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JUNTANEE VONGSPANICH: A COMPARISON ON STATISTICAL TECHNIQUES BETWEEN SINGLE AND COMBINED FORECASTS : A CASE STUDY ON TRAFFIC ACCIDENT DATA IN BANGKOK. THESIS ADVISOR: THAVACHAI VORAPONGSATHORN, Ph.D., CHUKIAT VIWATWONGKASEM M.Sc. 114 p. ISBN 974-664-477-7

Forecasting is used to predict future values of a variable based on known past values of that variable or other related variables. There are many factors to consider when choosing the most appropriate forecasting procedure for a given set of conditions. The purpose of this study was to compare three single and combined forecasting methods using traffic accident time series data in Bangkok. The single techniques considered were the Least Squares procedure for fitting an exponential curve, Holt-Winters and the Box-Jenkins methods. Three combined forecasts techniques were calculated using pairs of single forecasting procedures: Least Squares + Holt-Winters, Least Squares + Box-Jenkins and Holt-Winters + Box-Jenkins. Comparisons were made using data from different times in the past (5, 12, 36 and 60 months) to forecast future periods (3, 6 and 12 months). Methods were combined using Bates, Granger and Newbold procedures to take weighted averages. Then, the statistical indicators, the mean square error (MSE), the average mean square error (AMSE) and the mean absolute percentage errors (MAPE) were calculated to evaluate the accuracy of each method.

The findings of this study revealed that on average the combined forecast techniques yielded higher accuracy in forecasting the number of traffic accidents in Bangkok than the single forecast approaches. For the single forecast methods, the Least Squares method was appropriate for forecasting short distances in the future (3 months) using the past data from 5 and 12 months. The Box-Jenkins procedure was efficient for forecasting 3 months in the future using data from 60 months in the past. The Holt and Winters method was appropriate for forecasting farther into the future (6 and 12 months) using data from 12 and 60 months in the past. For the combined forecasting procedures, combining Holt-Winters and the Box-Jenkins methods gave low errors in forecasting for both short and long periods using data from 60 months in the past. This study recommends using this efficient combined method to reliably predict the number of traffic accidents. These data should be very useful in policy making and administrative planning in order to prevent and reduce the number of traffic accidents in Bangkok.