Integrated Intelligent Research (IIR)
International Journal of Web Technology
Volume: 05 Issue: 01, June 2016, Pages: 87-90
ISSN: 2278-2389

Bore Oil Machine Automated Using PLC Programming Operate With Pneumatic System

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Abstract-The present manual bore oil system is not much user friendly for industrial production in product of making brake. That in brake , assembly part TMC cylinder has to be sprayed lighter by manual it may sometimes overly sprayed. This causes the bore oil to be wasted and not qualify for pack the product. Then the fail component has to be go for cleaning process. During this process component may be scratched or damage. Thus working fouces difficulties in the machine such as , the plunger assembly machine , bore oil machine and seal punching machine occupies more space, and overcome it take over time to produce the component .This project aims is to overcome the above difficulties by a suitable design and analysis of semi-automatic production system. It is an innovative and unique design and an implementation project. A modification of manual nozzle spray system is done by using pneumatic system and controlled using PLC hardware and software programme. Pneumatic assistance is used for this application. This is a simple and versatile pack that may be fitted to any spraying system. It is fully controlled by PLC circuit.By implementing this spray nozzle, acheines an accurate operation, more user friendly, less effort to fail the component, it reduces the manual work and increase the productivity. These three machines are created as a single assembly to reduce the machine, and reduce also the man power to operate the machine. And it is easy to operate and understand the machine operation by the operator. This machine is designed for simple operation. The cost of this modification is low. That machine is works on an automatic spraying process and increase the product lifetime reduce the labour cost ,and freduces the component failure.

Keywords—component; nozzle; bore oil; spray; insert (key words)

I. INTRODUCTION

Used for assessing endurance performance, simulating vehicle pedal geometry and push rod articulation conditions. A custom built software has been developed to acquire all input & output parameters, such as pushrod travel, hydraulic pressure and knee point, generating instantaneous graphical output.This will work to the production brake in manufacturing company, assembly part TMC cylinder has to be sprayed lighter by manual it may sometimes overly sprayed. This causes the bore oil to be wasted and not qualify for pack the product. Then the fail component has to be go for cleaning process. During this process component may be scratched or damage.

Nozzles Selection and Sizing

This fact sheet covers nozzle description, recommended use for common nozzle types, and orifice sizing for agricultural and turf sprayers. Proper selection of a nozzle type and size is essential for correct and accurate pesticide application. The nozzle is a major factor in determining the amount of spray applied to an area, uniformity of application, coverage obtained on the target surface, and amount of potential drift. In spraying systems, nozzles break the liquid into droplets and form the spray pattern. Nozzles determine the application volume at a given operating pressure, travel speed, and spacing. Selecting nozzles that produce the largest droplet size, while providing adequate coverage at the intended application rate and pressure, can minimize drift. The size of the spray particle is important because it affects both efficacy and spray drift of the application of an herbicide, insecticide, or fungicide. If the size of the spray particle (for example, 250–500 microns) is doubled and the application volume stays the same, you have only one-eighth as many spray droplets (Figure 1). For example, to gain optimum efficacy in weed control, a 10–20 gallons per acre (GPA) spray volume is typically recommended, with a "medium" droplet size suggested for contact nontranslocating herbicides, and a "coarse" droplet size suggested for contact translocating herbicides. Concern for drift may cause you to consider using larger droplet sizes and higher spray volumes.

A. *ATE Master Brake Cylinders*

The tandem master cylinder is the basic unit for dual-circuit brake systems and consists of two series connected master cylinders in one housing. Operation usually is assisted by upstream devices such as brake boosters. We offer tandem master cylinders in expansion port and central valve versions.

B. *Nozzle Influence on Droplet Size*

Spray-drop size is one of the most important factors affecting drift. Because of the unusually small size of the target, good coverage is essential for those insecticides and fungicides that must come into contact with 5 the pest insect or disease-causing organism. Similarly, in the case of protectant fungicides and nonsystemic stomach poison insecticides, thorough coverage is essential, because untreated surfaces allow infection or crop damage to continue from feeding insects without exposing them to the applied control. "Fine-" to "medium-" size droplets are desirable when applying insecticides and fungicides, because they usually provide better coverage. "Fine" droplets, however, are difficult to deposit on the target, so they may remain airborne and drift long distances because of their small, lightweight size. Actual drop size, 500 µm , 1200 µm 5,500, µm one inch = 25,400 µm, one milli meter = 1000 µm, µm = micro meter Spray-droplet diameters are measured in micrometers. A micrometer is approximately 1/25,000 of an inch and is usually referred to as a "micron." For reference, the thickness of a human hair is approximately 100 microns. Drops smaller than 150 microns in diameter (smaller than the diameter of a sewing thread) usually pose the most serious drift hazard. Drift is far less likely to be a problem

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when droplets are 200 microns and larger in size. A study indicated that spray particles less than 50 microns in diameter remain suspended in the air indefinitely or until they evaporate. This should be avoided because there is no way to control deposition of very small droplets. A classification system developed by the British Crop Protection Council (BCPC) and the American Society of Agricultural and Biological Engineers (ASABE) assigns a droplet-size category to a nozzle based on droplet-size spectrum. comperrison of droplet size between various nozzles, operating conditions (pressure), and manufacturers.

C. *AIR CYLINDER SPEED*

Estimating cylinder speed is extremely difficult because of the flow losses within the system in piping, fittings, and porting through the valves which are in the air path. Flow losses cause a loss in pressure which directly effect the force output. To be able to determine the maximum speed of the cylinder, the sum of all flow losses, pressure required for the force output and the available inlet pressure must be known. Circuit losses cannot be determined or calculated accurately. Rules of thumb are relied upon to determine an approximation of air cylinder speed. The first general rule of thumb is choose a cylinder which will allow for at least 25% more force than what is required. For extremely fast operations, choose a cylinder which will allow for 50% more force than what is required. This will leave 25% or 50% of inlet pressure to satisfy system losses. The second rule of thumb is to select a directional control valve which has the same port size as the cylinder which it will be operating. Typically, a larger valve's internal flow capacity is the same as the connection size. On smaller valves, the internal flow capacity is typically much less than the connection size. Always be sure to check the valve's flow rate and do not relay on the port size.

II. PROBLEM DEFINITION

The existing production industry had some problems packing the TMC cylinder. Bore oil is manually sprayed , it could not be an accurate spray method. The present system is not much accurate for packing in production. It makes packing impossible to production. These manual operate nozzle do not give much of comfortness for the accurate spray system. Also the machine occupies a large area in the cabin resulting in the space congestion. Now the automatic nozzle spray type of pneumatic system is simplified using allen bradely PLC hardware and RS logic 1400 software. It reduce sequence to operate the system. And reduce pneumatic pressure to be wasted, reduce the labour by changing the machine as automated. But in this type of automatic nozzle spray system it is completely under the control of PLC programme and relay contacts. The conversion of manual spray to automatic spray is a way of upgrading the production for comfort. This is a costly affair because of the number of components to be tested and sprayed. It needs high pressure to converter, lubricator etc, for this conversion. This is not feasible if budget is a prime concern. Considering the above mentioned facts as the problems, a solution has been tried to solve these problem. The need of the hour, combination of manual spray and automatic spray has to be created for comfort production industry for packing the TMC cylinder. This type of nozzle spray system is called automatic spray system. And the plunger assembly machine , bore oil machine and seal assembly machine are occupies large are in the assembly unit line.It is made to be a single machine. That make the production easy reduce the time in manual method. The sequence is done one by one ,at first the cylinder placed and plunger has assembled. Then the bore oil door be closed ,the nozzle act to forward and spray the oil. In reverse action the nozzle spray oil ,that time sequence has to be set in the PLC software.

A. Abbreviations and Acronyms

TMC the word Tandum Mass Cylinder ,PLC Programming Logic Circuit ,BCPC British Crop Protection Council, ASABE American Society of Agricultural and Biological Engineers these are some words used.

B. Units

- Actual drop size, 500 μm , 1200 μm 5,500, μm one inch = 25,400 μm,
- one milli meter = 1000 μm, μm = micro meter
- Modular system - diameters from 20.64 to 31.75 mm and strokes of up to 46 mm
- Cr6-free surfaces for vehicles built in 07/2003 and after (as required by law) Suitable for ABS.

C. Equations

Viscous and turbulent whether the flow can be decided by reynold's number $R^{D.}$ If $R^{D}>2000$, the flow is turbulent

$$P_1A_1V_1=P_2A_2V_2$$

$$P=F/A$$

- Nozzle discharge (GPM) =

$$\frac{(Speed \text{ x } nozzle\ spcing \text{ x } Speray\ Volume)}{5940}$$

- Where: travel speed = miles per hour nozzle spacing = inches spray volume = gallons per acre (GPA)
- psi1 = psi2 x (GPM1)/ GPM2
- where: 1 = the desired condition2 = the known catalog specifications
- By implementing this spray method, it can be achieved without failure operation, more user friendly, less effort to change the spray nozzle.

III.METHODOLOGY

The need of the hour, combination of manual spray and automatic spray has to be created comfort nozzle spray for production for packing the TMC cylinder. This type of spray system is called automatic spray system. This is completely controlled by PLC circuit. The spray automatically with the help of PLC circuit. It is an innovative and unique design and an implementation project. A modification of manual spray system is done by using pneumatic and plc software and Allen barely hardware. Pneumatic assistance is used for this application. This is a simple and versatile pack that may be fitted to any spray method for its requirement. By implementing this spray method, it can be achieved without failure operation, more user friendly, less effort to change the spray nozzle. It could still be mechanically linked to the PLC ladder circuit, but now all it really needs is a few electrical contacts to sense the driver's input. So spray nozzle with this project provides ease of accurate spraying. The cost of this project is less, as it requires a minor alteration in the spray

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technique. It spread 360 degree evenly inside the TMC cylinder.

IV.RESULT AND DISCUSSION

The lower cost compared to a traditional automatic spray and the greater performance potential reinforces the value of the technology. This is much cheaper, and user friendly with more features. Legroom for passengers at front is increased more since the removal of spray, and also the machine may be automated. This technology spray technique in production industry.

Table : Pressure vs Velocity

Pressure Kpa	Velocity m/s
100	1500
300	1140
500	942
700	805.9
792.4	786.8
900	633.9
1100	572.2
1300	452.2
1500	310.8

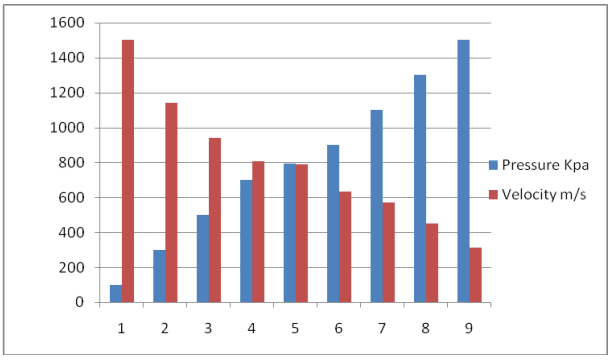

Figure Pressure (kpa) Vs Velocity (m/s)

To accelerate subsonic flow, the nozzle flow area must first decrease in the flow direction. The flow area reaches a minimum at the point where the Mach number is unity. To continue to accelerate the flow to supersonic conditions, the flow area must increase. A pressure disturbance propagates through a compressible fluid with a velocity dependent upon the state of the fluid. The velocity with which this pressure wave moves through the fluid is called the velocity of sound, or the sonic velocity.

Plunger Assembly Machine

Manual Spray Bore Oil

Plunger Seal Machine

Automatic Spray Nozzle

Three Machine Combined Single Machine with Spray Design Automatic

V. CONCLUSION

This project is an innovative concept. It is a new dimension in the spray system nozzle. This is a simple and versatile pack that may be fitted to any TMC cylinder existing with pneumatic system. By implementing this automatic spray system we can achieve more space, more user friendly, less effort to change the nozzle. A model of the system has been designed and tested for the operation. The performance of the system has also been tested. The time of production reduced. This concept of the spray nozzle can be extended in future to various brake assembly. Absolute (dynamic) viscosity is the property of a liquid which resists change in the shape or arrangement of its elements during flow. Liquid viscosity is a primary factor affecting spray pattern formation and, to a lesser degree, capacity. High viscosity liquids require a higher minimum pressure to begin formation of a spray pattern and provide narrower spray angles as compared to those of water. See the chart below for the general effects of viscosity other than water. A mechanical system will work effectively only if there is an electronic plc circuit to control its parameter. For further improvement of the project a PLC may be used to spray inside of the TMC cylinder actual performance. The spray ratios of the manual spray may not suite the varying operating conditions if a PLC is used to control it. For this spray may itself be modified according to the requirement. For variable speed requirements the F flow should be equipped with varying spray ratios.

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Volume: 05 Issue: 01, June 2016, Pages: 87-90
ISSN: 2278-2389

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