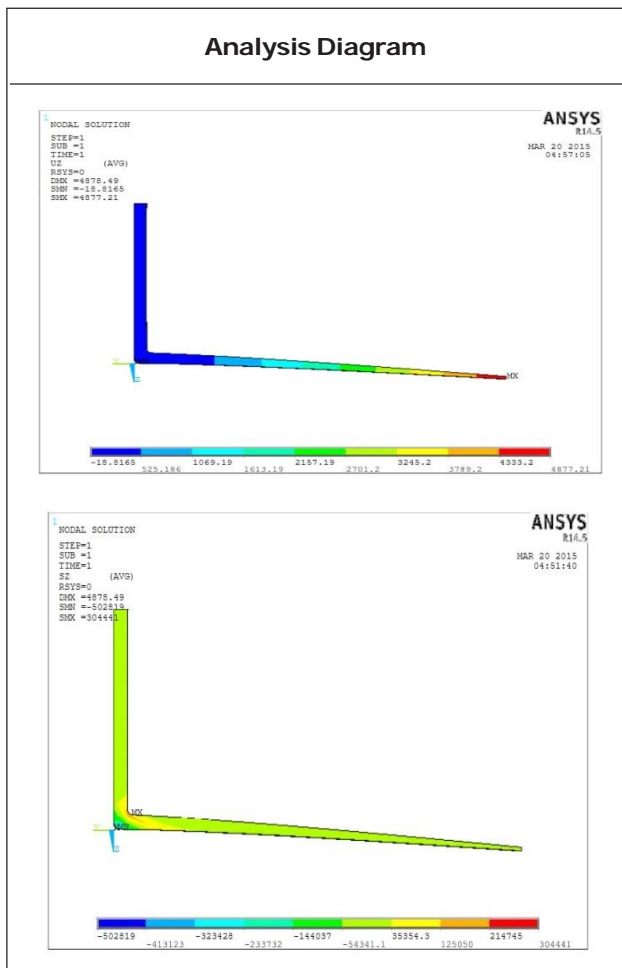
Tensile Strength u (MPa) ; 430

Fracture Energy Gc (kJ m<sup>-2</sup>) ; 100

### CALCULATION

S.No.	Pressure InBar	Load Lifted InKg
1	2	60
2	4	90
3	6	120
4	8	150
5	10	180

### ANALYSIS DIAGRAM



### CONCLUSION

Thus we conclude that this pneumatic fork truck

will be very useful for the small scale industry and this is economical with low cost and easy handling. It can be handle the irregular and uneven objects. The pneumatic power helps to handle the work. The individual movement of the fork is to manage the irregular surface variation the lifting capacities of the 200 kg. In the future work of the fork lifting is to adding the counter balancing back of the vehicle.

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