



Project Summary

Texas Department of Transportation

0-6608: Integrating the Transportation System with a University Campus Transportation Master Plan

Background

University campuses like that of the University of Texas at El Paso (UTEP)—with thousands of students, faculty and staff arriving and departing on a daily basis—are considered major trip attractors. This intense level of activity generates significant congestion levels within the campuses and in their vicinity, particularly in urban campus settings. With university enrollment trends expected to increase substantially in the next decade, this problem can only be expected to become worse. In addition, university campus settings are multimodal and complex in nature, incorporating vehicular traffic, transit and pedestrians into one transportation system. This creates a significant challenge for university campus planners trying to incorporate their campus master plan into the overall regional or metropolitan transportation system. The objective of this research is to document a systematic approach to analyze the problems associated with the interaction and integration between university campus transportation systems and the larger metropolitan transportation system, in order to develop solutions to these problems.

What the Researchers Did

To achieve the project goal, researchers:

- conducted an extensive and exhaustive literature review of common planning practices to integrate the university campus transportation system with the surrounding transportation system,
- used the UTEP campus master plan as a case study,
- reviewed historical data regarding accident locations in and around the UTEP campus,
- surveyed faculty, staff and students on campus with the purpose of gathering feedback on the existing transportation system on campus and their preferences on proposed future improvements,
- collected a myriad of data about the university transportation system including existing and future transportation infrastructure and parking as well as an extensive site investigation of the UTEP campus,
- identified all gaps between the UTEP campus transportation system and the surrounding transportation system,

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- conducted a multiresolution modeling effort that included both mesoscopic simulation at the regional level to analyze traffic redistribution given infrastructure improvements and microscopic simulation at the localized level to analyze pedestrian-vehicular interactions, parking lot distributions and overall traffic congestion in and around the campus perimeter,
- developed a cost estimate for all proposed infrastructure improvements and recommendations, and
- developed a synthesis of “best practices” for analyzing transportation system integration with a university campus master plan.

What They Found

The research showed that integrating a transportation system with a university campus transportation master plan requires a multitude of data resources and a series of actions. Traffic control on streets that contain both heavy pedestrian and vehicular traffic warrants careful analysis. Removing or limiting the number of pedestrians crossing at major conflict areas significantly reduces the chances of accidents involving pedestrians. When removing pedestrians from conflict areas is not an option, appropriate traffic control strategies and traffic calming devices can considerably improve overall pedestrian safety. Simulation results showed several areas on campus that needed infrastructure improvement for autos, pedestrians and bicyclists. Simulation was able to determine traffic redistribution in and around campus given future transportation improvements and assist both university and state officials in making cost-effective infrastructure improvements. Efforts to simulate with integrated simulation models at different levels of resolution proved to be ineffective because of the specialized nature of a university traffic composition. Mesoscopic models cannot differentiate separate vehicle classes (e.g., student, faculty and staff), and therefore a microscopic simulation tool was needed for detailed analysis of pedestrian-vehicular interactions within the campus setting. Mesoscopic simulation was able to analyze traffic redistribution around the campus perimeter including freeway off-ramps and adjoining arterials. Surveys and a review of accident data allowed researchers to identify “hot-spot” locations that were not conducive to pedestrian safety.

What This Means

Based upon the findings of the literature review, data acquisition and analysis, and simulation modeling, the Texas Department of Transportation (TxDOT) has the potential to provide a systematic approach for analyzing how university campus master plans integrate with their surrounding transportation system. By assessing the potential operational and safety benefits from university campus infrastructure improvements in conjunction with addressing other critical issues—such as collaborative planning, parking, transit service, and pedestrian/bicycle safety and public outreach—TxDOT has the opportunity to improve freeway and major arterials as they are impacted by university campus transportation systems.

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