

Predefined Height Measurement of the Slab in Plate Mill or In Rolling Mill

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Abstract- The challenging problem of height measurement of the slab in plate mill as well as in rolling mill is an active field of research in automation. Generally, for any slab which can be processed with the method of pressing whose length and breadth would be accurate but little variation in height. Here, the dimension can be measured with the help of ATMEGA32 microcontroller.

Index Terms- Plate mill, Automation, rolling mill, ATMEGA32 , microcontroller.

1. INTRODUCTION

Now a days, due to the availability of advanced technologies, probability of error has been reduced. According to research paper [1], thickness can be controlled with the help of Hydraulic Gap control. The work roll thermal has direct effect on strip thickness. The reheat furnace and the rolling mill can be considered two of the main process in a plate mill. The reheat furnace is used for heating iron blocks, which is the raw material for rolling mill is used for turning the steel block to a plate by making it wider, thinner and longer.

The rolling mill and furnace are quite different. The reheating is a thermal process while the rolling mill is a mechanical process. The main aim of interest in the operation of the furnace is the production capacity, measurement of dimension of the block and displaying it in the seven segment display using microcontroller. Naturally, the two process interact. The production capacity of the rolling mill affects the operation of the rolling and to obtain proper production, dimension should be accurate. That's why before entering of the bloom in rolling mill, one has to confirm about dimension of the bloom which is preheated and ready to enter in the rolling mill. The project describe the accurate measurement the

accurate measurement of the hot bloom and give the message by "Led Display".

1.1 Mill Process

Rolling mill are also known as reduction mills. It consist of the cylindrical rollers. The work piece is passing between the rollers. Rolling is one of the process of metal working in which changes the dimension and shape of work piece is produced with the application of pressure by contact with cylindrical rollers. Strip hardness and deformation characteristics are also varying for the different grades of steel and rolling conditions. There is error which can be prevented with the help of adaptive feed forward system. Any error can be removed by the mill controller feedback, which compares the desired thickness with the actual thickness. These bar-to-bar control loops work in conjunction with the in-bar automatic gauge control.

1.2 Types of rolling

Hot Rolling- If the work piece temperature is about its recrystallization temperature, then the process is known as hot rolling.

Cold Rolling- If the work piece temperature is below recrystallization temperature , then the process is known as cold rolling.

2 PROBLEM FORMULATIONS

The problem has been analysed in the plate mill of steel industries where due to inaccurate measurement of the slab, there may be a chance to decline the production rate. The slab which needs to be converted into plate is passing between two rollers. The rollers used in plate mill is high rolling mills. The gap between the rollers can be controlled with the help of manual controller .Thus , there should be some

display devices which tells the dimension of the slab before entering into the roller.

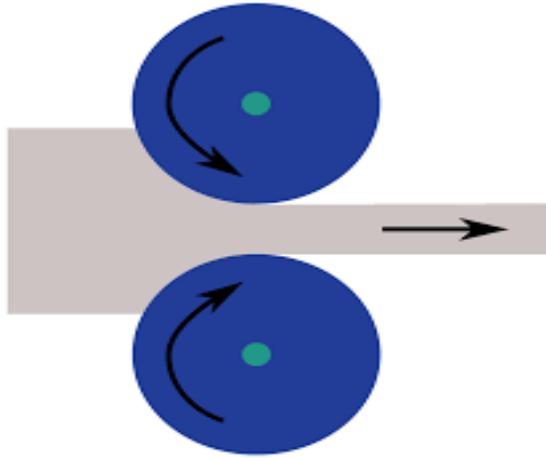


Fig-1 Slab between two rollers

3. CONTROL METHOD

As per article [2] thickness can be controlled with the help of AGC (Automatic Gauge Control). In article [3] slab thickness falls into two categories: Longitudinal and Transverse (cross) thickness .In case of [4] ,the thickness and the accuracy of plate production depends on the output Automatic Gauge Control (AGC) in plate mill area. A typical modern thickness control system design and implementation of a steel plate mill is discussed together with the impact on the design of the process models , available measurement ,available actuator and material properties. A high level software and hardware implementation approach provides the ability to make quick and accurate modification to the control loops and tuning constants. Control loop strategies and theoretical concepts of steel plate rolling are discussed.

2. Display

A seven segment display is a set of LED (light emitting diode) or LCD (liquid crystal display) elements. A seven segment display consists of illumination devices such as incandescent or gas – plasma (“ neon”) lamps. If all elements are activated , the display shows a numerical 8. When some of the element are activated ,any single digit from 0 to 9.

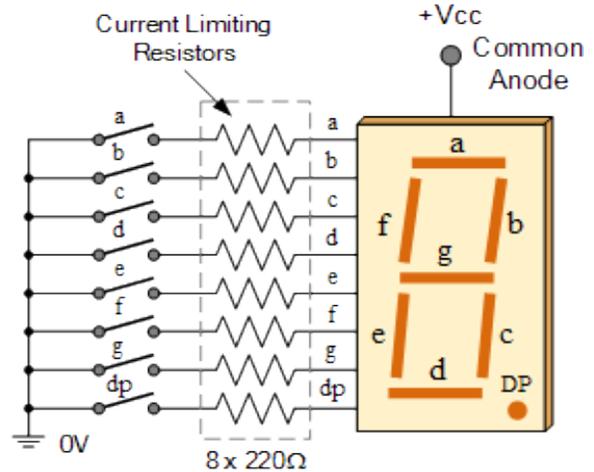


Fig-2 Seven-Segment Display



Fig -3 A hot steel slab exits the reheating furnace before moving to the plate mill section.



Fig -4 A hot plate exits the plate mill roller

3. Microcontroller

A microcontroller is a integrated device in a circuit designed to govern a specific operation in an embedded system .A typical microcontroller includes a processor, memory and input / output peripheral on a single chip. In ATMEGA32 is a microchip which consume less power and consist of various functions like timer, counter, interrupts, register storing capacities.

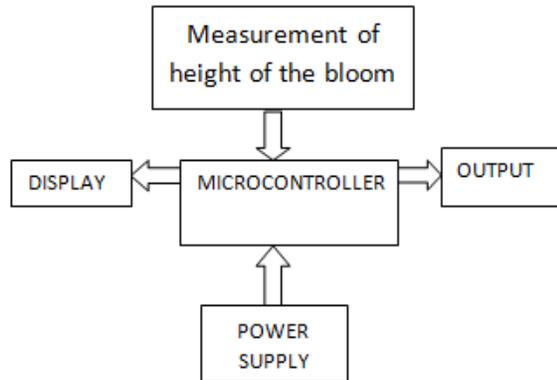


Fig-4 Simplified block diagram of the process

4. CONCLUSION

With the implementation of this system the instant response will be achieved, which is more beneficial than that of the existing system. By this system, the gap between the rollers will be maintained by viewing the display which shows dimension of the slab.

5. REFERENCES

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