

DESIGN AND FABRICATION OF PNEUMATIC SLIVER CAN TILTER

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ABSTRACT

Implementing optimal control in a pneumatic driven system is not a very cheap or easy process. The control subsystem of a pneumatic driven system has to distinctive direction of three ways control valve. The proposed system is built by the designed pneumatic force control system.oftenly use pneumatic cylinders, Air supply and 3-way control valve. These instruments is easy understandable, since fast and clean, isn't an electromagnetic compatibility trouble but can be used in potentially explosive environments. Which is coming from the dynamic characteristics of the air which is generally difficult to handles? In this project carried out such a solution, which can be achieved by using an embedded pneumatic sliver can tilter

successfully reduce the time consumption of the cleaning process. To reduce installation and operation cost compared with conventional electrical installation and ensures backward and forward operating level using pneumatic system. To sustain overload pressure conditions and reduce power consumption and initial cost, work load for human. The main goal of this project is to design a lifting mechanism through a pneumatic system. This system is used to lift the sliver can. The solenoid valve connected to the air cylinder to release the air pressure. The solenoid valve is powered ON/OFF through the switch. When the power of the solenoid valve will be ON by pressing the switch then air pressure releases though solenoid valve and lift come back to initial position.

The power supply section is used to power the solenoid valve.

Keywords: Piston, Pneumatic cylinder, Air hose tube

INTRODUCTION

Using pneumatic lift we have used mechanically operated lift which is more cost efficient and portable. We have designed scissor lift in such a way that it has reduced design complexities. All the design calculations are performed taking into consideration the dimensions and all the safety issues. Modifications can be done by providing rollers to the lower base so it could be portable.

The LNJ Bhilwara Group as it stands today is a well-diversified Rs.2,524 core multi-product conglomerate with over 25,000 strong work force, of which over 3,000 are highly qualified personnel in technical and managerial fields. The Group has an outstanding distinction of having as much as 45% of its turnover coming from

exports to both developed and developing countries. The LNJ, Bhilwara Group has diversified interests in Textiles, Graphite Electrodes, Power Generation; Sponge Iron & IT enabled services. RSWM Limited, Unit: Cheslind is a part of LNJ Bhilwara Group.

RSWM Limited, the first textile mill of the LNJ Bhilwara Group was big success and continues to be the flagship company of the Group. In 1968-69, RSWM Limited India's first Polyester Viscose (PV) blended yarn was established.

In 1973-74, the Group set up a spinning unit at Gulabpura, (Distt. Bhilwara) in Rajasthan. Today, Bhilwara is the largest Synthetic Suiting producing district in India.

In the year 1979, RSWM Limited established its own weaving facilities at Gulabpura units. Mayur Suiting brand was also launched in the domestic market. Today, the same quality fabric is being exported

to several countries. In 1989 construction and commissioning of the Banswara unit of RSWM Limited was completed.

RSWM Limited, Unit: Cheslind invested 10crores modernizing the machinery and technology. RSWM Limited, Unit: Cheslind improved Ring frame efficiency and to reduced bonds. We have installed premier ultimo with roving stop motion system.

PROBLEM IDENTIFICATION

In this project the spinning mill process to be more women workers are in the Industry. The doffing machine to carry out the doffing sliver cans. If the doffing sliver cans inside to the spring.

The total weight of sliver should be around 30kg. In the industry the women workers are cannot to be tilt the sliver cans and continuously not efficiency. The women workers are lift the maximum weight is 30kg,

that also not working in continuously.

The sliver should be damaged and cleaning time is very high. While tilling a drum for cleaning process, it's getting a chance to break due to sudden impact. In exiting method of cleaning, human safety is a major problem it leads to severe injuries. Time consuming is more.

DESCRIPTION OF COMPONENTS PISTON



Fig. Piston

Double-acting cylinders (DAC) use the force of air to move in both extends and retract strokes. They have two ports to allow air in, one for outstroke and one for in stroke. Stroke length for this design is not

limited; however, the piston rod is more vulnerable to buckling and bending. Additional calculations should be performed as well.

THREE WAY CONTROL VALVE

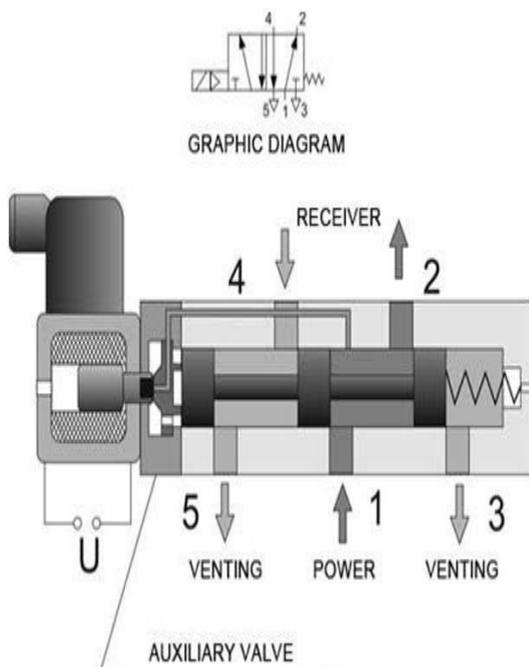


Fig. Three way control valve

A 5/3 way directional valve from the name itself has 5 ports equally spaced and 3 flow positions. It can be used to isolate and simultaneously bypass a passage way for the fluid which for example should retract or extend a double-acting cylinder.

There is variety of ways to have this valve actuated. A solenoid valve is commonly used, a lever can be manually twist or pinch to actuate the valve, an internal or external hydraulic or pneumatic pilot to move the shaft inside, sometimes with a spring return on the other end so it will go back to its original position when pressure is gone, or a combination of any of the mention above.

3 SLIVER CAN



Fig. 4.3.Sliver can

A sliver (rhymes with diver) is a long bundle of fiber that is generally used to spin yarn. A sliver is created by carding or combing the

fiber, which is then drawn into long strips where the fiber is parallel. When sliver is drawn further and given a slight twist, it becomes roving. Outside The Ring & Flowing Hoop---Top quality harden stainless steel is selected to make upper ring and hoop: Sliver Can Body Material---HDPE (high density polystyrene is selected to make the body of can, and suitable amount of imported animistic agent is added and mixed. . The support plate is extruded into the shape by ABS engineering plastic, which has high strength, aging-proof and is plain without deformation. Sliver Can Spring---65mm top quality carbon structural steel is used to make spring: Sliver Can Chassis & Wheel---The bottom plate is pressed and shaped hydraulically by cold-rolled steel plate, which has stable body, shock resistance and long service life.

CALCULATION

Pressure Measurement 1 Bar =
100Kpa = 100KNm⁻² = 14.5 PSI

Equation: $P = F/A$

$P = 2.5\text{bar} = 0.25 \text{ N/mm}^2$

Diameter of piston = $d = 50\text{mm}$

$A = (3.14 / 4) * (d * d)$
 $= (3.14 / 4) * (50 * 50)$

$A = 1963 \text{ mm}^2$

$P = F / A$

$0.25 = F / 1963$

$F = 490.75 \text{ N}$

$F = 50 \text{ Kg.}$

So, we have selected pneumatic cylinder move 50 Kg. Of force at 2.5 bar pressure.

COMPARITION WITH MANUAL AND AUTO MANUAL PROCESS

When the manual cleaning the sliver can take 7mins to cleaning process.

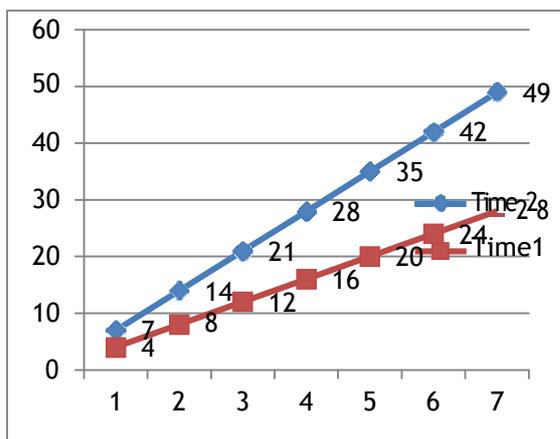
They have more time consumption to the cleaning process.

In manual cleaning the sliver can is more damages and broken of the process.

AUTOMATIC PROCESS

Then the automatic cleaning the sliver can take 4mins to cleaning process.

When compared to the manual cleaning process they rectify the cleaning time and less workers efficiency



CONCLUSION

The system has shown noticeable improvements in various sectors like cleaning time and cost of operation. It is observed that

cleaning time is reduced from 7 mines to 4 min per sliver can. The further advantages of the system has covered the safety of operator and made operation more convenient (reducing fatigue). After completing the project we have come to the conclusion that pneumatics. Sliver can tilters act in the place of hydraulic jacks efficiently. The air required for the operating easily available in the nature. Cost of the project is not high compared with other tilters.

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