3936832 SCEB/M : MAJOR : ENVIRONMENTAL BIOLOGY;
M.Sc. (ENVIRONMENTAL BIOLOGY)
KEY WORDS : SULFUR DIOXIDE/ AIR POLLUTION/ NEURAL NETWORK MODEL/ FORECASTING

PIRAPUN JAUNGAROON: DYNAMIC DISPERSION MODEL BASED ON NEURAL NETWORK FOR PREDICTING SULFUR DIOXIDE IMPACT AT THE MAE MOH THERMAL POWER PLANT. THESIS ADVISORS: PRAYAD POKETHITIYOOK Ph.D., SUCHART UPATHAM, Ph.D., 115 p. ISBN 974-662-221-8

Sulfur dioxide which is spreading around the Mae Moh Thermal Power Plant (MMTPP) not only causes air pollution, but also affects the health of humans living in that area. It is vital that the concentrations of sulfur dioxide, which are produced and released by the process of generating electricity of the MMTPP, have to be controlled under the standard safety level which is not harmful to the environment. Therefore, the MMTPP requires the model for predicting the concentrations of sulfur dioxide in advance to keep them to safety level for the whole day.

Mathematical models for predicting the concentrations of sulfur dioxide were found to be difficult to be applied for the MMTPP. They require experts and time for verification of the model. Furthermore, the existed models cannot provide the satisfactory output compared to the actual concentrations of sulfur dioxide. Artificial Neural Network (ANN) based model, in this study, was applied for predicting the concentrations of sulfur dioxide in short-time period. Functional Link Network (FLN) model had been selected to train and test for the information patterns of meteorological data measured from three meteorological stations: Meteorological Main Station (MS), Ban Kor Or (KO) and Ban Huai King (HK). The meteorological data consisted of fast and slow dynamics of the wind which were utilized for training the FLN model to learn and identify the concentrations of sulfur dioxide. After learning completely of the meteorological data, the proposed FLN model could be applied as a predictor of the concentrations of sulfur dioxide. There were two types of record time: 15-minute and one-hour period. They were employed to train and test the proposed FLN model. The test results of the FLN model indicated that a good satisfactory performance of the proposed FLN model employed the 15-minute average data was achieved. Its predicting output was close to the actual concentrations of sulfur dioxide, while there were some errors obtained by the model employed hourly average data. The correlation coefficient and sum of squared error between the predicting and the actual output were also utilized to test and report for comparison in each test condition. By utilizing the predicted value of concentrations of sulfur dioxide obtained from the proposed FLN model, a three-step ahead predictor based on the FLN model had been developed to achieve a longer time. A 45-minute ahead predicted output of the FLN model rendered a good acceptable performance and accuracy.