IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

DESIGN AND FABRICATION OF HYDRALIC COBOT STAND

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Abstract

The cobot is a robot which is use to work with the human being and without human. How ever the cobot is humanoid hand and the head of the head can detach and replace the head has a pick and place the object, welding the inner of the car, sketching the design in a board and it can be placed any where else to use cobot has a human helper. But in the process it can work only in a little extend. To improve the movement in the cobot we are making a stand that can help the cobot to extend mover and work more easier than before.

To improve the movement we are adding a hydraulic stand that can be adjusted in the angle of degree. We can control the hydraulic stand with arduino board has main brain. The lifting and set the will be a lot easier then the manual operator. The angle of the stand gives the angle of certain degree of 30^0 to 50^0. Mean while the height of cobot can also be extended

Keywords: Motors; Dampers; Plates; Power Cord

1. **Introduction:**
2. The cobot is a robot which is use to work with the human being and without human. How ever the cobot is humanoid hand and the head of the head can detach and replace the head has a pick and place the object, welding the inner of the car, sketching the design in a board and it can be placed any where else to use cobot has a human helper. But in the process it can work only in a little extend. To improve the movement in the cobot we are making a stand that can help the cobot to extend mover and work more easier than before.

The IFR defines four levels of collaboration between industrial robots and human workers. Coexistence: Human and robot work alongside each other without a fence, but with no shared workspace. Sequential Collaboration: Human and robot are active in shared workspace but their motions are sequential; they do not work on a part at the same time.
Cooperation: Robot and human work on the same part at the same time, with both in motion.
Responsive Collaboration: The robot responds in real-time to movement of the human worker.

3. Components

3.1 DC Motor:

The dc motor is a most important one thing, These project lawn mower dc motor is rotating electrical converting motor and also these properties many thing places using the dc motor, Some kind of energy convert to various voltage input some types of dc motor control the rpm speed device is there future innovation increase to decrease or decrease to increase the speed now a days calculate the dc motor speed. These 19300 rpm dc motor mainly used to lawn mower cut the grass.

Fig 2.1: DC Motor

3.2 Dampers

The hydraulic system works on th form of piston that moves upward and downward in the vertical or horizontal direction. Hydraulics are often used for moving parts of mechanical systems that need to lift or push heavy objects. These machines focus more on repetitive tasks, such as inspection and picking, to help workers focus more on tasks that require problem-solving skills. Hydraulics is most often used for its ability to move heavy loads with highly controlled motion. In this mechanism the motors rotation is used for the hydraulic function to actuate the hydraulic piston to move up and down.

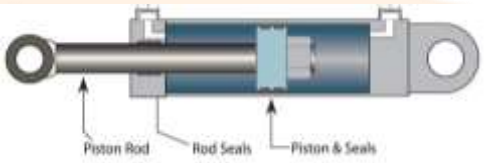

Fig 2.2: Damper

3.3 Steel Plates:

Mild steel is a ferrous metal made from iron and carbon. It is a low-priced material with properties that are suitable for most general engineering applications. Low carbon mild steel has good magnetic properties due to its high iron content, it is therefore defined as being 'ferromagnetic'. Mild steel has a carbon content of between 0.16% and 0.29 % maximum with a relatively high melting point of between 1450°C to 1520°C. Steels with a higher carbon content than mild steel, have a lower melting temperature. This high melting temperature means that mild steel is more ductile when heated, making it particularly suitable for forging, cutting, drilling, welding and is easy to fabricate. Mild steel is not suitable for through hardening. It can be case hardened by being heated and a chemically reactive source of carbon added, the subsequent quench cycle will harden the surface layer. This outer layer, 'the case' will become hardened.

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Fig 2.3: Steel Plate

3.4 Power cord:

These project used a specifically designed power cord. This type of power cord has 12V DC power supply. This power cord can be used, and it is handled very easily. Now a days, every this type cord can upgrade has user considers that particular cord are handled easily.

3.5 Arduino :

Arduino boards are able to read analog or digital input signals from different sensors and turn it into an output such as activating a motor, turning LED on/off, connect to the cloud and many other actions. You can control your board functions by sending a set of instructions to the microcontroller on the board via Arduino IDE (referred to as uploading software). Unlike most previous programmable circuit boards, Arduino does not need an extra piece of hardware (called a programmer) in order to load a new code onto the board. You can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks the functions of the micro-controller into a more accessible package.

4. Methodology:

In working operation, initially the damper is used to control the upper plate of the machine. The control unit is based on the microprocessor. This mechanism is based on the hydraulic support. The motor is connected to the hydraulic to control pressure in the system. The control unit controls the hydraulic pressure in which we to satisfy the cobot. The size and thickness of the hydraulic is 150mm and 50mm respectively.

5. Calculations:

5.1 Design calculation*:*

Height of damper H:50mm
Length of damper L:150mm
Inner(30mm), outer(20mm)
Weight=4kg

W=m x g
M=w/g
Ra, Rb =?
Moment about (A)
Rb x 0.26 =39.24x 10^{-3} KN x 013
Rb = 0.01962KN
Ra + Rb = 39.24 x 10^{-3}
Ra + Rb = 0.03924
Ra + Rb =0.03924 – 0.01962
= 0. 1962
Shear Force
S.F A_{left} = 0
S.F A_{right} = 0.01962
CL = 0.01962
CR = - 0.01962
BL = - 0.01962
BR = 0
Bending Moment
M_B = 0
M_C = 0.01962 x 0.13
M_A = (0.01962 x 0.26) – (0.03924 x 0.13)
= 0
σ_C = Mc/I
M=Maximum bending moment
C=Centroid distance
I=Inertia
I = $bh^2/1^2$
b=279mm
h=2mm
c=h/l
2/2=1mm
0.01m

σ_C = 0.01962 x (0.001) / I
= 0.01962 x (0.001)/ 0.00000009
σ_C =218 KN / m^2
σ_C =0.218 MPa

Strain = Δ L / L(δ/l)
δ=PL/EA
=39.24×0.26/2.0 × $(0.26)^2$
=10.2024/135.2
δ=0.075N/m^2
Ɛ=S/L
=0.075/0.26
Ɛ=0.29

6. The Main components of Lawn Mower

- Plates
- Dampers
- Stand
- Control unit
- Compressor
- Electric Motor

6.1 Stages of Working:-

Plates
Squares Shape Angles
Control Unit
Electric Motors
Electric Components

1. **Block Diagram**:

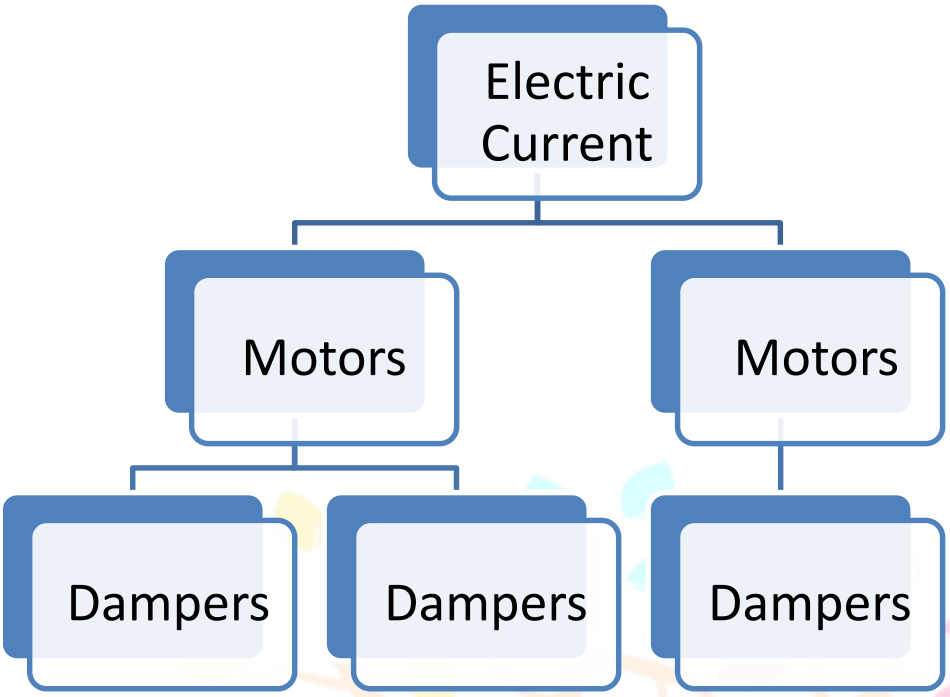

Fig 6.1: Block Diagram

2. **Conclusion**

Due to this additional support of stand the cobot can overcome there limits. The performance of the cobot increases in the process by working in high angle and the precise function. The tilt angle of stand about 30° and it can adjust the height of the cobot. So this conclude that the stand can help to improve the performance of the cobot.

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