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MEC299

**DESIGN AND FABRICATION OF VARIABLE
TEMPERATURE SENSOR ON CAST IRON AT TILTING
FURNACE**

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ABSTRACT

This study about temperature sensor on cast iron using tilting furnace. The problem of this study is there is no temperature sensor yet in the foundry laboratory, so a temperature sensor must be created for the molten cast iron. It is harder to measure the temperature of molten cast iron without a temperature sensor. The other problem is the high temperature of molten cast iron is too dangerous for people as it is too hot to be measured by using a thermometer. People can't measure the temperature of molten cast iron manually. This study is to design the temperature sensor at the tilting furnace at the foundry laboratory and to fabricate the temperature sensor of molten metal for cast iron at the tilting furnace. The wire and the circuit will be attached to the temperature sensor so as to be able to emit a danger sound when the temperature of the molten cast iron in impact rises to a high temperature. The sensor will detect the changed of the temperature and will display an output at the monitor. This study require to create a design in solid works for the temperature sensor. This feature are to measure the temperature of molten cast iron and to verify the maximum temperature of molten cast iron. This study will make a design and fabrication more effective because the design can detect the high temperature of molten cast iron and make an alert sound when the temperature rising.

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1.1 Background of study

Temperature sensors are used for a wide range of applications in a number of sectors across the world. In essence, these sensors offer data to a system that allows it to estimate or precisely calculate the temperature of a certain object or environment. Design and fabrication of variable temperature sensor on cast iron using tilting furnace. The concept of this study is the temperature sensor for the molten cast iron. The wire and the circuit will be attached to the temperature sensor so as to be able to emit a danger sound when the temperature of the molten cast iron in impact rises to a high temperature. The sensor will detect the changed of the temperature and will display an output at the monitor. First of all, this study requires to create a design in solid works for the temperature sensor. This feature is to measure the temperature of molten cast iron and to verified the maximum temperature of molten cast iron. This study will make a design and fabrication more effective because the design can detect the high temperature of molten cast iron and make an alert sound when the temperature rising.



Figure 1: Furnace Control Panel

While you would think that temperature sensors are only used to determine the temperature of an object or environment, they are actually far more complex. While this is one of its goals, many temperature sensors are also used to determine whether a process is taking place inside a specific range. A sensor is an electronic device that detects and responds to a signal or stimulus with an electrical signal. The output signals indicate some electrical signals, such as current or voltage. A sensor is a device that receives and transforms different sorts of signals, such as physical, chemical, or biological impulses, into electric signals. [1].

Sensors are categorized according to their uses, input signal, and conversion mechanism, as well as sensor material properties such as cost, accuracy, and range. This chapter presents an overview of sensors, covering classes such as thermal, magnetic, optical, mechanical, and chemical sensors. With an introduction to basic sensor types, the transfer functions, characteristics, and specifications are also discussed.

There are many types of sensors, such as contact temperature sensor and non-contact temperature sensor.



Figure 1.1: Contact temperature sensor

These individuals must contact the thing whose temperature they are measuring, whether it be a solid, liquid, or gas. They only measure their own temperature, but we deduce that any temperature they come into touch with is in thermal equilibrium (i.e. are the same temperature). Thermocouples, RTDs, thermistors, thermostats, and semiconductor temperature sensors are all common forms of contact temperature sensors. When you can create excellent thermal contact between the gadget and what you're monitoring, you should utilize them. Contact thermometers also make continuous monitoring and data collecting much easier.



Figure 1.2: Non-contact temperature sensors

These measure the thermal radiation emitted by an item or heat source to calculate temperatures from a distance. These are frequently used in high-temperature or dangerous conditions where you must keep a safe distance from a specific body. The most common noncontact temperature sensors are thermal imaging and infrared sensors, which are used when the target object is moving (such as on a conveyor belt or within moving machinery), if it's a long distance away, if the surrounding environment is dangerous (such as high voltages), or at extremely high temperatures where a contact sensor would fail [2].