



Project Summary

Texas Department of Transportation

0-6583: Methods for Developing External Travel Survey Data

Background

External travel surveys, often termed ‘roadside’ or ‘intercept’ surveys, are an essential component of the Texas Department of Transportation’s (TxDOT’s) travel survey program. External surveys are generally conducted at or near the boundaries of urbanized areas to collect information on the amount and characteristics of vehicles traveling into, out of, and through a defined study area. More specifically, the surveys collect data on internal-external (local) trips and external-external (through) trips by non-commercial and commercial vehicles. Additionally, external travel surveys provide the following key components to the external distribution portion of the travel demand modeling process:

- the apportionment of local and through trips for each external station,
- the allocation between non-commercial and commercial vehicle trips,
- an estimate of non-resident travel,
- the average trip length of local and through trips, and
- the expanded trip tables for local and through trips.

In recent years, there has been a heightened sensitivity to the methods used to collect external travel survey data. While these methods are generally considered ‘state of the practice’ by transportation practitioners, this research examined alternative methods for collecting external travel data as well as new methods for developing external survey data in lieu of conducting external surveys.

What the Researchers Did

Researchers examined the state of the practice in external survey data collection methodologies, with a particular focus on methods other than the traditional roadside/intercept survey method. The research identified three primary means for developing external survey data that did not involve collecting new data:

- the use of non-external survey data such as household, workplace, and commercial vehicle surveys,
- the use of Texas Statewide Analysis Model (SAM) planning data, and
- the application of logit models.

What They Found

Using recent household, workplace, and commercial vehicle survey data from Austin, San Antonio, and the Rio Grande Valley, researchers found the following:

- Household surveys underestimated the number of local trips made by residents.
- Workplace surveys did not show consistency in estimating local trips made by non-residents of the study area.

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- Commercial vehicle surveys underestimated the number of local trips made by commercial vehicles.
- Non-commercial vehicle average trip length estimates for the three study areas were inconsistent.
- Average trip lengths derived from the commercial vehicle surveys overestimated distances in all three study areas.

Researchers used estimates developed from external surveys in Corpus Christi (1996) and Austin (1998) and compared them to results obtained from SAM. The following is a summary of the findings and issues related to the use of SAM to estimate external travel:

- SAM underestimated the total number of trips in both areas.
- In comparing the percent of through trips by individual external stations in both study areas, a wide range of differences resulted between the survey data and the SAM results.
- The model has base and forecast years of 1998 and 2025, thus limiting the ability to perform a straightforward analysis for periods that fall in between these years.
- SAM does not have the ability to estimate non-resident trip information.

The research implemented a two-phase logit model to develop through travel estimates. The first phase developed estimates of the percent of local and through traffic at each external station in a study area. The second phase estimated the percentage of traffic at each external station that was going to or coming from every other external station in the study area. The following is a summary of the results and issues related to the use of the logit model:

- The model estimates for eight of the thirteen study areas were within 20 percent of the survey estimates.
- The model estimation method is much more cost-effective and easier to implement than traditional external surveys.
- The logit model method does not provide estimates of local trip distributions to internal zones and does not provide estimates of non-resident travel within the study area.

What This Means

While the methods reviewed in this research provide estimates on certain aspects of external travel, the best method for acquiring all the data needed by modelers still remains the roadside, or intercept, survey. Each method reviewed in the research has the potential to be manipulated in order to provide usable estimates, but none of the methods provide all of the key data elements needed by transportation planners, modelers, and engineers.

Of the methods reviewed, the logit model offers the most promise in terms of its ability to provide external travel estimates. The logit model has the ability to estimate through trips as well as allow for the development of through trip tables. However, it does not allow a means to develop a local trip table or develop trip length frequency distributions for local trips. Additionally, the logit model does not provide information on non-resident trips within the study area.

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