



Research Digest

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Research Digest

Item 1

Austin Commuter Survey: Findings and Recommendations

SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

SWUTC/05/167240-1 • 2005

The purpose of this research is to present the major findings and recommendations of a University of Texas (UT) commuter research study that (1) Examined the demographic, employment, and overall travel characteristics of Austin area commuters, and analyzing how these characteristics impact commute travel choices and perceptions, (2) Developed a framework for evaluating the effect of alternative congestion alleviation strategies on commute mode choice, and (3) Identified broad and important issues that have to be recognized when designing and analyzing a comprehensive mobility plan for Austin. The UT research study was based on a web-based survey of Austin area commuters undertaken between December 2003 and March 2004. The data from the web-based survey was weighted appropriately to be representative of the Austin area commuter population.

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<http://swutc.tamu.edu/publications/technicalreports/167240-1.pdf>

Item 2

Traffic Engineering Applications of Driving Simulation

SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

SWUTC/06/167142-1 • 2006

Driving simulation has primarily been used to study issues of driver distraction and to evaluate in-vehicle devices. The visualization and driver performance capabilities of simulators can be applied to more traditional traffic engineering problems as well. This project aimed to demonstrate the usefulness of a driving simulator in evaluating geometric designs for two-lane roads. Paved surface width has been shown to be correlated with crash rates and travel speeds on two lane rural roads throughout Texas. The current project examined how travel lane width, edge line striping, and shoulder width solutions affect driver errors on these roadway types. In addition, as a result of this project, the library of roadway cross-sections in the driving simulator was increased and is available for use in future studies.

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Item 3

The Texas Rural Summer Transportation Institute

SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

SWUTC/06/167143-1 • 2006

A considerable number of Texas students grow up in rural or small urban centers that are a significant distance from the large metropolitan areas. These students are not afforded the same access to the many summer and pre-college programs that are available in large metropolitan areas. This often affects the students' decision to further their education and attend colleges or universities. The Summer Transportation Institute is an established program funded by the Federal Highway Administration's Office of Civil Rights. Currently, the STI targets urban students and thereby misses a large segment of the student population of Texas who are potential members for the transportation work force. By developing and conducting a modified Summer Transportation Institute in selected smaller communities and rural areas an audience not previously exposed to transportation career opportunities is reached. This modified program can be easily implemented for rural Texas students. This modified program was conducted as a pilot program in three locations. These locations are similar in that they were rural or semi-rural and at least 35 miles from a major metropolitan area.

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Item 4

Innovative Solutions to Transportation Needs in the Colonias

SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

SWUTC/06/167144-1 • 2006

An estimated 400,000 Texas residents, most of whom are legal citizens of the United States, currently live under poor conditions in underdeveloped neighborhoods called colonias along the Texas- Mexico border. They are challenged daily with the simple tasks of seeing their children off to school, going to work, obtaining water for daily use, buying groceries, obtaining quality health care, and having their trash removed. A major link in all of these basic needs is sufficient and affordable transportation. While many areas are gradually working to provide desperately needed infrastructure to these communities, the process is slow and expensive. Innovative and cost-effective solutions are needed to solve immediate transportation needs to help support these Texans in daily life. This research attempts to assess and document innovative, affordable, and cost-effective methods for meeting some of the unique transportation challenges facing residents of the colonias. The overall approach is to provide resources that may help improve the quality of life for these citizens by meeting their transportation needs on a daily basis.

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Item 5

Microscopic Datasets: a Novel Approach Applied to Visualization of Spatiotemporal Flow Regions

SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

SWUTC/06/167452-1 • 2006

A parsimonious approach to microscopic traffic flow datasets is suggested. This approach is based on provision of minimal data, along with a set of supporting tools termed as feature extraction operators that are intended to provide researchers with the flexibility to extract those particular features of the data that they desire to study. As an illustration of the possibilities of this approach, an attempt is made to validate the hypothesis that traffic flow decomposes into spatiotemporal regions representing one of the four classes of congested flow, shock wave, acceleration wave or free flow. This approach employs the classical conceptual framework of the field of pattern recognition, as applied to microscopic datasets. The specific microscopic dataset employed is that labeled I-405 Northbound at Mulholland Drive, Los Angeles in the 1985 study conducted by JHK Associates for the FHWA. The classical approach of plotting and manually analyzing vehicle trajectories is initially employed, to establish some approximation to ground truth. Then it is demonstrated that speed alone is inadequate to support the desired classification. Finally, a 4-means cluster analysis in velocity-acceleration feature space is employed to demonstrate that a spatiotemporal plot of the resulting cluster numbers provides a decomposition more-or-less as expected.

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Item 6

Fibers From Recycled Tire as Reinforcement in Hot Mix Asphalt *SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER* *SWUTC/06/167453-1 • 2006*

Previous laboratory and field research has demonstrated that virgin synthetic and cellulose fibers provide important attributes for hot mix asphalt (HMA): reduced asphalt (mastic) draindown during construction for certain types of mixtures, reinforcement which significantly reduces cracking; and, in some cases, reduced rutting. By-product fibers from grinding of scrap tires offer an excellent, low-cost alternative to virgin and cellulose fibers. Currently, most of these fibers are being disposed of in landfills or incinerated. Two types of recycled tire fibers were evaluated to determine whether they can be used in different types of HMA mixtures as a replacement of currently used cellulose fibers or mineral fiber. The researchers tested three different types of mixtures: stone mastic asphalt (SMA), permeable friction course (PFC), and coarse mix high binder (CMHB) mixtures with two different types of recycled tire fibers, one cellulose fiber, and no fiber. HMA specimens were prepared using all of these combinations and tested using several common laboratory test procedures. The laboratory tests used to evaluate the mixtures were: draindown test, dynamic modulus test, overlay test, indirect tensile strength test, and Hamburg wheel tracking test.

Mixtures containing tire fibers, in most cases, outperformed the mixtures containing cellulose fiber and mixtures with no fiber. Draindown test results clearly revealed that recycled tire fiber can be used in SMA and PFC mixtures as a replacement for cellulose fiber (or mineral fiber) to prevent asphalt draindown during construction. Researchers examined the availability of by-product tire fibers and found them to be readily obtainable in various parts of the USA. The incorporation of recycled tire fiber into HMA does not require any special technique or equipment beyond that typically used for handling other fiber products. The cost of tire fiber will probably be less than cellulose fiber, particularly when tire fiber is available locally.

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Item 7

Impact of Demographics, Built Environment Attributes, Vehicle Characteristics, and Gasoline Prices on Household Vehicle Holdings and Use *SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER* *SWUTC/06/167550-1 • 2006*

In this report, we formulate and estimate a nested model structure that includes a multiple discrete continuous extreme value (MDCEV) component to analyze the choice of vehicle type/vintage and usage in the upper level and a multinomial logit (MNL) component to analyze the choice of vehicle make/model in the lower nest. Data for the analysis is drawn from the 2000 San Francisco Bay Area Travel Survey. The model results indicate the important effects of household demographics, household location characteristics, built environment attributes, household head characteristics, and vehicle attributes on household vehicle holdings and use. The model developed in the report is applied to predict the impact of land use and fuel cost changes on vehicle holdings and usage of the households. Such predictions can inform the design of proactive land-use, economic, and transportation policies to influence household vehicle holdings and usage in a way that reduces the negative impacts of automobile dependency such as traffic congestion, fuel consumption and air pollution.

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Item 8

Household Location Choices: The Case of Homebuyers and Apartment Dwellers in Austin, Texas

SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

SWUTC/06/167552-1 • 2006

This paper explores the issue of residential location choice for apartment dwellers and recent homebuyers in the Austin, Texas area. An understanding of residential location choice is fundamental to behavioral models of land use and, ultimately, travel demand. Surveys of over 200 apartment dwellers and 900 recent homebuyers offer valuable data on movers and their reasons for moving, as well as their priorities in home type and location selection and tradeoffs from such decisions.

Survey results show that apartment dwellers have different reasons for moving than homebuyers. The top reasons for moving for homebuyers are wanting to own a home and wanting a newer/bigger/better home; many apartment dwellers also reported wanting a newer/bigger/better home (the most frequently chosen response), but they were also much more likely to be moving for an easier commute, new job or job transfer, and planning to attend or graduate from college.

Both apartment dwellers and recent homebuyers reported their level of importance for various housing and location attributes; several of which described various types of access, such as commute time, proximity to shopping availability of bus services, and access to bus services. These features accounted for approximately 40% of the average reported importance for all housing and location attributes for apartment dwellers, but only 25% for homebuyers, suggesting that apartment dwellers place a higher priority on access than homebuyers.

Lifecycle variables, such as living situation and marital status, are important indicators in binary choice experiments and the importance of various measures of accessibility, especially in the case of apartment dwellers. Families in apartments are more likely to choose a location with plenty of parking over a downtown location with limited parking and homebuyers with children favor larger lots over proximity to shopping facilities. Although lifecycle variables are statistically significant in models of stated preferences for homebuyers, current home and location features are more practically and statistically significant, on average. In many instances, homebuyers are more likely to favor improvements that reflect their location choice. For example, households with homes far from the Austin Central Business District (CBD) tend to favor home enhancements over improvements in accessibility despite the fact these locations have lower levels of accessibility, in general. Overall, binary logit and ordered probit model results show that women and non-Caucasians (apartment dwellers and homebuyers) tend to be more concerned with all types of access -- commute time, proximity to shopping, availability of bus services, and access to major freeways.

Predictive models of monthly rent, home value, and location offer important insights, while controlling for many key factors. For instance, centrality is valued by residents, so monthly rents fall rapidly within 3 miles of the CBD but taper at further distances, and home values fall linearly by \$8,000 for each additional mile away from the CBD, *ceteris paribus*. As predicted rents and home values decrease with less accessibility (i.e., being further from the CBD), these values increase with apartment/home size (i.e., interior square footage), recognizing the tradeoffs that homes make between various attributes for a given cost constraint.

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Item 9

Robust Design and Evaluation of Transportation Networks with Equilibrium Under Demand Uncertainty
SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER
SWUTC/06/167556-1 • 2006

As long-term forecasts of origin-destination (O-D) travel demands are inherently uncertain, future network performance cannot be predicted with certainty. Neglecting the uncertainties present can result in inaccurate measures of network performance that may lead to incorrect policy decisions. This work relaxes the assumptions of determinism and independence of O-D demand in solving user equilibrium assignment. Insight is presented into the impacts of these assumptions through numerical analyses, where demand takes on various types of normal and lognormal multivariate distributions. The results indicate that incorrect assumptions of independence can, depending on the actual relationship between demands, lead to significant over- or under-estimation of network performance and incorrect network improvement decisions.

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Item 10

3-D Traffic Simulation Professional Development Seminars 2005 Final Activity Report
SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER
SWUTC/06/167652-1 • 2006

Society's increasing dependence on software, technological products, services and systems has been mushrooming far beyond expectations of only a few years ago. The major stimulant for this has been the explosion of the web-based technologies. It is now widely recognized that technology is the "glue" binding together communications, electronics, multi-media, and many other hi-technology products and services, and that it is, perhaps, the largest and most pervasive of global industries. The accelerated growth in this industry has created tremendous opportunities. But it has also presented a number of very tough challenges to the participants - for example, to ensure the supply of adequately developed human resources, to cope with "speed-of-light" technology changes, and to support increasingly rapid product release rates.

This on-going project is designed to fill the gap by addressing the needs of transportation agencies and organizations for supplemental job training to transportation professionals. The educational infrastructure is critical to the continuous professional development of today's workforce and universities must take the lead in training, upgrading, and retraining workers to support economic growth and retain jobs for the domestic workforce. Companies are continuously driven to employ the latest technologies in their products and in the development of their products. The tremendous rate of change in this sector is placing enormous pressure on organizations, and on their workers, to keep abreast of the changes in order to remain competitive. This is the final activity report for the 3D Traffic Simulation Professional Development Seminars reflects the outcome of the project during fiscal year 2005.

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Item 11

Accurate Speed Estimation Using Single Loop Detector Data

SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

SWUTC/06/167761-1 • 2006

Flow speed describes general traffic operation conditions on a segment of roadway. It is also used to diagnose special conditions such as congestion and incidents. Accurate speed estimation plays a critical role in a traffic management or traveler information system. Data from loop detectors has been a primary source for traffic information, and single loop detectors are the predominant source in many places. However, single loop detectors do not produce speed output.

Several methods have been developed for speed estimation using single loop detector outputs. These methods, however, have their limitations and are often inaccurate under various traffic conditions. Some of the methods are also difficult to implement. This research project seeks to improve on the existing methods and to increase the accuracy of speed estimation. A new methodology, the Unscented Kalman Filter (UKF) method, is developed for this purpose. Datasets collected from three different freeway locations are used for speed estimation and evaluation of the proposed method. The results show that the proposed method generates accurate and stable estimations of speed. The proposed method is superior to existing methods.

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Item 12

Developing a “Recruitment Toolbox” for Transportation Professionals

SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

SWUTC/06/167765-1 • 2006

The transportation engineering workforce in the U.S. is facing a concerning shortage. While the need to address this shortage is well-recognized, substantive tools and funding mechanisms for making progress towards the recruitment of transportation professionals are lacking. In cooperation with the Institute of Transportation Engineers (ITE), this project developed a tool - a Recruitment Toolbox - to better support professional participation in local recruitment efforts.

The development process consisted of the following tasks: develop targeted communications plan; develop/distribute solicitation; review other program resources and ITE submissions; develop electronic recruitment toolbox, companion outreach guidelines, and assessment plan; develop/distribute availability announcement, identify venues for “showcase,” and document development process/observations.

The completed Recruitment Toolbox contains a total of 92 activities that cover a range of age levels (Kindergarten through 12th Grade) and topic areas (e.g., environment and energy, planning and urban development, traffic safety, etc.). The companion Outreach Guidelines focus on understanding your audience and effectively engaging student participants. The proposed Assessment Plan includes three levels of information gathering: website access, pre-activity survey, and post-activity survey. The first two products will be available to outreach providers from the ITE website (www.ite.org) beginning January 2007.

The development of the Recruitment Toolbox represents a first step in encouraging higher quality and more frequent outreach to pre-college students. As a next step, existing activities should be reviewed and enhanced with additional preparatory information and/or more constructive hands-on applications. Information gathered through the Assessment Plan can help to guide the priority of improvements.

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Item 13

Estimation of Travelers' Values of Time Using a Stated-preference Survey with Variable Pricing Options
SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER
SWUTC/06/167766-1 • 2006

This study analyzed data from a stated preference survey of Houston travelers faced with numerous mode choices, including value pricing options. The study: (a) examined the possibility of using a genetic algorithm to estimate mode choice models while removing the need of making the IIA assumption, (b) estimated nested logit models, (c) attempted to estimate random parameter logit models, and (d) estimated numerous multinomial logit models. After comparing different specifications and optimization techniques (namely the genetic algorithm and Newton-Raphson method in the econometric software, Limited Dependent LIMDEP) the multinomial logit model estimation using LIMDEP was found to be more efficient because of easy estimation and a much lower time requirement for estimation. Hence a multinomial logit model was used for estimating the values of travel time savings (VTTS) and the penalty for changing travel schedule for different groups of travelers. The values estimated for the penalty for changing travel schedule were not statistically significant and were therefore not used. The values estimated for travel time savings were significant and comparable to those obtained in previous studies. It was found that the average VTTS was 39 percent of the wage rate and was higher for females, non-commuters, households with few vehicles, and the wealthy.

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Item 14

A Comprehensive Analysis of Built Environment Characteristics on Household Residential Choice and Auto Ownership Levels
SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER
SWUTC/06/167860-1 • 2006

In this report, we identify the research designs and methodologies that may be used to test the presence of “true” causality versus residential sorting-based “spurious” associations in the land-use transportation connection. The report then develops a methodological formulation to control for residential sorting effects in the analysis of the effect of built environment attributes on travel behavior-related choices. The formulation is applied to comprehensively examine the impact of the built environment, transportation network attributes, and demographic characteristics on residential choice and car ownership decisions. The model formulation takes the form of a joint mixed multinomial logit-ordered response structure that (a) accommodates differential sensitivity to the built environment and transportation network variables due to both demographic and unobserved household attributes and (b) controls for the self-selection of individuals into neighborhoods based on car ownership preferences stemming from both demographic characteristics and unobserved household factors.

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Item 15

Development of a Phase-by-Phase, Arrival-Based, Delay-Optimized Adaptive Traffic Signal Control Methodology with Metaheuristic Search

SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

SWUTC/06/167863-1 • 2006

Adaptive traffic signal control is the process by which the timing of a traffic signal is continuously adjusted based on the changing arrival patterns of vehicles at an intersection, usually with the goal of optimizing a given measure of effectiveness. Herein, a methodology is developed in which the characteristics of a traffic signal cycle are optimized at the conclusion of every phase based on the arrival times of vehicles to an intersection, using stopped delay as the measure of effectiveness. This optimization is solved using metaheuristic search procedures, namely tabu search, and embedded in an algorithm in which current vehicle arrival times are detected, arrival patterns over a specified horizon are predicted, the traffic signal timing is optimized, and the timings are sent to a traffic signal controller. The methodology is shown to provide improvement in performance for a number of intersection configurations and traffic regimes over traditional forms of traffic signal control, and the metaheuristic search is demonstrated to significantly reduce the computation time for a solution as compared with other search procedures.

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Item 16

Enhanced Freight Sketch Planning Tool for Assessing Multimodal Investment Strategies

SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

SWUTC/06/167868-1 • 2006

In recent years, there have been dramatic changes in the volume and movement of freight within the US and internationally. Traditional distribution systems have been replaced by just-in-time driven processes and freight transportation patterns have become much more complex. Innovations in containerization as well as changes in trade geography have directly influenced international trade movements. NAFTA and the deregulation of rail, trucking and air in the latter part of the twentieth century also had a large impact on freight movement. Given these changes, it has become increasingly necessary for transportation planners to look to modes other than traditional highways as solutions for congestion and other transportation problems. However, public agencies have been challenged to demonstrate and contrast the benefits of these modal investments with traditional highway spending.

During the first phase of the research a spreadsheet based tool, entitled Multimodal Analysis Freight Tool (MAFT) was developed to quantify and evaluate the benefits associated with multimodal freight investments. However, the tool needed to be further developed to accurately account for the rail and barge components and data regarding these modes was not readily available during the first phase of the project. This study addresses that issue as well as develops and analyzes a case study involving the rail mode and one involving the barge mode using MAFT.

Additionally, given the uncertainty of assumptions made in the tool, a sensitivity analysis to determine the critical input values is needed. A critical examination of the output from several case studies was studied to determine the overall effect of these factors on the results. An assessment of the oversimplifications in the tool, due to its sketch planning nature, was undertaken and possible solutions identified.

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Research Digest

Item 17

Compendium of Student Papers: 2006 Undergraduate Transportation Engineering Fellows Program
SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER
SWUTC/06/473700-00003-11 • 2006

This report is a compilation of research papers written by students participating in the 2006 Undergraduate Transportation Engineering Fellows Program. The ten-week summer program, now in its sixteenth year, provides undergraduate students in Civil Engineering the opportunity to learn about transportation engineering through participating in sponsored transportation research projects. The program design allows students to interact directly with a Texas A&M University faculty member or Texas Transportation Institute researcher in developing a research proposal, conducting valid research, and documenting the research results through oral presentations and research papers.

The papers in this compendium report on the following topics, respectively: 1) identification of positive guidance deficiencies in urban interchange work zones; 2) driver comprehension of diagrammatic advanced guide signs and their alternatives; 3) performance evaluation of traffic responsive signal control; 4) internal trip capture estimation for mixed-use developments; 5) creating a process to identify a traffic fingerprint and correct altered data; and 6) evaluation of tripal5 trip generation default models.

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Item 18

Importance of Short Line Railroads to Texas
SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER
SWUTC/06/473700-00027-1 • 2006

Short line railroads employ more than 20,000 persons, serve 11,500 customer facilities, and originate or terminate approximately 25 percent of all rail movements. A good portion of short lines also operate on rail lines that were previously unprofitable and are often the lifeline for many rural agriculture communities. Texas currently has 41 short line railroads that operate on more than 2,600 miles of track, which represents almost 20 percent of the state rail infrastructure. The remainder of the track is operated by the three Class I railroads in the state. Nationwide, there are seven Class I and 545 short line railroads. The Class I railroads are characterized by long distance movement of freight over high-density rail lines between major markets. The major commodities are usually transported over a few major lines that stretch across the country, similar to perhaps the interstate highway system. On the other hand, the short lines operate shorter distances with the primary focus being on serving the customers on the line. Short line railroads face many obstacles to efficient, profitable operations. But they also hold great potential, especially with their ability to work closely with shippers to quickly meet changing needs and provide high levels of customer service. This project examines the issues facing short line railroads, future opportunities, and the importance of these railroads to the state of Texas.

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Item 19

Remedial Driver Education in Texas: Does it Do Any Good?

SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

SWUTC/06/473700-00029-1 • 2006

The objective of this report was to assess the effectiveness, if any, of remedial driver education in reducing subsequent traffic crashes and violations in a sample of Texas drivers who took a driver safety course in 2001 (the DSC group), as compared to a control group of drivers who had a violation but did not take a course (the CON group). The 194,314 drivers examined were a convenience sample of 18-20- year-old Texans obtained for another study.

For every age group, and for the combined group of 18-, 19-, 20-year-old Texas drivers, the DSC group had statistically significantly ($p = .05$) better post-qualifying-event driving records than did the CON group. Total events were significantly better. Crashes were significantly better. Convictions were significantly better. The findings are generally inconsistent with the research literature, so possible explanations, such as demographic differences between the two groups, were explored, to no avail.

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Item 20

Children and Transportation: Identifying Environments that Foster Walking and Biking to School

SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

SWUTC/06/473700-00031-1 • 2006

Few children walk or bike to school. In fact, less than 13% of children in the U.S. walk or bike to school and 85% of trips to school are made by car or school bus (United States Department of Health and Human Services [USDHHS], 2004). Almost 50% of children walked or biked to school in 1969 (United States Environmental Protection Agency [USEPA], 2003). Did changes in transportation infrastructure contribute to this reduction in walking and biking? What new changes should be made in transportation infrastructure today to reverse this trend and provide a greater likelihood that children will walk or bike to school?

Although there is very limited understanding of how pedestrian environments influence children's walking and biking to school, previous research shows that physical environments can foster non-automobile mode choices to school. Landscape buffers and trees add to parents' perceptions of their children's safety and increase their willingness to let their children walk to school (Kweon, Naderi, Maghelal, & Shin, 2004). Ewing (in press) also found that more children walked to school where there were sidewalks. In addition, Safe Routes to School programs increase children's walking to school (Staunton, Hubsmith, & Kallins, 2003).

Physical environments can also be a barrier to children walking and biking to school. In fact, in a study completed by the CDC (2002, August 16), distance was found to be the number one barrier to children walking to school. Texas along with many other states established 2-mile school walk zones measured by the nearest practical route from the school attended. However, particularly in the U.S., why distance is the dominant factor in determining walk zone policies and what an appropriate distance might be for walking to school have yet to be consistently documented.

In this research we investigated how additional physical attributes (e.g., street pattern, land use, housing density, environmental content) in the pedestrian environment influence children's walking and biking to school. We also measured what school children consider walkable and bikable distances to school.

One hundred eighty six parents from four school walk zones in College Station, TX participated in this study. They reported their children's commute modes, routes to school and perceived walking and biking environments to school. Satellite imagery and spatial data from the College Station Geographic Information Services were used to further investigate distances to school, environmental content, surrounding land use, and street patterns.

Results indicate that children walk more in older neighborhoods with mature trees while they bike more in newer neighborhoods with more sidewalks. Also children who live on cul-de-sacs walk to school less than those who live on grid streets. Also, children's walking is also significantly related to housing densities and mixed land use.

Contrary to the popular 2-mile walk zone guidelines, the mean distance for walking in this study is .71 miles while the mean distance of biking is .93 miles. On average, children who live beyond 1 mile from their school either ride in a car, car pool, or pay a transportation fee to ride a school bus. These findings are being used to shape better school walk zone guidelines in support of active and healthy communities.

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Item 21

An Investigation on the Environmental Benefits of a Variable Speed Control Strategy

SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

SWUTC/06/473700-00072-1 • 2006

The safety benefits of variable speed limits (VSL) have already been widely recognized. However, the environmental benefits of variable speed limits have been largely ignored. This paper presents a study of the potential benefits of variable speed limits in reducing mobile emissions. A Monte Carlo simulation approach is developed to evaluate the effectiveness of the idea of using variable speed limits to manage and reduce mobile emissions. A case study is performed on the IH-35 corridor in Austin, Texas. The numerical results indicate that on “Ozone Action” days, by managing the freeway/expressway traffic speeds at appropriate levels through VSL, the major pollutants, such as Nitrogen Oxides (NOx) emissions, could be significantly reduced. Considering the large contribution from freeway/expressway traffic to mobile emissions, a variable speed limit strategy could be an effective measure to balance travelers’ need for mobility with conservation of the environment.

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| <input type="checkbox"/> 1 | SWUTC/05/167240-1 | <input type="checkbox"/> 12 | SWUTC/06/167765-1 |
| <input type="checkbox"/> 2 | SWUTC/06/167142-1 | <input type="checkbox"/> 13 | SWUTC/06/167766-1 |
| <input type="checkbox"/> 3 | SWUTC/06/167143-1 | <input type="checkbox"/> 14 | SWUTC/06/167860-1 |
| <input type="checkbox"/> 4 | SWUTC/06/167144-1 | <input type="checkbox"/> 15 | SWUTC/06/167863-1 |
| <input type="checkbox"/> 5 | SWUTC/06/167452-1 | <input type="checkbox"/> 16 | SWUTC/06/167868-1 |
| <input type="checkbox"/> 6 | SWUTC/06/167453-1 | <input type="checkbox"/> 17 | SWUTC/06/473700-00003-11 |
| <input type="checkbox"/> 7 | SWUTC/06/167550-1 | <input type="checkbox"/> 18 | SWUTC/06/473700-00027-1 |
| <input type="checkbox"/> 8 | SWUTC/06/167552-1 | <input type="checkbox"/> 19 | SWUTC/06/473700-00029-1 |
| <input type="checkbox"/> 9 | SWUTC/06/167556-1 | <input type="checkbox"/> 20 | SWUTC/06/473700-00031-1 |
| <input type="checkbox"/> 10 | SWUTC/06/167652-1 | <input type="checkbox"/> 21 | SWUTC/06/473700-00072-1 |
| <input type="checkbox"/> 11 | SWUTC/06/167761-1 | | |

These items are available on a **two-week** loan basis.

Please fill out form completely and use other side of this page to mail in order. Thank you.

NAME _____

D/D/O _____

MAILING
ADDRESS _____

EMAIL _____