ISSN (Online) 2456-1290
International Journal of Engineering Research in Mechanical and Civil Engineering (IJERMCE)
Vol 2, Issue 5, May 2017

Accident Avoiding System for Heavy Cutting Machine

[1] SachinAnant , [2] BiradarVinayak T. [3] Basavaraj N. , [4] Pramath N P , [5] Sharat VD
[1] Assistant Professor [2], [3], [4], [5] UG Scholars
Department of Mechanical Engineering
Sri Sai Ram College of Engineering, Anekal, Bengaluru

Abstract: **-- The aim of our project is to take a system wide approach to preventing the machine accident.The system includes not just the machine and the operator; but rather it includes everything from the initial design of the machine to the training of every one that is responsible for any aspect of it, to the documentation of all changes to regular safety audits and finally a corporate culture of safety first. Design is the part of a machine life where the greatest impact can be made in relation to avoiding accidents. The designer should ensure that the machine is safe to set up and operate, safe to install, safe to maintain, safe to repair and safe to decommission. Although safe operation is usually at the forefront of a designer mind safe maintenance and repair should also be a high priority. Around 50% of fatal accidents involving industrial equipment are associated with maintenance activities and design contributory factor in some 32% of these fatalities.**

I. INTRODUCTION

The main objective of our project is to perform operations using with the help of pneumatic sources. For a developing industry the operation performed and the parts (or) components produced should have it minimum possible production cost, and then only industry runs profitability.

In small-scale industry and automobile maintenance shops, there are frequent needs of tightening and loosening of screws; drilling, boring, grinding. Further for every operation separate machine is required. This increases the initial cost required, large area requirements and large number of machine is required. in our project above complicated are rectified.

NEED FOR AUTOMATION:

Automation can be achieved through computers, hydraulics, pneumatics, robotics, etc., of these sources, pneumatics form an attractive medium for low cost automation.

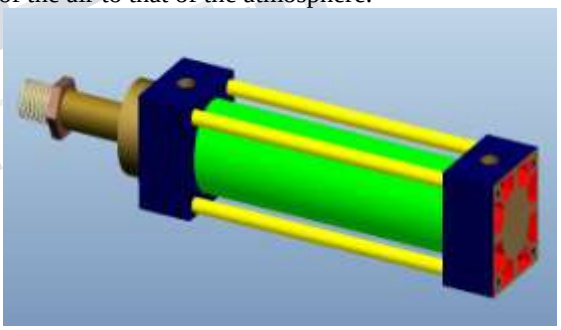
Nowadays almost all the manufacturing process is being atomized in order to deliver the products at a faster rate.The manufacturing operation is being atomized for the following reasons.

- To achieve mass production
- To reduce man power
- To increase the efficiency of the plant
- To reduce the work load
- To reduce the production cost
- To reduce the production time
- To reduce the material handling
- To reduce the fatigue of workers
- To achieve good product quality
- Less maintenance

II. DESCRIPTION OF EQUIPMENT

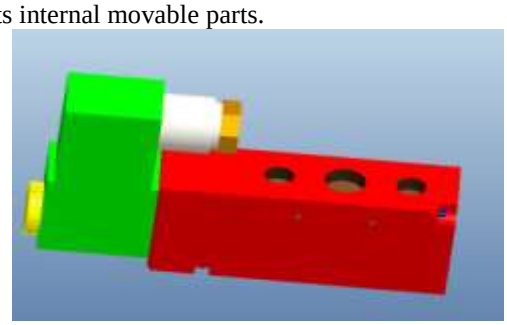
2.1 PNEUMATIC CYLINDER

An air cylinder is an operative device in which the state input energy of compressed air i.e.pneumatic power is converted into mechanical Output power, by reducing the pressure of the air to that of the atmosphere.



2.2 SOLENOID VALVE

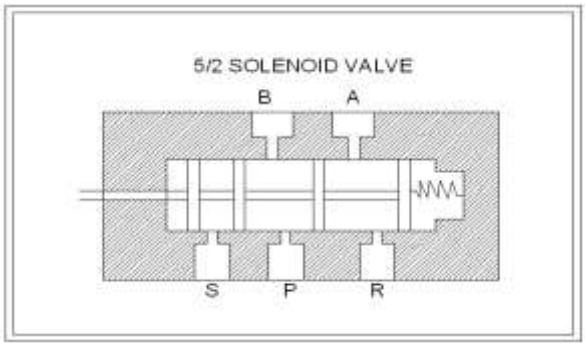
The directional valve is one of the important parts of a pneumatic system. Commonly known as DCV; this valve is used to control the direction of air flow in the pneumatic system. The directional valve does this by changing the position of its internal movable parts.



All Rights Reserved © 2017 IJERMCE

ISSN (Online) 2456-1290
International Journal of Engineering Research in Mechanical and Civil Engineering (IJERMCE)
Vol 2, Issue 5, May 2017

This valve was selected for speedy operation and to reduce the manual effort and also for the modification of the machine into automatic machine by means of using a solenoid valve.



Parts of a solenoid valve

1. Coil

The solenoid coil is made of copper wire. The layers of wire are separated by insulating layer. The entire solenoid coil is covered with a varnish that is not affected by solvents, moisture, cutting oil or often fluids. Coils are rated in various voltages such as 115 volts AC,230volts AC,460volts Ac,575 Volts AC.6Volts DC,12Volts DC,
24 Volts DC,115 Volts DC &230Volts DC.they are designed for such
Frequencies as 50Hz to 60Hz.

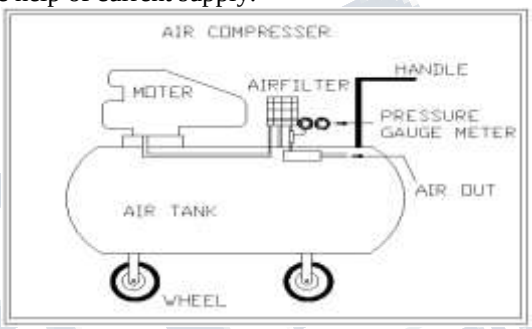
2. Frame

The solenoid frame serves several purposes. Since it is made of laminated sheets, it is magnetized when the current passes through the coil. The magnetized coils attract the metal plunger to move. The frame has provisions for attaching the mounting. They are usually bolted or welded to the frame. The frame has provisions for receivers, the plunger.

2.3 AIR COMPRESSOR:

Compressor is the air producing machine. They collect the airs from the atmosphere are in the running of machine are engine. Air compressors are utilized to raise the pressure of a volume of air. Air compressors are available in many configurations and will operate over a very wide range of flow rates and pressures. Compressed air was expelled by primitive man to give glowing embers sufficient oxygen to allow them to flare up into a fire. During the compression process, the temperature increases as the pressure increases.

Selection of the air compressor is only the first step in designing an efficient and reliable compressed air system. The air exiting the compressor is saturated with moisture and will have compressor lubricants (lubricated compressors only). Other chemicals that may have been drawn into the compressor intake may also be present. This contamination is harmful to many processes, pneumatic tools, instruments and equipment. Selection and purchase of the compressor and necessary purification equipment can be easily done on the Compressed air site. Our application engineers are ready to answer all of your questions and to assist you in placing your order. And it work in the process of rotating the fan and the piston movement with the help of current supply.



2.4OBJECT SENSOR:

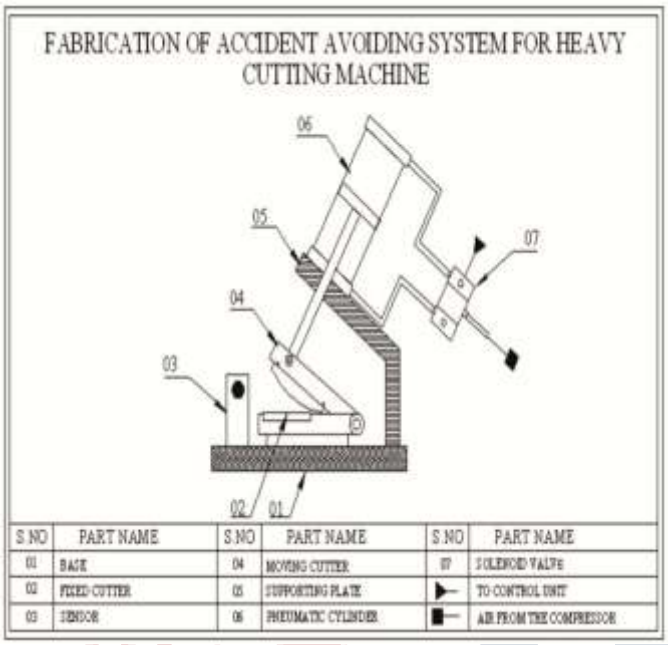
A sensor is a device that measures a physical quantity and converts it into a signal which can be read by an observer or by an instrument. Sensors are used in everyday objects such as touch-sensitive elevator buttons and lamps which dim or brighten by touching the base. There are also innumerable applications for sensors of which most people are never aware. Applications include cars, machines, aerospace, medicine, manufacturing and robotics. A sensor's sensitivity indicates how much the sensor's output changes when the measured quantity changes.

All Rights Reserved © 2017 IJERMCE

ISSN (Online) 2456-1290
International Journal of Engineering Research in Mechanical and Civil Engineering (IJERMCE)
Vol 2, Issue 5, May 2017

III. DESIGN AND DRAWING

3.1 DRAWING FOR ACCIDENT AVOIDING SYSTEM FOR HEAVY CUTTING MACHINE



S.NO	PART NAME	S.NO	PART NAME	S.NO	PART NAME
01	BASE	04	MOVING CUTTER	07	SOLENOID VALVE
02	FIXED CUTTER	05	SUPPORTING PLATE		TO CONTROL UNIT
03	SENSOR	06	PNEUMATIC CYLINDER		AIR FROM THE COMPRESSOR

IV. WORKING PRINCIPLE CHAPTER-V WORKING PRINCIPLE

This project involves controlling accident or defecting due to machines. Here an object sensor is fixed on the machine where if anybody gets close contact with the machine then the relay circuit will trip off the machine and indicate through alarm. Hence accidents can be prevented which is caused due to carelessness. The main function of pneumatic is to cut thin and by pneumatic power. The compressed air from the compressor is used as the force medium for this operation. There are pneumatic double acting cylinders solenoid valves and the timer unit is used. The air enters to the solenoid valve. The function of solenoid valves all of air correct time interval. The 5/2 solenoid valve is used. In one position air enters to the cylinder and pushes the piston so that the cutting stroke is obtained. The next position air enters to the other side of cylinder and pusses the piston return back, so that the releasing stroke is obtained.

ALL PARAMTER VALUES WHAT WE USED IN THIS CALCULATION ARE APPROXIMATE ONLY DESIGN CALCULATION FOR PNEUMATIC CYLINDER

(32 x 100)

Mini pressure applied in the cylinder (P) = $2x10^5 N/m^2$ (2 bar)
Diameter of the cylinder (D) = 32 mm
Diameter of the piston rod (d) = 17 mm
Stroke length = 100 mm
Area of cylinder (A) = $(3.14/4*(D^2)$
$= (0.785x.032^2)$
$A= 8.0384 x 10^{-4} m^2$
Force during forward stroke,
F = {π/4x D^2 x P}
F = $(2 x 10^5 N/m^2) (3.14/4*(0.032^2)$
F = 160.68 N
1kg = 9.81 N
Load capacity during forward stroke W= F / a
W = 160.68 / 9.81
W = 16.37 KG
Force during return stroke,
F = {π/4x (D^2 – d^2) x P}
F = $\{\pi/4x (0.032^2 – 0.017^2) x 2x10^5\}$
F = 115.45 N
Load capacity during return stroke W= F / a
W = 115.45 / 9.81
W = 11.76 KG
For all practical purposes, design your system 25% over and above your theoretical calculations.

V. CONCLUSION

This project is made with pre planning, that it provides flexibility in operation. Smoother and noiseless operation by the medium of "ACCIDENT AVOIDING SYSTEM FOR HEAVY CUTTING MACHINE"

The comparative gain that can be accomplished is the utilization of roller bar. This innovation has made the more desirable

This project "ACCIDENT AVOIDING SYSTEM FOR HEAVY CUTTING MACHINE" is designed with the hope that it is very much economical and help full to many industries and workshops

This project helped us to know the periodic steps in completing a project work. Thus we have completed the project successfully.

All Rights Reserved © 2017 IJERMCE