



Project Summary

Texas Department of Transportation

0-5424: Analytical Enhancements to PASSER V for Arterial and Access Management

Background

PASSER V was first released in 2003. It combines, under a graphic user interface, arterial and diamond interchange signal timing optimization and analysis technology developed by the Texas Transportation Institute (TTI) over a period of several decades. PASSER V contains models to optimize signal timings to minimize delay or maximize progression. However, it could not be used in access management and raised-median projects because it lacked models to address unsignalized intersections. Thus, Texas Department of Transportation (TxDOT) districts dealing with such projects had to rely on Synchro, which does not guarantee signal timings for providing optimal two-way arterial progression preferred by many districts. The objective of this project was to incorporate modeling of two-way stop-controlled (TWSC) intersections into PASSER V to produce a software tool that guarantees two-way progression.

What the Researchers Did

In this project, researchers conducted the following work:

- assessed TxDOT needs,
- conducted literature review to identify the model that best suits the needs,
- conducted field studies at nine unsignalized intersections in College Station, Texas, with stop-controlled minor approaches,
- conducted detailed assessment of modifications required in PASSER V-03,
- modified PASSER V-03 to produce PASSER V-07,
- conducted testing of PASSER V-07 by comparing it with results from Highway Capacity Software (HCS) 2000,
- used data from two recent raised-median projects to compare PASSER V-07 with Synchro, and
- developed updated training material for conducting PASSER V-07 training workshops.

Research Performed by:

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Project Completed:

8-31-07

What They Found

From the work conducted, researchers found that:

- Modeling of TWSC intersections is sufficient for TxDOT needs.
- Despite its flaws, the TWSC intersection model in the *Highway Capacity Manual* (HCM) is the most comprehensive and appropriate for use in PASSER V.
- There is a lack of models/procedures for addressing U-turns at signalized and unsignalized intersections.
- Extremely elaborate data collection procedures/plans are needed to obtain data for full calibration of the HCM TWSC intersection model, but are beyond the scope of this project. It is possible to partially calibrate the model using easy-to-collect data.
- Required PASSER V modifications include:
 - changes to existing data structure, data file, input screens, output screen, and graphic capability;
 - addition of data structures and input screens; and
 - addition of TWSC intersection modeling and modification of all applicable tools in PASSER V, including: PASSER II, GA-Based, Volume Analysis, Time-Space Diagram, and Delay Analysis.
- The resulting PASSER V-07 program works as intended, but the existing Extensible Markup Language (XML) based input data file format is inefficient for large arterials.

What This Means

The new PASSER V-07 program is ready for immediate use for access management applications, including modeling of two-way stop controlled intersections. One of the two case studies created as part of this project relates to an ongoing raised-median project in Brownsville, Texas. This Brownsville case study data file can be used to quickly transition to the use of the new version of PASSER V. Also, the updated training material developed as part of this project can be used to conduct training workshops to familiarize/train TxDOT staff in various districts to provide for quick transfer of technology.

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