SENSOR BASED ACCIDENT AVOIDING SYSTEM IN PNEUMATIC BEND AND BEND REMOVING MACHINE

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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 everyone that is responsible for any aspect of it, to the documentation of all changes, to regular safety audits and a finally a corporate culture of safety-first. Design is the part of a machine's 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's 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 is a contributory factor in some 32% of these fatalities. In our project the IR sensors are used to avoiding the accident. The system automatically stops, when the IR sensor detecting the any parts of the operator inside the machine.*

Keywords—Sensor; pneumatic bend, relay

1. INTRODUCTION

The designer should make the machine as reliable as reasonably possible to minimize the maintenance requirement and allow for long intervals between routine maintenance tasks.

It is also important to design the machine and its control system so that maintenance can be carried out safely

For example, hold-to-run controls can be installed that allow a machine to be run at a reduced speed, or removable tool holders can be used so that sharp blades can be replaced on a workbench instead of in an difficult position inside a machine.

In addition, operators and maintenance technicians must be discouraged from bypassing safety equipment. Safety components are often designed to interrupt processes in the event of a fault and will have an impact on machine availability.

In order to minimize this effect - and the temptation to interfere with the safety circuits - high-reliability safety components should be specified so as to keep the number of nuisance faults at a minimum.

Designing safety into a new machine is important, but it has to be remembered that the vast majority of machines do not remain unaltered, with unchanged operating procedures, for their entire lifetime.

2. NEED FOR SAFETY SYSTEM IN MACHINERY

Modifications are almost inevitable and working practices can evolve or be deliberately revised by managers in an attempt to improve throughput. Any changes made to the machine or the way it is operated also changes the original risk assessment.

Research has shown that a significant number of industrial accidents result from uncontrolled changes. It is usually via a complex sequence of events that a change leads to an accident.

Clearly it is necessary to ensure that machinery and operating procedures are fully documented. Even if a machine and its associated safety systems are all properly designed and documented, it is vital that the machine is monitored during installation, commissioning and first-off production.

Often it is necessary to make small changes during any or all of these stages.

It is imperative that any proposed change is first subjected to a rigorous risk assessment, and any changes that are implemented must be fully documented.

After production has commenced, a further review should take place to make certain that no further changes have been made.

Note also that "no further changes" also refers to the raw materials or components that are being processed by the machine.

Audits should be undertaken on a regular basis to check that the machine and operating procedures are still in the documented state.

Furthermore, functional audits should also be carried out on the machinery safety systems. Often the components in a safety control system are only used in the event of an emergency, which can make them very difficult to test.

Nonetheless these systems should be tested at regularly scheduled intervals. Safety field buses such as AS-i Safety At Work (AsiSafe) and Profisafe can support intelligent field devices able to perform self-monitoring functions and transmit diagnostic data to a central controller that can alert the machine operator prior to the failure becoming an unacceptable risk.

Education and training is another aspect of the company-wide approach to machinery safety.

Increasingly complex modern machinery makes education and training ever more important.

There are new standards and regulations with which companies must comply. On-the-job experience may have sufficed in the past but this is unlikely to be acceptable in the future.

Obviously training for machine operators and maintenance technicians is a requirement, but there is also an important need for more general education of the workforce and management in order to generate a safety-first corporate culture.

3. BLOCK DIAGRAM

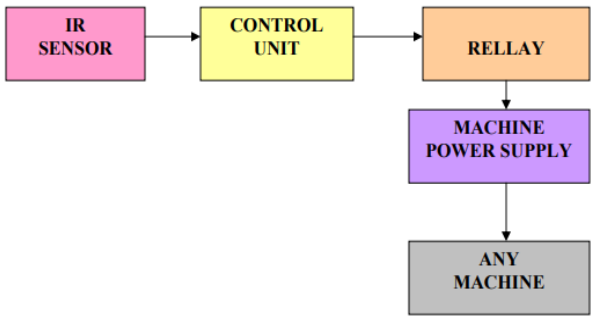

Fig. 1 – Block diagram

4. FIGURE

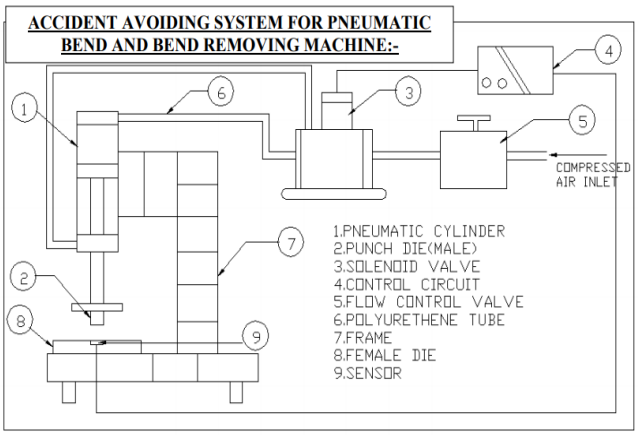

Fig. 2 – Construction diagram

5. WORKING PRINCIPLE

The pneumatic bending/bend removing press is used for bending up to 18 gauge sheet metal with low pressure. In the pneumatic press the main source given here is compressed air or pressurized air with the help of compressor.

The air in the compressor cylinder is passed to the double acting cylinder through the control valves. Here we consist of two control valves one is flow control valve and another one is direction control valve.

When the compressed air is passed to the flow control valve, the speed of movement of piston is controlled by adjusting the knob.

Then the air goes to the direction control valve, this is used to up/down movement of the double acting pneumatic cylinder. The cylinder piston rod is connected to the top fixture.

A bottom fixture is fixed on the base plate by using bolts and nuts. For the operation of sheet metal bending and bend removing system.

This project involves controlling accident or defecting due to machines.

Here one IR transmitter and IR receiver is fixed in machine where if anybody gets close contact with the machine then the sensor will pass the signal to the controller then the controller will pass the signal to the solenoid valve.

So that the input air supply for the double acting cylinder will be cutoff. When we cut the air supply to the cylinder automatically the cylinder starts to stop the work. Also relay circuit will trip off the machine and indicate through alarm.

6. APPLICATIONS

- All Heavy Cutting Machine
- All Ramming Machine
- In all Foundries
- In all Machine Shop

7. ADVANTAGES

- This system is more safety to the operator
- Simple type of automatic accident avoiding system
- Quick in response
- Simple in construction

8. CONCLUSION

These systems are helpful in making workers safer and secure while working in heavy machines, this system is simple in construction and it doesn't required any additional setups to interface in existing systems it costs very low price and easy maintenance.

REFERENCES

[1] R. Risack, N. MÂ¨ohler ,W.Enkelmann,(2000). â€œA videobased lane keeping assistantâ€. IEEE Intelligent Vehicles Symposium 2000. pp.356-361 U.S. Department of Transportation. http://www.dot.gov/

[2] Belisle J, Laurin JA. Analyse des causes d'un accident survenu une machine de coulée. In: Safety of industrial automated systems. Proceedings of the conference. Montréal, Canada: Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSST); 1999. p. 6–10.

[3] Edwards R. Experience gained from accidents associated with complex electronic technology. In: 2nd International Conference: Safety of industrial automated systems. Sankt Augustin, Germany: Berufsgenossenschaftliches Institut für Arbeitssicherheit (BIA); 2001, p. 39–44.

[4] Malm T. Safety aspects in automation of paper roll handling. In: 2nd International Conference: Safety of industrial automated systems. Sankt Augustin, Germany: Berufsgenossenschaftliches Institut für Arbeitssicherheit (BIA); 2001, p. 51–8.

[5] Harms-Ringdahl L. Safety analysis. Principles and practice in occupational safety. London, UK: Elsevier; 1993.

[6] MaTSU. Employers incident analysis 1991– 1998 (Offshore Technology Report OTO 2000 002). Health and Safety Executive; 2000. Retrieved April 13, 2004, from: http://www.hse.gov.uk/research/otohtm/2000 /index.htm