**THE DESIGN OF IOT SYSTEM FOR ICEHOUSE MANUFACTURING**

**ABSTRACT**

This paper present design and implement the system to measure the behavior of ice process from icehouse using a cheap internet of things (IoT) technology. The key devices used for communication was the Arduino microcontroller, which is responsible for converting the voltages from the three voltage sensors to the digital data, recording data on the SD card and sending it to the server. This server provides real-time data transmission and display from IoT devices. The data recorded from ice production can be used for other purposes, such as calculating the optimal time for ice production or detecting cooling system failure. This research was the first step to improve the ice production process of the automation system.

**EXISTING SYSTEM**

At present, a have small ice factories (ten to twenty year olds) spread across all areas. The most popular ice-making system is the vapor compression system. The refrigerant circuit is shown in Fig. 1 [1]. Because it is an old control system. Therefore, all controls are fixed and ignore the outside environment temperature. In fact, the outside environment temperatures affect the production of ice. That is, we must increase the duration of the compressor for longer when the outside temperature falls down due to pressure from the evaporator was increased. On the other hand, we can reduce the compressor operating time to less than the timer setting when the outside temperature rises because the inlet pressure of the compressor output is lower than normal. Now, the most efficient ice control in many plants depends on the technician's experience controlling the timing of the ice making process. So, the ice production process is more efficient and reduces the electrical energy consumption if we can read the pressure inside the inlet pipe of the compressor and adjust the ice production period to the optimum range.

**EXISTING SYSTEM DISADVANTAGE**

* In this system it cannot send live data to internet
* It is not efficient system.
* It cannot provide large set of data for future reference.
* It is not cost effective method.

**PROPOSED SYSTEM**

The ice house monitoring system consists of two parts that is sensor node and server. The sensor node was collecting the pressure data from compressor. The server was displaying the real-time pressure data that received from the sensor node on the free board. From the refrigerant circuit, we installed three pressure sensors at inlet pipe, outlet pipe and the lubricant in the engine room of the compressor. We are measuring the pressure at the inlet and outlet pipe for monitoring the efficiency of refrigerant circuit. We can detect the leakage of refrigerant by the pressure of the lubricant. So, the block diagram of sensor node was designed as shown.. The microcontroller converting the analog voltage and recording the three pressure data to SD card every 1 minute. The format of the data recorded every minute is in the format {time sensor1 sensor2 sensor3}. The pressure data read from sensor can be displayed in many ways. It can be shown on the mobile devices or the website via freeboard. We can monitor the inlet pipe pressure, outlet pipe pressure and oil pressure of the compressor at the same time. The data recorded on the SD card can be plotted as a graph of compressor outlet pressure. The graph shows the compressor output pressure in one round of ice production. That is, each ice production takes around 20 minutes. During the first 15 minutes, the pressure gradually increases from 10bar to 12bar. Then, the pressure will increase rapidly over a period of 16 to 20 minutes. At 20 minutes the compressor will stop working. The pressure will drop to 4bar, which is the initial pressure of the ice-making process. In the next production cycle, the pressure graph is similar to the first production cycle as shown in the dot line in At the compressor inlet side, if there is no abnormality, it will remain at approximately 3.2 - 3.8 bar. In the same way, if the refrigerant does not leak into the engine room of the motor. The pressure of the oil is maintained at about 4bar. The oil pressure will increase if the refrigerant was leaking.

**PROPOSED SYSTEM ADVANTAGE**

* It can provide live data of pressure in the pipe line.
* It store the data in SD card
* It can be used for future data using server.
* Cost effective.

**BLOCK DIAGRAM**

POWER SUPPY

GSM/GPRS

SD CARD MODULE

TEMPERATURE SENSOR

PRESSURE SENSOR 3

PRESSURE SENSOR 2

ARDUINO

PRESSURE SENSOR 1

**HARDWARE REQUIREMENT**

* Arduino
* Temperature sensor
* Pressure sensors
* SD card module
* GSM/GPRS

**SOFTWARE REQUIREMENT**

* ARDUINO IDE