



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 3, March 2017

A Survey on Bahmular CNC Grinding Machine Up gradation

Vivek D. Ugale¹, Harshada Dhattrak², Rutuja Khairnar³

Asst. Professor, Department of E & TC, Sandip Institute of Technology & Research Centre, Nashik Savitribai Phule
Pune University, Pune, India

U.G. Student, Department of E & TC, Sandip Institute of Technology & Research Centre, Nashik Savitribai Phule Pune
University, Pune, India^{2,3}

ABSTRACT: Bahmular Grinding Machine is the primary machine which is used in many companies. Previously the machine was equated with Eckelman PLC. Now a days machine is not properly working because the machine aging. Also Ecklmen PLC is becoming out-dated. To maintain continuous production rate in the market, machinery should be proper way. So, we are exchanging the PLC of Bahmular Grinding Machine with Siemens 840D-SL CNC having improved in PLC. After the replacing controller, entire system will be upgraded with new controller safekeeping the operation of the machine exact. To regenerate the machine with new technology is the main objective of this project. We have also imparted in PLC programming of this system.

KEYWORDS: PLC, 840D-SL Controller, Upgradation.

I. INTRODUCTION

Technology is enlarging with the fast speed. As per the need of industry the machines are change with new technology. Whole machine and system replacement is not possible. So up gradation is used. Up gradation is not only developing the software or hardware of the machine, but it assists to overcome the drawbacks of the past system. Bahmular Grinding Machine is machine which executes grinding procedure on the nozzles. PLC (Programmable Logic Controller) is controlling the entire system. The machine is running from more than twenty years. Due to aging, numerous difficulties are obtained with this machine. It needs more fixture and it gets difficult to meet the as per the market demands, as production rate has reduced. Also the Eckelman PLC is becoming out dated and spare parts are not gettable easily. So there is a big need of either upgrading or replacing entire machine with recent technology. Buying new machine is more expensive than upgrading machine. In these project, by keeping the same operation we upgrading new programming will be done for the system. We are looking to better production capacity, process availability by reducing cycle time. We will renew parts in electrical panel with the latest components that are adaptable with the new CNC system. By using current technology we will upgrade operator interface. Consequently programming will be exist.

II. LITERATURE SURVEY

In 20th century, automation was used in very often. They worked manually. In previous industry there was hard job to the workers in automobile field, electronic industry. That system was more time overwhelming and unsafe to humans.([1],[4]).

In previous system extensive wiring also problem related to the electrical panels with number of electrical components so programmable logic control starts for the controlling purpose. Logic controller was developed in ladder diagram. This helps to control electrical panels, less wiring and also provide the greater flexibility [2].D. Khurgeet. al., [5] he used PLC controller for Bore SHG surface inner grinding machine. By using this PLC scanning and fix time is reduced. Thats why execution analysis of these system is better. These PLCs consummated some of their of necessity but the want to obtain software obsessed automation with quality and flexibility involved the improvement of Computer Numeric Control (CNC), as CNCs offers more quality with enhanced flexibility ([3],[6]).



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 3, March 2017

Yun-Kuan Jiang [7] presented activity of PLC in CNC System of rules. Here practicality of both controllers are composed that gives benefits of both for improved performance. PLC is designed for utilized in rough industrial environments, so has a powerful anti-interference cognition. In constituent to the input/output region it takes photoelectric isolation measures, the arithmetic unit, power supply, storage, controller and so on also set up numerous type of protection and shielding. With PLC control, modification the anti-interference quality of the electric parts, modify the dependability of the machine tool. Composed machine tool is configured for a specific processing, specific job and design of a extremely economic automated processing instrumentality, such instrumentality most of more than one tool at work.

Shuqin [8] and Dongkai et al., [9] also supplies utilization of PLC in Computer Numerical Control Machine. With the improvement of structure, automation technology, and belongings of PLC are also constantly rising, from the overall construction to the improvement of tiny modular construction, PLC computing, increasing the adaptability of PLC configuration, data processing, graphics display, network connection and opposite functions largely increased. Utilization of PLC in CNC will form relation of machining center more reliable and more flexible.

Kaleem [10] justifies a system supported on CNC, here the controller acts as a ruler concluded the PLC. And related with encoders to supply point response. In command to have improved control for aligning, controlled rate and fast occurrence of path of slide motion, servo motors having few inertia, along with servo drives are overlapped with the CNC. The CNC decoded the part of program which is based by user. Provides the wanted visibility with the control existing supply to PLC. And drives as and when necessary. Particular measuring devices as surveyors, gauges being overlapped with the CNC. Through autonomous controllers supply more quality. Rathika et al., [11] provided a machine with collection of PLC and CNC to sort the system more dependable and semiautomatic. By this quality of superior site is reached.

Hu Fuwen in [12] has also enforced a group of Brilliant Vacuum Fixture Disciplined by Made-up-in PLC in CNC System. The activity method of the brilliant artifact was incorporated with the CNC machine implement. The intelligent fixture example was accepted on the platform of Mitsubishi M64 CNC system. So this method can automatically observe the ratio of workpiece by meaning of proximity switches. In improvement, it can be titled into a NC program by an M code matured settled on the communication between the programmable logic controller and computer numerical controller (CNC). Observational results pointed the matured fixture could activity well to help the workpiece loading process as it combination both facilities of CNC and PLC.

Harshitha and Narasimhan [13] enforced PLC logic for CNC flame cutting machine. A Computer is utilized for processing of data and dominating various activities of the machine. PLC overlaps the System and the Machine. A large flat of quality and quicker cycle period can be advantaged with the utilized of a CNC machine. Since this automation has a advanced repeatability, it can gain the uniformity and output. So alternatively of only victimization either PLC or single CNC as controller, victimization CNC with united PLC yields greater flexibility with innovative properties.

International Journal of Innovative Research in Computer and Communication Engineering

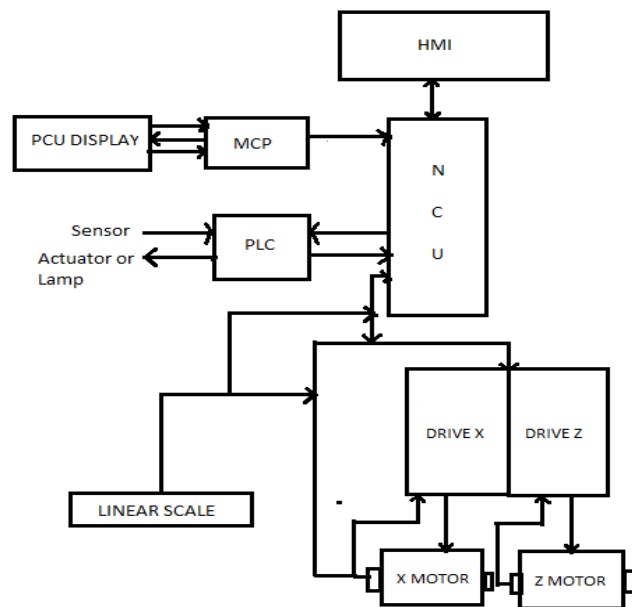
(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 3, March 2017

III. PROPOSED SYSTEM

3.1 Proposed Work



3.1 Block diagram of CNC machine

1. HMI : HMI is a human machine interface. It is a software that offers material to an operator or user around the state of method.
2. PCU DISPLAY: PCU is mainly used for program controlling unit. It can be handled by the user. It works as a display. PCU gives the input to MCP.
3. MCP: MCP is the machine control panel. The overall machine is controlled by this panel. The user can handle it properly because various buttons are present on it.
4. NCU: NCU is Numeric Control Unit. It is the brain of the CNC machine. It consists of controller 840D SL. In NCU, we use complex flash cards to save programs. The overall system is controlled by this NCU.
5. PLC: PLC is programmable logic controller. It consists of 8 modules. All sensors, actuators, or lamps are operated by PLC. PLC input or output is given to NCU.
6. DRIVES: Drives control the motors. The use of drives depends on how many motors are used.
7. MOTORS: Motors move forward or reverse for grinding the metal part. Motors give input to drives and are controlled by NCU.
8. LINEAR SCALE: Linear scale feedback can be given to NCU or motor, depending on storage.

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 3, March 2017

3.3 FLOWCHART

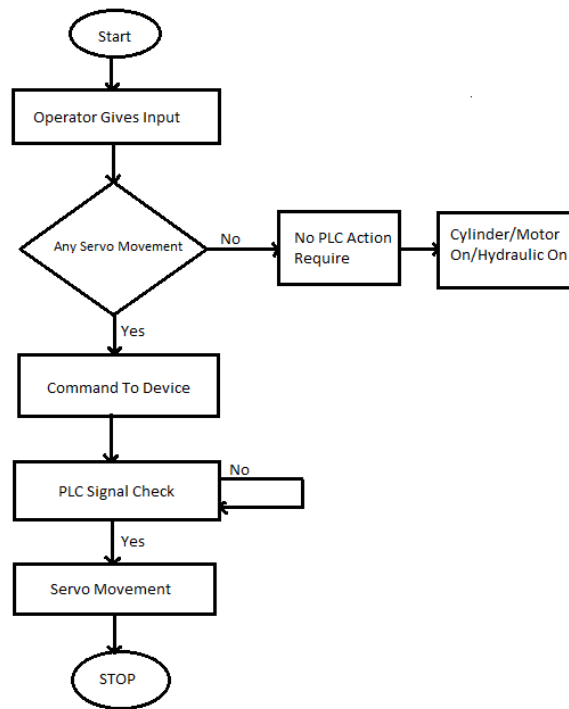


Fig3.3 Proposed dataflow of System

Fig. 3.3 shows proposed dataflow of the work. It is briefed as:

1. Start the system.
2. Operator gives initialization as in form of programme.
3. Check the servo movement if yes the gives command to the device for further processes.
4. If no there is no requirement of plc action.
5. After giving command to device PLC checks the signal.
6. If yes then servo movement is achieved or processes are going on.
7. Stop the system

IV. CONCLUSION

The system which is to be upgraded is improved the cycle rate by 2.6% seconds per part. The production rate is also improved by 45% hence profitability is increased in industry. Thus the component and automation of the machine made-up the way for increasing the productivity and reliability. It is also beneficial to non-skilled user.

REFERENCES

- [1] R. Hackworth, F. D. Hackworth, "Programmable Logic Controller Programming Methods and Applications", Pearson Education, 2007.
- [2] C. Johnson, "Process control instrumentation technology"; 8th Edition, Pearson education.
- [3] M. Dhotre, D. Rao, "CNC Technology Programming and Operating"; RupaliPrakashan
- [4] V. J. Maggioli, "Programmable Controllers in Process Control Applications", IEEE Transactions on Industry Applications, Vol-IA-15, No. 6, pp. 695-700, Nov/Dec 1979.
- [5] D.S. Khurge, S. Waykole, A. Thorat, N. Sapru, "PLC Installation on Inner Ring Bore SHG Grinding Machine", International Journal on Recent and Innovation Trends in Computing and Communication (IJRITCC), Vol 3, Issue 4, pp. 2189 - 2193, April 2015.



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 3, March 2017

- [6] R. Schoop, R. Neubert, B. Suessmann, "Flexible Manufacturing Control with PLC, CNC and Software-Agents", Proceedings of 5th International Symposium on Autonomous Decentralised system, 2001, pp. 365-371.
- [7] Y. Jiang, "Application research of PLC in the CNC system", International Conference on Intelligent Systems Research and Mechatronics Engineering (ISRME 2015).
- [8] X. Suqin, "Application of PLC in Computer Numerical Control Machine", International Conference on Industrial .Electronics and Applications (IEA), 2015.
- [9] Q. Dongkai, Y. Xiang-yu, J. Jinxin, "The Application of PLC to CNC MachineTools Development", Second International Conference on Digital Manufacturing and Automation (ICDMA), pp.1213-1216, 2011.
- [10] K. Khan, "A Model for Taking Decision for Rejuvenation of Machine Tools", Industrial Engineering Management, Volume 4, Issue 1, 2015.
- [11] R. kumari, Sathya, S. sankari, Suganya, "Retrofitting of PLC,CNC and VVVFDrives in a Double Column Planning Machine in Order to Improve Efficiency",ITSI Transactions on Electrical and Electronics Engineering (ITSI-TEEE),Vol 1, Issue 4, pp 33-36,2013.
- [12] F. Hu, "An Intelligent Vacuum Fixture Controlled by Built-in PLC in CNC",Sensors Transducers Journal , Vol. 181, Issue 10, pp. 45-51, October 2014.
- [13] N Harshitha, S. M. Narasimhan, "Implementation of PLC for CNC Flamecutting machine", International Journal of Scientific Engineering Research, Vol5, Issue 7, pp.277, July-2014