CHAPTER 1

INTRODUCTION

Temperature is an important factor in steelmaking process which must be considered. The temperature determines the quality of products. The temperature must be controlled in the range of operation of each step. In converter process, temperature of the liquid steel will decrease following the step of process except the oxidation reaction from some additives, such as silicon, aluminium, is occurred. There are many reasons that change the temperature of liquid steel. Transferring of energy to surrounding by radiation, conduction and convection during processing and tapping are the main reasons. The absorbing energy from additive and flux is another reason. The type of refractory material and characteristic of ladle also effect the temperature of liquid steel. If the liquid steel temperature is lower than the operation range, it must be heated up to the range of operation. For example, if the temperature of liquid steel is lower than the casting temperature, the electrical heat or chemical heat is needed to heat the liquid steel until the casting temperature of such steel grade is attained. Therefore the controlling temperature of liquid steel is importance in steelmaking process.

This investigation studies and formulates the model, which can predict temperature change of the liquid steel during tapping from converter into ladle, adding some additives and fluxes. The neural network is applied to modeling in this investigation.

In recent years, the iron and steel industries began to use neural network technology in the control system. Neural networks for control systems have the benefit that knowledge of mechanism or details of each system is not necessary. Another benefit of this control system is that no assumption must be made between target and the influence variables. The neural network system is easy to design and to use. The neural network system is suitable for non-linear system, a system that is difficult to build with the help of mathematics model like some system in steelmaking process. The most popular neural network that has been used in iron and steel industry is multilayer perceptron with backpropagation. This model is applied in many parts of steelmaking process from blast furnace to the rolling process.

1.1 Objectives

1. To find the model for controlling the temperature of liquid steel during tapping into the ladle of BOF's process.

2. To study the effect and behavior of flux, additive and time to the changing temperature of liquid steel during tapping and adding flux and additive into the ladle.

1.2 Scope of Studying

1. Study the temperature change of liquid steel in BOF during tapping from converter into ladle and adding flux, additives.

2. Find model for controlling temperature change by using neural network.

3. Study the effect of tapping time on the temperature change of liquid steel.

4. Study the effect of flux on the temperature change of liquid steel.

5. Study the effect of additives on the temperature change of liquid steel.

1.3 Expected Usefulness

1. To understand the effect and behavior of flux, additives and tapping time on the temperature change of liquid steel in steelmaking process.

2. To be the model for controlling the temperature change of liquid steel.