

COMPARING SHORT-TERM TRAFFIC PROJECTIONS WITH TRAFFIC COUNTS—THE JUATS 2015 MODEL

PROBLEM STATEMENT

The rapid pace of advancements in computer hardware and software has changed the landscape of travel demand forecasting. Geographically accurate networks, detailed employment databases, and population demographic profiles are available commercially. As a result, many users have taken advantage of these products to improve the accuracy of their travel demand model. However, with limited budgets, users must determine which product/improvement provides the greatest return on investment. For example, should resources be applied to obtaining a geographically accurate network or to improving the socio-economic data? An evaluation of the different improvements is needed to determine the best investments.

OBJECTIVES

This study examined the TRANPLAN based model developed for the Jacksonville Urban Area Transportation Study (JUATS) in 1995. The base year of the JUATS model is 1990 and the horizon year is 2015. Interim networks developed included the 2000 Existing-Plus-Committed (E+C) network, which included projected population and employment for 2000 and a proposed 2000 open-to-traffic network based on Florida Department of Transportation (FDOT), City of Jacksonville construction schedules in 1995.

The main objective of the project was to compare the projected 2000 traffic volumes with actual 2000 traffic counts conducted by FDOT and the City of Jacksonville. The next step was to discover the cause of any discrepancies. Since 2000 was a census year, the projected 2000 population demographics were compared with 2000 Census population tabulations. Researchers also investigated the relative impact of two other factors on traffic volumes projections: the accuracy of the 2000 highway network and the effect of two-digit highway network coding scheme (which allows the user greater flexibility in defining the speed and capacity of the highway facility).

Specific objectives included performing the following tasks:

1. Update the projected population and employment data with 2000 Census population and InfoUSA employment data to determine the impact of accurate demographic data on traffic projections.
2. Update the projected 2000 highway network to the actual 2000 highway network to determine the impact of the accurate highway network on traffic projections.
3. Update the projected network to 2000 and replace the one-digit facility codes of the network links with two-digit codes to determine the impact of two-digit coding on traffic projections.
4. Determine the combined effects of all three factors (Tasks 1 – 3) on model accuracy.

FINDINGS AND CONCLUSIONS

The study results can be summarized as follows:

1. The socioeconomic and demographic statistics (e.g., number of residents/employment for a given transportation analysis zone) of the study area were underestimated. The accuracy of the 2000 traffic model in projecting traffic volumes was improved with updated population and employment demographics. The Percent Root Mean Square Error (% RMSE), a measurement of accuracy of forecasts, was reduced for the 2000 traffic model.
2. Not all committed highway improvements projected in 1995 were constructed as scheduled. After the highway network was updated, the % RMSE statistic calculated from the observed and counted traffic volumes was reduced without any modification to the original population and employment demographics. This means that the updated highway network had a more significant effect on model accuracy than the population/employment files.
3. The two-digit coding scheme improved the performance of the 2000 traffic model by further reducing % RMSE.
4. Population/employment demographics, accurate highway/transit network, and two-digit coding are not independent factors: i.e., they do not have a fixed effect on model accuracy. Their effects on the model depend on their combinations; the presence of one factor enhances the effect of another. This study suggests that an accurate network is the most important factor. The benefit of updated population/employment demographics cannot be realized until the highway network is updated. Therefore, special attention is needed to ensure the quality of network coding

This research has provided further insights into the effect of population/employment demographics and highway network on the accuracy of short-term traffic projection. This research was limited to JUATS model and further research in different metropolitan areas of Florida is needed to test the conclusion and transferability of the research.

BENEFITS

As the population of Florida continues to grow, the need for a comprehensive, coordinated transportation improvement plan that ensures the mobility of its residents while preserving the quality of life becomes paramount. The backbone of this plan is the ability to accurately forecast changes in population and traffic so that resources can be directed to growing areas in advance of any failures.

This study closely examines the accuracy of the transportation model in Jacksonville. It identifies areas for improvements and dispels certain myths. Previously, anecdotal evidence had pointed to population/employment demographics as being the key to improving the accuracy of the traffic model. This research identified the accuracy of the highway network as being the most important factor. It is hoped that the results of the research will be used by transportation professionals in prioritizing their choices during model development, especially when resources are limited.

This research was conducted by Fang Zhao, Ph.D., P.E. of the Lehman Center for Transportation Research at the Florida International University. For more information, contact Imran Ghani, P.E., AICP, Project Manager, at (386) 961-7379, imran.ghani@dot.state.fl.us.