

# Hover Board Forklift Machine

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**ABSTRACT:** In general, the forklift is a machine capable of lifting heavy weights that is difficult for an ordinary human being to lift. It is a kind of vehicle with an addition of two forks to lift the weight. The operator using these forks can lift any heavy weight material on a click of button without any effort. The forklift operator just pushes the fork below the weights and up to certain distance the weights are lifted in air so that they can be moved accordingly as per the requirements.

Existing forklift design has limitations to use in small scale industries. They are generally more expensive and space consuming, so it cannot be used in narrow spaces. Our new design has mainly focused to the small scale industries to increase their productivity with lesser efforts. Hover board forklift is a two wheel drive forklift machine with two forks attached to the front and it is work based on the lead screw mechanism.

**KEYWORDS:** Hover board forklift, two wheel drive, lead screw mechanism, small scale industries.

## I. INTRODUCTION

A Forklift machine is one of the most important tool used in every industries. Advancement in the forklift machine is improved day by day. Rough terrain forklift trucks are some of the example for the advancement. Thereby the human effort will reduced. It is used in large scale industries with multiple locations. Wide varieties of forklifts are available for required necessities. Forklift trucks are mainly powered by using propane or gasoline, diesel etc. But they are more difficult in maintenance and fuel can be costly. Due to this these

are not affordable in warehouse and small scale industries.

Varieties of products with different shapes and packaging of goods for loading and unloading has always been a heavy process. So it is necessary to forklifts to save time. If cargos are being organized properly by the use of forklifts with right attachment would be a best way to load and unload which would be make the whole process less time consuming and less workers intensive.

Hover board forklift is employed in small scale industries having narrow workspace to improve the productivity. A lead screw mechanism is used for the up and down movement of the forklift. The forklift and vehicle is powered by using a rechargeable battery. So it is more affordable to warehouses and small scale industries.

## II. METHODOLOGY

This hover board forklift machine aims to reduce the human effort, increase the profit and reduce the time consumption. It is a two wheel drive machine works on DC motor powered by battery. The forklift movement is due to lead screw and it is driven by a motor.

### 2.1 LEAD SCREW

Lead screw also known as a power screw or translational screw. A lead screw converts rotary motion into linear motion. The screw thread has larger frictional losses compared to other linkages. It is used for the up and down movement of the forklift with the help of a motor. The frame of the forklift is screwed to the lead screw mechanism.



Figure 1-lead screw

### 2.2 DC MOTOR WITH WORM GEAR

A DC motor is a rotary electrical motor that converts direct electrical current into mechanical work. Its action is based on the principle that when a current-carrying conductor is placed in a magnetic field, it experiences a magnetic force whose direction

is given by Fleming's left hand rule. When a motor is in operation, it develops torque. This torque can produce mechanical rotation. DC motors are also like generators classified into shunt wound or series wound or compound wound motors.



Figure 2- DC motor

### 2.3 FORKS

The forks are the main element which are made to take up the load of the goods being lifted. These are the most stressed elements as it involves

variable loading condition during lifting and loading. These components are generally low in cost and made up of cast iron. These forks attached to lead screw mechanism.



Figure 3- Forks

#### 2.4 SPUR GEAR

Spur gears or straight-cut gears are the simplest type of gear. They consist of a cylinder or disk with teeth projecting radially. Though the teeth are not straight-sided, the edge of each tooth is

straight and aligned parallel to the axis of rotation. These gears mesh together correctly only if fitted to parallel shafts. No axial thrust is created by the tooth loads. Spur gears are excellent at moderate speeds but tend to be noisy at high speeds.



Figure 4- Spur gear

#### 2.5 BATTERY

Where high values of load current are necessary, the lead-acid cell is the type most commonly used. The electrolyte is a dilute solution

of sulfuric acid ( $H_2SO_4$ ). In the application of battery power to start the engine in an auto mobile, for example, the load current to the starter motor is typically 200 to 400A.



Figure 5- Battery

## 2.6 WHEELS

The wheels of two different type are used. The front wheels are of same type and vary from rear. The front wheels have their center at good

height so that a good amount of ground clearance would be achieved and it also help the goods at proper and safe height from the ground. So that it doesn't cause any harm while moving the object.



Figure 6- Wheels

## III. MODELLING



Figure 7 – 3D Drawing

The design consists of a forklift setup in which three wheels are mounted. One wheel at the rear and the other two wheels at the front side of the vehicle. Two D.C motors are provided to the front wheels of the vehicle setup. These motors are operated by a battery using a switch control. Motor is coupled to the front wheel shaft by spur gear mechanism. In front of the Segway, the forklift arrangement is mounted. A lead screw mechanism is used to lift the fork, this is powered by a motor

#### IV. RESULT

The project Hover board forklift machine is able to lift and transport loads across an industry without any damage. It reduces human effort and time consumption and thereby increases the productivity.

#### V. CONCLUSIONS

There are different types of forklifts used to lift and carry loads in industries. Most of them are powered by propane or gasoline. In our project we developed a forklift that is powered by electricity which are affordable to small scale industries and warehouses. In our machine we are using lead screw mechanism to lift the loads. Proper use of the machine is needed to reduce the human effort. By utilizing this mechanism profit can be increased by a greater amount. A moderately trained human being can operate the machine properly. This machine is

one of the most needed for the industries in the current scenario.

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