Comparison of FHWA TRAF Simulation Programs and the Highway Capacity Software in Analyzing Impacts on Surface Streets and Freeways

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Abstract

This paper presents the results of comparing various traffic engineering software in analyzing the effects of existing and future traffic demand on arterial streets and freeways. Providing the best analysis for traffic conditions and having a comfort level with the results is a difficult task based on the various methodologies available. Some of the arterial streets analyzed contained one way north- south and east-west pairs. The freeway section analyzed posed an interesting challenge in that the corridor has three freeway to freeway interchanges in less than two miles. The middle freeway to freeway interchange contains both left and right exit ramps. Ramp metering is also present along the corridor.

Traffic simulation software and the Highway Capacity Software (HCS94) were utilized in the analysis of the arterial streets for both existing conditions and future forecasts. The project was originally analyzed with TRAF-CORFLO (NETFLO1), a macroscopic simulation model. TRAF-NETSIM was subsequently utilized in the same corridor. NETSIM is a microscopic simulation model. The TRAF family of simulation models were developed for the Federal Highway Administration. These simulation models were chosen since a network of streets in the downtown core were to be assessed. The models were calibrated for existing conditions based on count data. The 1994 HCS was also utilized on study intersections. TRANSYT-7F was utilized to calculate the fixed time signal timings for the networks.

Three pieces of software were utilized in the freeway analysis due to limitations and comfort level of the reviewing agency; TRAF-FRESIM, FREFLO, and Highway Capacity Software (HCS94). FRESIM is microscopic simulation software, FREFLO is macroscopic simulation software, and HCS is based on the Highway Capacity Manual. Providing the best analysis of traffic conditions and having a comfort level with the results is a difficult task based on the various methodologies available. Both existing conditions and future forecasts were to be performed using traffic simulation software and as a check the HCS94. The models were calibrated for existing conditions based on counts, headway data, and origin-destination data collected as part of the study. The 1994 HCS sections on weaving and ramp and ramp junctions were utilized.

The results, comparisons, and flaws encountered using the various FHWA TRAF simulation programs and the HCS for assessing a network of arterial streets and a freeway corridor will be presented. The objective was to find out whether the results of simulating the same traffic network with the different software were similar. The software employs different approaches to assess traffic flow on urban arterial streets and urban freeway corridors. Measures of effectiveness (MOEs) such as delay, speed, and queue length are compared between the software results.