

Chapter I

Introduction



1.1 Background

The increasing of the energy demand over the recent years forced Electricity Generating Authority of Thailand (EGAT), responsible for generating the regular supply of electric energy, to construct and operate new power plants. From 1990's six combined cycle power plants has been established in Thailand and nine plants are under construction. (EGAT, 1994) There are several kind of pollutant emitted from power plant such as air pollution, thermal pollution, wastewater and solid waste pollution, and noise pollution. The combined cycle power plant is accepted by EGAT as the one having lowest degree of pollution released. Noise pollution is one of the most important pollutant from combined cycle system. Not only noise inside the plant but also the noise propagating outside the plant affects humans in the vicinity of power plant. An Environmental Impact Assessment (EIA) report to the office of Environmental Policy and Planning (OEPP) is compulsory in order to have a permission for the construction of the plant. The requirements of preventing and mitigating noise pollution are increasingly important subject on EIA approach, therefore is vital to find an efficient way to assess environmental impact from existing data to make a prevention plan, mitigation plan and monitoring plan of the new power plant. Hence, the mathematical model concept is introduced to this approach for developing the prediction of noise immission from power plant. The prediction model is used to scope the effective areas, mitigation and prevention plans for the noise pollution control in combined cycle power plant project.

New power plant project in the future will be consist of the combined cycle system (EGAT,1995), the advanced flue gas cleaning system and the thermal treatment of waste system. (PEA, 1995) They release different kind of pollutant to the environment, including noise pollution. While, the power plant is increasing, the combined cycled system are also popularly used in power supplied systems of large industries such as petrochemical plants and refinery plants. Therefore, noise pollution from power plant project will be more significant because of increasing of the plants. It will be very difficult for an EIA reviewer to study and review all the power plants due to number of power plants under short period situation. The increasing of the plants affect periods of time and accuracy of studying and reviewing EIA report. The prediction model is an efficient method in order to study and investigate the noise pollution that comes from the projects.

At present, several environmentalists are using computer software which was imported from another country to predict the immission noise from industrial plant without any guidelines for selecting suitable industrial noise source data. Those software cannot almost modify the noise source determination and the other part of transfer functions fitting to their requirements. Using those software would be waste time and currency because the software have frequently high prices. Despite, the software was occasionally incompatible to use for every purposes. In Thailand, there is still not collaborated mathematical model of the power plant noise prediction

using computer software. It could be a great reason to have a study of the power plant noise prediction model using computer software in order to propose the management of industrial noise pollution control in our country. The studied model is extracted from the International Organization of Standardization (ISO) report no. 9613 Part II (International Organization of Standardization, 1993) applying to noise data from Rayong Power Plant (RPP), Map Ta Phut, Rayong Province, Thailand.

1.2 Objectives

1. To develop computer programs for prediction of noise immission from combined cycle power plant from the sound propagation concepts.
2. To find an appropriate emission noise levels for the noise prediction model of combined cycle power plant with respect to the air environment in Thailand.

1.3 Scope of Works

This study considered noise emission as input data of the noise prediction model from combined cycle power plant for the case of RPP. The study is divided into two parts; field work study and model development.

1. Field work study was to examine the prediction model by comparing the predicted data with the measured data which was collected noise data from RPP. The data collected from RPP were used in the model equations to develop a prediction model suitable for a combined cycle system in Thailand. The atmospheric data was correct to match the suitable range for Thai conditions (0-45 °c ,and 10-100 % Relative humidity), using the study of atmospheric absorption in ISO 9613 Part I (ISO, 1993)
2. The development of prediction model used to build the computer programs from a set of chosen equations that depended on assumption of the typical data input of RPP. The comparison of the predicted data and measured data to test the accuracy of this model.