CHAPTER I. INTRODUCTION

1.1 Background

With the advent of a revolutionary system, the fourth manufacturing industry was transformed into a digital ecosystem. In this transformation, the Internet of Things (IoT) and Big Data are the main roles. Towards that goal, industrial companies have entered a new era of "Big Data", where the volume, speed, and various data they manage to explode very quickly. IoT describes a network of objects that are interconnected through embedded technology, which will be entered directly into the Big Data concept by allowing the collection of more information. By utilizing IoT, more and more devices, manufacturing equipment, factories, vehicles, and manufacturing equipment are equipped with sensors. However, despite the adoption of high-level IoT in a manufacturing, cost-efficient and plug-and-play approach that will allow the interoperability system, it is still not on target [1].

Kiln is very important part of a cement plant, where the kiln greatly affects the production of all factory elements. Kiln as a rawmix burner becomes clinker. Construction of tubular (cylinder) kilns made of steel plates, the inside of kiln is given a layer of refractory stone, and has inlet and outlet channels. In operation, kiln rotates on the supports by using two drive motors. Kilns are installed with a slope of 4% of the length of the kiln or about 2 to 5 degrees. Speed of rotary kiln is around 2.5 to 3.1 rpm and driven by two drive motors with the power of each motor is 600 kW. From the rotating drive motor is passed to the gear-girth mounted on the kiln shell using pinion gears. For dimensions of kiln itself, the length is 100 m with an outer diameter of 4.5 m with a full weight of about 1300 tons. With the temperature of outer layer is 300 ° C [2-5].

Girth-gear or Ridding Kiln that supports rotary Kilns subjected dynamic stress. The stresses that have the most significant effect is caused by contact stress and bending stress. Thermal stresses due to the temperature difference between the inner and outer layers of the kiln can significantly reduce fatigue strength. But it

can not be affected to dimension of kiln like the other two stresses. The contact stress operates on all rotating parts because it causes a three-dimensional stress below the surface and the highest value of the equivalent and tangential stress slightly below the surface where the crack will occur[2].

Fatigue that occurs on surface of kiln with a long-term effect on the stresses acting on the contact area of friction. Pits, cracks and spalling are the types of cracks that have occurred since then. Gears, bearings, and axles are components that are susceptible to forgotten thirst. Fretting usually occurs between two tight-fitting surfaces that are subjected to a cyclic, relative motion of very small amplitude. Fretting often produces small cracks, this crack could be the source in subsequent fatigue load. So fretting usually causes catastrophic failure[3].

Therefore, this topic was raised as a final project proposal to produce the adoption of IoT in manufacturing to obtain data on the Large Industry. In addition, IoT applications that can be cost-effective and non-intrusive for SMEs can be produced by exploring high data volumes.

1.2 Objective

Based on the background described, the objectives of this Final Project Proposal are as follows:

1. To design a system for measure roundness and kiln temperature,
2. To design IoT systems for monitoring roundness and kiln temperature based on raspberry pi wireless and real time system,
3. To test the system that will be used to measure roundness and temperature based on IoT.

1.3 Advantage

The advantages of this final project proposal are to produce an effective and efficient system to monitor roundness and temperature of the kiln at any time and wherever the user for predictive maintanance.

1.4 Scope of Problem

Consider the extent of the discussion of this final project proposal, the problem needs to be limited to:

1. The sample was taken on Kiln at PT. Semen Padang,

2. IoT just for a monitoring system.

1.5 Systematic of Writing

The discussion of this Final Project is arranged in five chapters, namely chapter 1 introduction which contains background, objectives, advantages, and systematics of writing. Followed by chapter 2 literature review which contains basic theories about Kiln, Internet of Things, Sensor and communication systems. Then in chapter 3 the methodology is explained the research flowchart, system design, and test design. In chapter 4 data and discussion contain the results of functional testing and performance of the device. Finally, in chapter 5, the conclusions contain conclusions on the work that has been done along with recommendations and suggestions for further development and improvement. This final project is also equipped with a bibliography as a reference for literature and sources as well as an attachment containing report supporting data.