



Year 16 (2002-2003)
Semi-Annual Progress Report
For the
University of California Transportation Center

February 2004

Director: Prof. Elizabeth Deakin
Tel. 510 642-4749
Fax 510 643-5456
Email edeakin@uclink.berkeley.edu

Staff Contact: Diane Sutch
Tel. 510 643-7378
Fax 510 643-5456
Email dsutch@uclink.berkeley.edu

108 Naval Architecture Bldg.
University of California
Berkeley CA 94720-1782

Table of Contents

| | |
|--------------------------------------|-----------|
| A. Success Stories | 3 |
| Research into Practice | 3 |
| Conferences and Symposia | 3 |
| Awards and Honors | 4 |
| New Academic Courses and Programs | 5 |
| Publications | 5 |
| B. Research Project Status | 8 |
| Status Reports - Year 15 (2002-2003) | 11 |
| Status Reports - Year 16 (2003-2004) | 24 |
| C. Program Financial Status | 34 |

List of Tables

| | |
|--|-----------|
| Table 1 UCTC Publications - Fall 2003-Winter 2004 | 6 |
| Table 2 Year 15 (2002-2003) Research Projects | 9 |
| Table 3 Year 16 (2003-2004) Research Projects | 10 |
| Table 4. Allocated Amounts as of February 2004 | 34 |
| Appendix. Completed Projects Since Start of Grant | 35 |

A. Success Stories

The University of California Transportation Center receives equal funding from the US Department of Transportation (for whom we are the designated Region IX University Transportation Center) and the California Department of Transportation. We use these funds to sponsor faculty research and contribute to conferences, symposia, and other technology transfer activities. We also underwrite education, especially for graduate students, through fellowships, grants, and research appointments, and support for new educational initiatives. We are always pleased when our efforts pay off – when our research is put into practice, our faculty members are invited to advise government, our conferences and symposia are well attended, our faculty and students win awards. The following examples document some of our results to date in the first half of the UCTC's 2003-2004 grant year – Year 16 of the Center.

Research into Practice

Advising Congress on TEA-21 Reauthorization.

Professors Martin Wachs of UC Berkeley, Elizabeth Deakin of UC Berkeley, and Daniel Sperling of UC Davis were each invited to comment on drafts of pending TEA-21 legislation and offer recommendations to the House and Senate committees and their staffs during Fall 2003.

Conferences and Symposia

Asilomar Transportation - Energy Conference, August 2003

The ninth conference on transportation and energy, *The Hydrogen Transition*, was held at the Asilomar Conference Center in Monterey, California this August. More than 200 experts from universities, government and industry gathered to discuss the possibility of a transportation sector “hydrogen transition.” The goal of the conference was to address key questions about the steps necessary for a transition to occur, and to explore whether such a transition is likely, needed, or even possible. The specialty conference held is very other year with support from UCTC and others. Daniel Sperling of UC Davis is the conference organizer and chair.

First Statewide California Bicycle-Pedestrian Conference, September 2003

The UCTC was a co-sponsor of the first statewide bike-pedestrian conference, held in Oakland, CA in September. The three day conference was attended by nearly 300 transportation professionals, faculty, students, and advocates.

Lake Arrowhead Conference, October 2003

The 13th annual Lake Arrowhead conference, The Transportation - Land Use - Environment Connection, was attended by over 120 policy-makers and university researchers in October. The theme of this fall's symposium was *Finance: The Critical Link*. Presentations and discussions examined the current shortfall of transportation funding and explored the feasibility, desirability, economics and equity of alternative methods of raising new revenues for transportation.

Transportation Research Board Annual Meeting, January 2004

Three dozen faculty members and graduate students affiliated with UCTC presented papers at sessions of the annual meeting of the Transportation Research Board this January in Washington, DC. In addition, the UC Transportation Center jointly hosted a reception at TRB with its ITS partners from the Berkeley, Irvine, Davis, and LA campuses, the UC PATH program, the UC Center for Traffic Safety, and the National Center of Excellence for Aviation Operations Research. Over 300 faculty and students from all UC campuses, alumni of the UC transportation programs and UCTC, and friends from many other transportation centers and research groups joined us at this event reuniting alumni, faculty, and colleagues.

Awards and Honors

Student of the Year

Lisa Schweitzer is the University of California's Student of the Year for 2003-2004. Lisa Schweitzer grew up in rural Iowa and attended the University of Iowa for both her baccalaureate and master's degrees, earning credentials in social work, economics, and urban planning. Her professional experience includes planning and program evaluation for the Iowa and Minnesota Departments of Transportation, and more recently for Caltrans. She is currently completing a PhD in Urban Planning at UCLA, where she studies the intersections between environmental and transportation planning, with a special focus on how planning and policy decisions affect impoverished and minority groups.

Eisenhower Fellowships and Grants

Brad Flamm of UC Berkeley won a multi-year Eisenhower Fellowship and Christina Ferracane, Anne Goodchild, Robert Hannay, Matthew Buckley, and Lynn Scholl were awarded one-year grants from the Eisenhower program in Fall 2003. They join previous winners Todd Goldman, who completed his dissertation in December, and ongoing PhD students Karen Frick, Jonathan Mason, and Noreen McDonald.

Chester Rapkin Award

A paper by Anatasia Loukaitou-Sideris, Robin Liggett, and Hiroyuki Iseki was selected for the Chester Rapkin Award by the Journal of Planning Education and Research. The paper, "The Geography of Transit Crime: Documentation and Evaluation of Crime Incidence on and around the Green Line Stations in Los Angeles," was based on UCTC research and appeared in JPER Volume 22, 2002 pages 135-151. The award was presented at the joint ACSP - AESOP conference held in Leuven, Belgium in July 2003.

2003 CUTC Transportation Awards

Three recent UCLA transportation graduates won awards from the Council of University Transportation Centers (CUTC). Kathleen Rogers (Urban Planning M.A. '03) won the Wootan Award for her master's thesis, "Measuring Social Equity of Public Transit Finance: A Synthesis and Reinterpretation of the Literature." Jeffrey Brown (Urban Planning Ph.D. '03) won for best Ph.D. dissertation for "The Numbers Game: The Politics of the Federal Surface Transportation Program." Heather Burton (Urban Planning M.A. '03) was named winner of the 2003 CUTC/HNTB Non-Thesis Award for her paper, "Culver City Rapid Bus: An Evaluation of Bus Rapid Transit on Culver City Bus' Line 6."

New Academic Courses and Programs

Urban Studies Undergraduate Major

A new undergraduate major in Urban Studies is underway at UC Berkeley. This major is sponsored by the Dept. of City and Regional Planning in cooperation with several social sciences departments, including Political Science, Sociology, and Economics. Course offerings for this new major include the undergraduate courses in transportation planning previously supported by UCTC. In addition, most of the core courses in the major have transportation content.

Metropolitan Studies Initiative

Berkeley transportation faculty are part of a new campus initiative in Metropolitan Studies, which will support the hiring over the next few years of 4-5 new faculty members with interdisciplinary interests.

Publications

UCTC helps put research into practice by making our publications available free of charge. All final reports and an increasing number of other UCTC publications can be directly downloaded from the web; others are mailed to anyone who requests a copy. Our publications are listed on our web page, where we are now receiving 6,000-7,000 downloads a month.

We also publish ACCESS, a twice-yearly magazine designed to bring UCTC research findings to the general public. ACCESS is distributed free of charge to about 20,000 subscribers in hard copy, and another 5,000 downloads of ACCESS from the web add to its readership.

Publications stemming directly from research projects include final summary reports – brief statements of the work performed on each completed UCTC project, designed to allow the busy professional to learn about the major findings of the research without delving into the details. In addition, all UCTC projects produce at least one other, full-length product – a technical report, a working paper, a journal article, a monograph, or even a book or film. Many researchers produce two or three papers in the course of their work on a project, hence our publication list is several times longer than our number of research projects.

The 41 publications added to the UCTC list Aug.1, 2003 - Jan. 31, 2004 are shown in Table 1.

Table 1 UCTC Publications - Fall 2003-Winter 2004

| | | | |
|--|--|------------|-----|
| Clark, William A.V., and Youqin Huang | Black and White Commuting Behavior in a Large Segregated City: Evidence from Atlanta | 2003, Fall | 665 |
| Nixon, Hilary, and Jean-Daniel Saphores | Used Oil Policies to Protect the Environment: An Overview of Canadian Experiences | 2003, Fall | 666 |
| De Valois, Karen K., Tatsuto Takeuchi, and Michael Disch | Judging the Speed of Pedestrians and Bicycles at Night | 2003, Fall | 667 |
| Brownstone, David, and Kenneth A. Small | Valuing Time and Reliability: Assessing the Evidence from Road Pricing Demonstrations | 2003, Fall | 668 |
| Reilly, Michael, and John Landis | The Influence of Built-Form and Land Use on Mode Choice | 2003, Fall | 669 |
| Mokhtarian, Patricia L., Gustavo O. Collantes, and Carsten Gertz | Telecommuting, Residential Location, and Commute Distance Traveled: Evidence from State of California Employees | 2003, Fall | 670 |
| Nixon, Hilary, and Jean-Daniel Saphores | The Impacts of Motor Vehicle Operation on Water Quality: A Preliminary Assessment | 2003, Fall | 671 |
| Golob, Thomas F., and Amelia C. Regan | Surveying and Modeling Trucking Industry Perceptions, Preferences and Behavior | 2003, Fall | 672 |
| Song, Jiongjong, and Amelia C. Regan | Combinatorial Auctions for Trucking Service Procurement: An Examination of Carrier Bidding Policies | 2003, Fall | 673 |
| Steimetz, Seiji S.C., and David Brownstone | Heterogeneity in Commuters' "Value of Time" with Noisy Data: a Multiple Imputation Approach | 2003, Fall | 674 |
| Golob, Thomas F., and Amelia C. Regan | Truck-Involved Crashes and Traffic Levels on Urban Freeways | 2003, Fall | 675 |
| Boarnet, Marlon G., Kristen Day, and Craig Anderson | Evaluation of the California Safe Routes to School Construction Program | 2003, Fall | 676 |
| Lam, Terence C., and Kenneth A. Small | The Value of Time and Reliability: Measurement from a Value Pricing Experiment | 2003, Fall | 677 |
| Taylor, Brian D. | When Finance Leads to Planning: Urban Planning, Highway Planning, and Metropolitan Freeways in California | 2003, Fall | 678 |
| Prozzi, Jorge A., and Samer Madanat | Analysis of Experimental Pavement Failure Data Using Duration Models | 2003, Fall | 679 |
| Brown, Jeffrey, Daniel Baldwin Hess, and Donald Shoup | BruinGo: An Evaluation | 2003, Fall | 680 |
| Taylor, Brian D., and Camille N. Y. Fink | The Factors Influencing Transit Ridership: A Review and Analysis of the Ridership Literature | 2003, Fall | 681 |
| Taylor, Brian D., Douglas Miller, Hiroyuki Iseki, and Camille Fink | Analyzing the Determinants of Transit Ridership Using a Two-Stage Least Squares Regression on a National Sample of Urbanized Areas | 2003, Fall | 682 |
| Horvath, Arpad | Life-Cycle Environmental and Economic Assessment of Using Recycled Materials for Asphalt Pavements | 2003, Fall | 683 |
| Holzer, Harry J., John M. Quigley, and Steven Raphael | Public Transit and the Spatial Distribution of Minority Employment: Evidence from a Natural Experiment | 2003, Fall | 684 |
| Raphael, Steven, and Michael Stoll | Can Boosting Minority Car-Ownership Rates Narrow Inter-Racial Employment Gaps? | 2003, Fall | 685 |
| Brown, Jeffrey, Daniel Baldwin Hess, and Donald Shoup | Fare-Free Public Transit at Universities: An Evaluation | 2003, Fall | 686 |

| | | | |
|--|--|------------|-----|
| Sperling, Daniel | Cleaner Vehicles - Handbook 4: Transport and the Environment | 2003, Fall | 687 |
| Sperling, Daniel, and Eileen Clausen | The Developing World's Motorization Challenge | 2003, Fall | 688 |
| Sperling, Daniel | FreedomCAR and Fuel Cells: Toward the Hydrogen Economy? | 2003, Fall | 689 |
| Lipman, Todd, and Daniel Sperling | Market Concepts, Competing Technologies and Cost Challenges for Automotive and Stationary Applications | 2003, Fall | 690 |
| Sperling, Daniel, and Deborah Salon | Transportation in Developing Countries: An Overview of Greenhouse Gas Reduction Strategies | 2003, Fall | 691 |
| Kean, Andrew J., Robert A. Harley, and Gary R. Kendall | Effects of Vehicle Speed and Engine Load on Motor Vehicle Emissions | 2003, Fall | 692 |
| McNally, Michael G., and Ming S. Lee | Putting Behavior in Household Travel Behavior Data: An Interactive GIS-Based Survey via the Internet | 2003, Fall | 693 |
| Lee, Ming S., Jin-Hyuk Chung, and Michael G. McNally | An Empirical Investigation of the Underlying Behavioral Processes of Trip Chaining | 2003, Fall | 694 |
| Lee, Ming S., and Michael G. McNally | On the Structure of Weekly Activity/Travel Patterns | 2003, Fall | 695 |
| Lee, Ming S., Ramesh Sabetiashraf, Sean T. Doherty, Craig R. Rindt, and Michael G. McNally | Conducting an Interactive Survey of Household Weekly Activities via Internet: Preliminary Results from a Pilot Study | 2003, Fall | 696 |
| Schipper, Lee, Elizabeth Deakin, and Daniel Sperling | Sustainable Transportation: The Future of the Automobile in an Environmentally Constrained World | 2003, Fall | 697 |
| Taylor, Brian D., Mark Garrett, and Hiroyuki Iseki | Measuring Cost Variability in Provision of Transit Service | 2003, Fall | 698 |
| Law, Philip, and Brian D. Taylor | Shelter from the Storm: Optimizing Distribution of Bus Stop Shelters in Los Angeles | 2003, Fall | 699 |
| Iseki, Hiroyuki, and Brian D. Taylor | The Demographics of Public Transit Subsidies: A Case Study of Los Angeles | 2003, Fall | 700 |
| Garrett, Mark, and Brian D. Taylor | Reconsidering Social Equity in Public Transit | 2003, Fall | 701 |
| Taylor, Brian D., Hiroyuki Iseki, and Mark Garrett | How Much Does a Transit Trip Cost? | 2003, Fall | 702 |
| Luhrsen, Kurt F., and Brian D. Taylor | The High Cost of Flat Fares: An Examination of Ridership Demographics and Fare Policy at the Los Angeles MTA | 2003, Fall | 703 |
| Taylor, Brian D., Martin Wachs, Kurt Luhrsen, Lewison Lee Lem, Eugene Kim, and Michael Mauch | Variations in Fare Payment and Public Subsidy by Race and Ethnicity: An Examination of the Los Angeles MTA | 2003, Fall | 704 |
| Taylor, Brian D., Mark Garrett, and Hiroyuki Iseki | Measuring the Effects of Peaking, Vehicle Capital, and Passenger Capacity on the Cost of Providing Transit Service | 2003, Fall | 705 |

B. Research Project Status

The UCTC currently has 23 active research projects: 13 Year 15 projects and 10 Year 16 projects.

The 10 new projects selected for funding with Year 16 (2003-2004) grants were initiated this fall, once both USDOT and Caltrans funds were received and had been transferred to the project PIs' home campuses. These projects have an end date of July 31, 2004, with an option for a one-year extension.

The thirteen projects awarded in Year 15 (2002-2003) and continued into Year 16 also have a completion date of July 31, 2004. The extensions were granted because delay in receipt of funds meant that projects could not commence until the January/February academic term. The projects are on target for completion by the end of this grant cycle.

Ongoing projects for each year are listed in Tables 2 and 3. Please note that all UCTC projects include funding for one or two graduate student research positions and for one or two faculty summer months. Other faculty time during the academic year is donated. In addition, the California Department of Transportation and the US DOT jointly sponsor all projects, although funding may be primarily from one funding source or the other. The External Project Contact is Sallybeth Scott, Caltrans, 1120 N St., Sacramento, CA 94305, tel. 916 324-2440. Caltrans' dollar-for-dollar match of federal funds for UCTC has been critical to our success.

Following the tables are brief reports that present the status of each faculty research project underway at UCTC in 2002-3. The reports cover performance through January 2003.

Projects funded since the start of the current USDOT grant (Year 12) but completed in previous years are listed in the Appendix to this report.

Table 2. Year 15 (2002-2003) Research Projects Continuing in 2003-2004 (13 Projects)

Expanded Evaluation of the California Safe Routes to School Program

Marlon Boarnet, Kristen Day, and Craig Anderson, UC Irvine

Verifying Regularities in Queued Freeway Traffic

Michael Cassidy, UC Berkeley

Commuter Rail, Land Use and Travel Behavior

Robert Cervero, UC Berkeley

Comparing White and Minority Household Commuter Behavior

William Clark, UC Berkeley

Storage System Dynamics and Management Policies

Carlos Daganzo, UC Berkeley

High-Coverage Point-to-Point Transit

R. Jayakrishnan, UC Irvine

Handheld Travel Survey Technology to Supplement Vehicle Tracking

Michael McNally, UC Irvine

I/O Analysis of Communications and Travel for Industry

Patricia Mokhtarian, UC Davis

Public Transit and Residential Location Choices of Minorities and Transit Dependents

John Quigley and Stephen Rafael, UC Berkeley

An Evaluation of Employer-Based Transit Programs

Donald Shoup, UCLA

Effects of Contracting on Fixed-Route Bus Cost-Efficiency

Brian Taylor, UCLA, and Martin Wachs, UC Berkeley

Exploring the Marketability of Fuel-Cell Electric Vehicles

Thomas Turrentine, UC Davis

Theoretical and Empirical Investigations of Traffic Flow at Highway Merges

Michael Zhang, M., UC Davis

Table 3. Year 16 (2003-2004) Research Projects (10 Projects)

Experiments to Increase Freeway Merge Capacity

Michael Cassidy, UC Berkeley

Amber Alert Policy: Laboratory Experiments to Improve a Policy

Theodore Cohn, UC Berkeley

Improved Developer Models for the Sacramento Region

Robert Johnston, UC Davis

Death on the Crosswalk: A Study of Pedestrian Accidents in Los Angeles:

Anastasia Loukaitou-Sideris, UCLA

Aggregate Structural Equations Modeling of the Relationships Between Consumer Expenditures on Communications and on Travel

Patricia Mokhtarian, UC Davis

Auctions for the Procurement of Transportation Service Contracts

Amelia Regan, UC Irvine

Identification and Measurement of Freeway Congestion

Alexander Skabardonis, UC Berkeley

Capacity Provision and Pricing in Road Transport Networks in an Imperfectly Competitive Economy

Kurt Van Dender, UC Irvine

Family Caregivers, the Elderly, and Land-Use: An Evaluation of Transportation in Two California Communities

Martin Wachs, UC Berkeley

Transportation Policy Development: Labor as a Missing Stakeholder

Margaret Weir, UC Berkeley

Status Reports - Year 15 (2003-2004)
(Projects Continued To July 31, 2004 – 13 Projects)

Expanded Evaluation of the California Safe Routes to School Program

| | |
|---|--|
| Principal Investigator: Marlon Boarnet Institute of Transportation Studies University of California, Irvine Irvine, CA 92697-3600 Tel. 949 824-7695 Email: mgboarne@uci.edu | Other Key Participants: Kristen Day Institute of Transportation Studies University of California, Irvine Irvine, CA 92697-3600 Tel. 949 824-5880 Email: kday@uci.edu |
|---|--|

Abstract: This research expands an ongoing pre- and post-evaluation of the California Safe Routes to School (SR2S) construction program, which allocates \$44 million to local governments for infrastructure projects to improve the safety and feasibility of walking and bicycling to school. We are evaluating 12 SR2S sites in Southern California and sites in Northern California. The research includes: (1) assessment of changes to SR2S sites that are associated with the construction program; (2) observations of pedestrian, bicyclist, and driver behavior before and after SR2S construction at each site; and (3) surveys of parents before and after SR2S construction at each site to assess attitudes and perceptions of safety. The evaluation examines the effectiveness of different neighborhood and traffic interventions in improving the safety of children's non-motorized travel near schools, the frequency of walking and bicycling among children, and the interaction between perceived safety, traffic patterns, the physical environment, and walking and bicycling behavior.

Key Words: school, pedestrian, bicycle, safety, sidewalks

Work Completed to Date:
"After" studies are underway, as are analyses and writing.

Papers to Date:
None to date

Conferences Attended:
Transportation Research Board Annual Meeting, 2003, 2004

Other Accomplishments:
None to date

Percent Complete: 67%

Direct Cost: \$62,690

Verifying Regularities in Queued Freeway Traffic

Principal Investigator:

Michael Cassidy
Civil and Environmental Engineering
416B McLaughlin Hall
University of California, Berkeley 94720-1720
Tel. 510-642-7702

Email: cassidy@ce.berkeley.edu

Abstract: This work seeks to make sense of at least two puzzling phenomena of queued freeway traffic: 1) stop-and-go oscillations and 2) the wide scatter invariably observed in plots of queued flows vs. density or occupancy. Recent (preliminary) evidence suggests these are not the results of chaotic driver behavior as has been commonly theorized, but to behaviors that are more regular and easily explained. By measuring queued freeway traffic from video and processing these data in careful ways, we expect to verify that stop and go oscillations are created by the vehicle lane-changing maneuvers that abound near ramps. The details of this suspected cause and effect relation are examined. We further expect to confirm that the scatter observed in flow-density plots is merely the result of extracting (and plotting) data from transition zones between queued and un-queued traffic; these zones may be (spatially) long and likely arise because drivers respond to shocks by changing speeds gradually. The findings should advance current understanding of vehicular traffic and help sort-out which theories adequately describe certain traffic phenomena and which phenomena are not yet described by theory.

Key Words: traffic theory, queues, freeway on-ramps.

Work Completed to Date:

We have completed a review of recent literature on the topic and have assembled data for the analyses. Exploratory analyses are well underway.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003, 2004

Other Accomplishments:

None to date

Percent Complete: 65%

Direct Cost: \$50,614

Neighborhood Design, Physical Activity, and Travel

Principal Investigator:

Robert Cervero

UC Berkeley

Email: robertc@uclink.berkeley.edu

Abstract: There's a growing interest in the relationships among neighborhood design, physical activity, and travel choices. Research has linked obesity and other public-health problems to sedentary lifestyles. Some evidence further suggests that postwar residential designs are associated with increased reliance on automobile travel and low levels of walking and cycling. This project will use the BATS 2000 (activity based) survey to extract trip records for limited trip purposes over limited trip ranges – e.g., personal services, convenience-neighborhood shopping, eating, social-recreation, and school travel (over 0 to 5 mile distance ranges). Mode choice for these short trips will be investigated, using metrics that capture walking-scale attributes of built environments – namely street connectivity and block dimensions - along with land-use data and density measures, other attributes of built-environments..

Key Words: public health, biking, walking, mode choice

Work Completed to Date:

We have assembled the data and reviewed it in detail, extracting records needed for this analysis. We have conducted preliminary model specification and estimation.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 67%

Direct Cost: \$15,000

Comparing White and Minority Household Commuting Behavior: Measuring the Differences

Principal Investigator:

William Clark
Dept. of Geography
UCLA
Los Angeles, CA
Email: wclark@geog.ucla.edu

Abstract: Previous research developed a model of the responses to work-residence separation that linked the probability of moving closer to the job to increasing distance from the work place. Households beyond a threshold distance moved closer to the job when they changed residence. The current project uses that model to examine the commuting behavior of white and minority households, and is specifically interested in how race affects the probability of moving closer to the job when households change residence. Do black, Hispanic and Asian households also move closer to their jobs when they relocate? Do black and Hispanic households who have “constrained” residential choices incur greater commuting costs which arise from the greater spatial separation. The project uses a specialized data set of work residence relationships from the Fulton County school district to examine the patterns of commutes of middle income households, and their dispersed commuting in the Atlanta metropolitan region. The study will provide important new data on how relatively affluent minority households make commuting decisions in a complex metropolitan environment.

Key Words: commuting behavior, commuting costs, spatial separation, dispersed commuting

Work Completed to Date:

We have reviewed the recent literature on the topic and have assembled and evaluated data for the analysis. We have conducted preliminary exploratory data analyses. We are undertaking model specification and estimation.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 60%

Direct Cost: \$36,658

Storage System Dynamics and Management Policies

Principal Investigator:

Carlos Daganzo
416 McLaughlin Hall
University of California
Berkeley CA 94720
Tel. 510 642-3853

Email: daganzo@ce.berkeley.edu

Abstract: This study investigates the dynamics of networks with link-to-link interactions caused by storage effects and develops effective management policies. Street networks, supply chains and transit lines are the kinds of systems in which instabilities commonly arise when the outflow of a sub-network decreases if some input flows increase. The phenomenon receives different names for different modes (“gridlock” for freeways, “bullwhip effect” for supply chains, and “pairing” for transit systems), but its causes are similar. Instabilities undermine system performance and make management difficult. This research shows how the behavior of storage networks of various kinds can be predicted and managed effectively with new methods. The work focuses on two difficult but related problems: (i) managing the morning commute in a congested city, and (ii) stabilizing freight networks driven by inventory considerations. The morning commute problem is a prototype of systems with centralized management. For this problem, we quantify, based on a physically realistic network model, the connection among residence location and the distribution of congestion costs. Government policies such as tolls, taxation and land-use regulations are evaluated. The freight network problem is a prototype of decentralized systems with multiple managers. For this problem, we demonstrate how to eliminate the “bullwhip effect” and minimize costs with decentralized policies.

Key Words: networks, flows, congestion, freight management

Work Completed to Date:

We have reviewed the literature and the current research on the topics covered here. We also have refined the theoretical approach to the problems and have undertaken analytical explorations. We are conducting exploratory analyses.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003, 2004

Other Accomplishments:

None to date

Percent Complete: 67%

Direct Cost: \$54,544

High-Coverage Point to Point Transit: Institutional Feasibility and Demand Study of Agencies, Users and Operators

Principal Investigator:

R. Jayakrishnan
Department of Civil and Environmental Engineering
UC Davis
Davis, CA 92697-2175
Tel. 949-824-2172
Email: rjayakri@uci.edu

Abstract: We examine demand for and acceptability of a new design for private-public transit, named High-Coverage Point to Point Transit (HCPPT.) The technical and design details of HCPPT are currently under development by the PI in a separately funded project. The design is based on jitney or shuttle-style operations with a large number of deployed vehicles coordinated using advanced information supply and fast routing and route optimization. The system design ensures that no more than one transfer is needed for the travelers, by using transfer hubs and re-routable and non-re-routable portions in vehicle travel plans. Simulation studies have shown that with enough deployed vehicles, the system can be substantially better than more conventional fixed route and demand-responsive transit systems. In the UCTC funded research we investigate (1) the acceptability of the system to public and private transit agencies, (2) acceptability to operators, primarily drivers; and (3) the responses from potential travelers.

Key Words: transit, advanced transit technologies, simulation, demand

Work Completed to Date:

We have reviewed previous work on the topic and have assembled the data we need for this analysis. We have discussed the issues with stakeholders and have begun to develop a set of issues on acceptability. We have developed a research approach for testing responses from potential travelers.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003, 2004

Other Accomplishments:

None to date

Percent Complete: 60%

Direct Cost: \$15,000

Handheld Travel Survey Technology to Supplement Vehicle Tracking in a Shared-Use Station Car Program

Principal Investigator:

Michael G. McNally
Institute of Transportation Studies
University of California, Irvine
Irvine, CA 92697-3600
tel. (949) 824-8462
fax (949) 824-8385
Email: mmcnally@uci.edu

Abstract: An experimental shared-use station car program using electric vehicles is being implemented in association with several public and private sector organizations in Irvine, CA. The goal of this program is to demonstrate the potential of linking shared-use electric vehicles with conventional line-haul public transit services to provide automobile-like accessibility at the ends of the commute trip. GPS-based in-vehicle tracking technologies are being utilized with web-based travel surveys to determine how participants schedule activities before and after shared-use vehicles become a travel option. In this project we supplement the survey research using a GPS-based handheld device to track travel and activity when not using program vehicles. The handheld device continuously records and stores spatial position, then dumps the data via a wireless link to the in-vehicle device when completing activities. In conjunction with current program technologies and as a stand-alone technology, the handheld technology is assessed for its acquisition of comprehensive data on daily travel and activities, as well as user effort and inconvenience. The devices also are evaluated as a means of providing remote access to reservation systems and as keyless access to program vehicles. **Key Words:** travel surveys, new technologies, GPS

Work Completed to Date:

We have analyzed data quality from hand held devices and developed performance measures. We have met with stakeholders to discuss the issues of data collection and have conducted a comparative evaluation of alternative data collection approaches.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003, 2004

Other Accomplishments:

None to date

Percent Complete: 50%

Direct Cost: \$53,659

An Input-Output Analysis of the Relationships between Communications and Travel for Industry

Principal Investigator:

Patricia L. Mokhtarian
Department of Civil and Environmental Engineering
University of California, Davis
One Shields Ave.
Davis, CA 95616
(530) 752-7062
Email: plmokhtarian@ucdavis.edu

Abstract: Numerous public policies have been promulgated on the assumption that telecommunications will be a useful trip reduction instrument. However, many scholars have suggested that the predominant effect of telecommunications may be complementarity – increasing travel. Although short-term, disaggregate studies of single applications such as telecommuting have tended to find a substitution effect, more comprehensive studies, on the aggregate scale, are needed. One of the few such studies used input-output analysis to examine relationships between transportation and communication input intensities across 44 industry classes in Europe for 1980, and found strong evidence of complementarity. The present study would apply a similar methodology to the input-output accounts for the US across multiple points in time (at least 1982, 1987, 1992, 1996, 1997, 1998). This important extension would permit analysis both of industry-specific differences in the relationships of interest, and of how those relationships change over time (e.g. with the increasing adoption of the Internet and other telecommunication technologies). The result will be a more informed view of the extent to which it is realistic to expect telecommunications to substitute for travel, at least in the industrial context, which constitutes a sizable proportion of the total demand for telecommunications and transportation. **Key Words:** telecommunications, industrial development, input-output analysis

Work Completed to Date:

We have reviewed and critiqued previous work on the topic and have assembled data for the US case. Analysis is underway and initial results have been obtained.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003, 2004

Other Accomplishments:

None to date

Percent Complete: 60%

Direct Cost: \$59,200

Public Transit Systems and the Residential Location Choices of Minority and Transit-Dependent Households Seed Grant

| | |
|--|---|
| Principal Investigator: John M. Quigley Dept. of Public Policy 2607 Hearst Avenue University of California Berkeley, CA 94720 Tel. 510-642-4670 Email: quigley@econ.berkeley.edu | Other Key Participants: Steven P. Raphael University of California Berkeley, CA 94720 Email: raphael@socrates.berkeley.edu |
|--|---|

Abstract: In this project, we analyze the impact of several recent extensions of the Bay Area Rapid Transit (BART) system on the residential location choices of minority households and other households that are particularly dependent on public transit. We compare before-after changes in the resident populations of census tracts serviced by the new stations to similar changes in comparable areas located in the region's suburbs but located far from the new stations. Data from the 1990 and 2000 U.S. census are used to measure population change. We characterize the distance between each census tract in the East Bay suburbs to each of the three new BART stations, e.g., physical distance between the centroids of each tract and the nearest station, or commute time estimates between each tract and the nearest station, and construct a merged data set at the census tract level describing the residential populations of each for 1980, 1990, and 2000. This data set is constructed using 1990 tract definitions (which will require some imputation of 1980 variables) and is used to construct the dependent variables, measures of population change, as well as to construct a set of variables from the 1980 and 1990 data describing initial conditions. **Key Words:** residential location, transit impacts, minority household

Work Completed to Date:

We have assembled Census data on resident populations for 1990 and 2000 and have characterized the distance and time from centroids to BART stations. We are proceeding with the data analysis and model estimation.

Papers to Date:

None to date

Conferences Attended:

None to date

Other Accomplishments:

None to date

Percent Complete: 70%

Direct Cost: \$10,752

Unlimited Access to Work: An Evaluation of Employer-Based Transit Programs

Principal Investigator:

Don Shoup
Institute of Transportation Studies
School of Public Policy and Social Research
University of California, Los Angeles
Los Angeles, Ca 90095-1656
Tel. 310-825-5705
Email: shoup@ucla.edu

Abstract: Transit agencies have found a new way to increase ridership: offer transit-pass programs that cater to specific user groups. In these programs, a group purchases the right for all its members to ride public transit without paying a fare. Because all members of the group can ride free, they ride public transit more often. We refer to these programs collectively as Unlimited Access. Unlimited Access programs have been developed for the university, the workplace, and the home. Previous research has examined university programs, and has shown that they increase transit ridership, reduce vehicle travel, reduce parking demand, and increase transit riders' incomes. The largest potential market for Unlimited Access is for workplace transit programs, but there have been few studies of these programs. We examine these workplace programs and: 1) explain how the programs work, 2) examine the programs' effects on employee transit ridership, vehicle travel, and parking demand, 3) analyze the programs' effects on transit agency performance, 4) calculate the programs' costs and benefits, and 5) recommend best practice guidelines. Unlimited Access appears to be a promising innovation with great potential, and we will evaluate its potential benefits for employers, transit agencies, and society. **Key Words:** transit fares, transit pass, commuting

Work Completed to Date:

We have identified workplace programs and are gathering data for each program in accordance with the tasks listed above. We have discussed the issues with stakeholders and analyzed the issues they raised.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003, 2004

Other Accomplishments:

None to date

Percent Complete: 65%

Direct Cost: \$54,827

The Effects of Contracting for Service on the Cost-Efficiency of Fixed-Route Bus Transit in the U.S.

| | |
|---|---|
| Principal Investigator: Brian Taylor SPPSR University of California, Los Angeles Box 951656, 5383 Public Policy Bldg. Los Angeles, CA 90095-1656 310-825-7442 Email: btaylor@ucla.edu | Other Key Participants: Martin Wachs Dept. of Civil and Environmental Engineering 110 McLaughlin Hall University of California Berkeley, CA 94720-1712 Email: mwachs@uclink.berkeley.edu |
|---|---|

Abstract: This study examines the economic effects of contracting for fixed-route bus service. Previous research has examined whether contracting for bus service has reduced costs. Our focus in this project is on how contracting affects cost-efficiency, recognizing that earlier studies don't account for the fact that cost-efficiency problems are likely to motivate transit systems to contract for service in the first place. To account for such causality questions, we use advanced regression analysis methods on a rich, new merged cross-sectional data set to examine the influence of contracting for transit service cost-efficiency. The merged data set for this study is drawn primarily from two sources: (1) the National Transit Database maintained by the FTA and 2) a transit service contracting database compiled from a recent Transportation Research Board survey of transit agencies nationwide. **Key Words:** transit, contracting, costs, efficiency

Work Completed to Date:

We have conducted a literature review and assembled data. Analysis is underway.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003, 2004

Other Accomplishments:

None to date

Percent Complete: 70%

Direct Cost: \$15,000

Exploring the Marketability of Fuel-Cell Electric Vehicles

| | |
|---|---|
| Principal Investigator: Thomas Turrentine Institute of Transportation Studies University of California, Davis Davis, CA 95616 530-752-6500 Email: | Other Key Participants: Kenneth Kurani Institute of Transportation Studies University of California, Davis Davis, CA 95616 Email: knkurani@ucdavis.edu |
|---|---|

Abstract: Fuel-cell vehicles (FCVs) promise to reduced greenhouse gases and criteria pollutants, as well as improve fuel efficiency for light-duty motor vehicles. But lack of a developed “green-car” market and uncertainty that such a market is possible has limited industry and government commitment to current green car technologies. We take two first steps in market research for FCVs: 1. A FCV focused review of recent research on consumer response to refueling range, fuel types, social benefits, and fuel distribution; 2. A design and pilot test of custom interactive stated-preference methods for FCV markets with a sample of vehicle owners who currently use and understand in-vehicle power plants—such as RV owners and small businesses who carry generators. **Key Words:** fuel cells, market research, stated preference surveys.

Work Completed to Date:

We have completed a detailed review of the literature including recent news articles on fuel cells and new vehicle technologies. We have reviewed the consumer response literature. We have designed a stated preference research approach and have developed a procedure for pilot testing it.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003, 2004
Asilomar Transportation-Energy Conference, 2003

Other Accomplishments:

None to date

Percent Complete: 65%

Direct Cost: \$15,000

Experimental and Theoretical Investigations on Traffic Flow at Highway Merges

Principal Investigator:

H. Michael Zhang
Civil and Environmental Engineering
3145 Engineering III
University of California, Davis
Davis, CA 95616
Tel. 530-754-9203
Email: hmzhang@ucdavis.edu

Abstract: In this project, we gather and analyze empirical data at merge sites to study the possible combinations of stationary states at merges. To get a clearer picture of the underlying relations between stationary states at merges, we study isolated merges, especially those without the presence of significant immediate upstream/downstream diverges, so as to avoid the complications arising from interactions between merges and diverges. We examine a number of data sources to find such merges with usable data, such as the PEMS database, the Berkeley Highway Lab database, the Toronto QEW database. We identify, from a large amount of data collected at certain merges, all possible combinations of stationary states existing in these merges. Stationary states of congestion can be categorized into recurrent and non-recurrent, according to whether they appear from day to day or not. We also are interested in free flow states. The findings of this study should be useful in understanding on merge traffic dynamics, and should suggest better strategies for traffic management and control. **Key Words:** traffic congestion, queues, merges

Work Completed to Date:

Data collection and assessment of data issues has been completed. Analysis is well underway.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003, 2004

Other Accomplishments:

None to date

Percent Complete: 60%

Direct Cost: \$15,000

Status Reports - Year 16 (2003-2004)
(New Projects – 10)

Experiments to Increase Freeway Merge Capacity

Principal Investigator:

Michael Cassidy
UC Berkeley

Email: cassidy@ce.berkeley.edu

External Project Contact : All UCTC projects are co-sponsored by Caltrans, Contact Sallybeth Scott, Caltrans, 1120 N St., Sacramento, CA 94305, tel. 916 324-2440

Abstract: Ramp metering strategies that increase the capacity of a freeway/on-ramp merge will be designed and experimentally tested. To these ends, we will build upon some preliminary studies of a merge in San Diego, California. Observations indicate that vehicle slowing and lane-changing maneuvers can diminish the capacity of this merge by 8 to 10 percent. The observations further show that these deleterious slowing and lane-changing effects occur when inflows to the merge (from the on-ramp and/or from the freeway) become too high. The research will explore how onramp metering might mitigate these deleterious effects. In this way, we expect to establish traffic management policies that reduce overall commuter delay at the merge. Further, the work will set the stage for future efforts to develop delay-saving policies that do not merely favor the major traffic stream (the freeway) to the detriment of the other (the on-ramp), but instead involve the management of both inflow streams in a more equitable manner. The work should also advance the theory of traffic flow at merges.

Key Words: freeway capacity, ramp metering, merges

Objective: develop strategies for managing merges on freeways

Tasks: Review previous work on the topic, assemble data, analyze data, and prepare reports.

Milestones, Dates: Official start date Aug. 1, 2003, end July 31, 2004

Student Involvement: Graduate Student Researcher

Technology Transfer Activities: Publications will be posted on UCTC's Website and distributed in hard copy, in most instances free of charge. .

Relationship to Other UCTC Research: new project

Potential Benefits: improved traffic management strategies

Work Completed to Date: We have conducted a detailed literature review and analysis and are assembling data for analysis.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2004

Other Accomplishments:

None to date

Percent Complete: 30%

Direct Cost: \$54,034

Amber Alert Policy: Laboratory Experiments to Improve a Policy

Principal Investigator:

Theodore Cohn
UC Berkeley

Email: tecohn@sensitivity.berkeley.edu

External Project Contact : All UCTC projects are co-sponsored by Caltrans, Contact Sallybeth Scott, Caltrans, 1120 N St., Sacramento, CA 94305, tel. 916 324-2440

Abstract: In 2002, California adopted the communication protocol known as the Amber Alert (AA) which is now becoming a nationwide effort. The purpose is to alert the driving public to emerging events such as child abduction. The AA structure employs Variable Message Signs (VMS) on California highways. Policy is jointly developed by the CHP, the agency that initiates the alert, and Caltrans, the agency that implements it on VMS signs. CHP would like more information conveyed, to improve the odds of success. Caltrans would like less information conveyed so as to minimize congestion that signs have been observed to cause. We propose a laboratory study to examine the ability of drivers to acquire the message without the need to slow while passing by. Abbreviations, compacting of text, optimization of presentations that require two screens of information, are a few of the many possible strategies that we can study. The outlines of a field operational test of what the lab study reveals will be developed.

Key Words: amber alert, variable message signs, congestion management

Objective: study ability of drivers to acquire a message without slowing

Tasks: Review previous work on the topic, assemble data, analyze data, and prepare reports.

Milestones, Dates: Official start date Aug. 1, 2003, end July 31, 2004

Student Involvement: Graduate Student Researcher

Technology Transfer Activities: Publications will be posted on UCTC's Website and distributed in hard copy, in most instances free of charge. .

Relationship to Other UCTC Research: new project

Potential Benefits: develop sign strategies that better meet objectives of both Caltrans and the California Highway Patrol

Work Completed to Date: We have reviewed previous work on message acquisition and signage and have begun the design of an experiment.

Papers to Date:

None to date

Conferences Attended:

None to date

Other Accomplishments:

None to date

Percent Complete: 30%

Direct Cost: \$56,275

Improved Developer Models for the Sacramento Region

Principal Investigator:

Robert Johnston

UC Davis

Email: rajohnston@ucdavis.edu

External Project Contact : All UCTC projects are co-sponsored by Caltrans, Contact Sallybeth Scott, Caltrans, 1120 N St., Sacramento, CA 94305, tel. 916 324-2440

Abstract: Urban models have advanced greatly in the last 20 years. Recent models represent the floor space developer explicitly, increasing the behavioral validity of the land markets in the models. We believe, however, that there is a need to separately represent the developers of large projects on the urban edge, as these projects can strongly affect subsequent development patterns. We propose to estimate and test such a model, and to apply it within an advanced urban model set for the Sacramento region.

Key Words: land use models, developer behavior

Objective: develop a model of large developer behavior at the urban fringe

Tasks: Review previous work on the topic, assemble data, analyze data, and prepare reports.

Milestones, Dates: Official start date Aug. 1, 2003, end July 31, 2004

Student Involvement: Graduate Student Researcher

Technology Transfer Activities: Publications will be posted on UCTC's Website and distributed in hard copy, in most instances free of charge. .

Relationship to Other UCTC Research: new project

Potential Benefits: improved transportation-land use modeling and analysis

Work Completed to Date: We have reviewed previous work on the topic and have discussed the issues with modelers. We have begun model design.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2004

Other Accomplishments:

None to date

Percent Complete: 30%

Direct Cost: \$42,141

Death on the Crosswalk: A Study of Pedestrian Accidents in Los Angeles

Principal Investigator:

Anastasia Loukaitou-Sideris
UC Los Angeles

Email: loukaitou-sideris@ucla.edu

External Project Contact : All UCTC projects are co-sponsored by Caltrans, Contact Sallybeth Scott, Caltrans, 1120 N St., Sacramento, CA 94305, tel. 916 324-2440

Abstract: This research proposes to explore the spatial distribution of pedestrian-automobile accidents in Los Angeles and to analyze the social and physical factors that affect the risk of getting involved in such accidents. More specifically, the proposed study will investigate the influence of socio-demographic characteristics as well as the design of urban form on pedestrian accident rates. This study will involve research both at the macro and micro level. We will first provide an exploratory spatial and statistical analysis of pedestrian collision data in Los Angeles County to identify preliminary relationships between accident frequency and socio-demographic and land use characteristics of census tracts. This analysis will also help us identify major concentrations (regional clusters) of pedestrian collision data. More qualitative and detailed analysis will follow of specific case studies of intersections with high frequency of pedestrian-automobile accidents. The study will use pedestrian accident data provided by the California Highway Patrol, traffic volume data provided by Caltrans, socio-demographic data from the U.S. Census 2000, and pedestrian volume and built environment data from fieldwork research.

Key Words: pedestrian accidents, social factors, demographic factors

Objective: identify socio-demographic characteristics of pedestrian accident victims; identify intersections with high pedestrian accident rates

Tasks: Review previous work on the topic, assemble data, analyze data, and prepare reports.

Milestones, Dates: Official start date Aug. 1, 2003, end July 31, 2004

Student Involvement: Graduate Student Researcher

Technology Transfer Activities: Publications will be posted on UCTC's Website and distributed in hard copy, in most instances free of charge. .

Relationship to Other UCTC Research: new project

Potential Benefits: improve pedestrian safety

Work Completed to Date: We have completed a review of previous work on the topic and begun to assemble and analyze data.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2004

Other Accomplishments:

None to date

Percent Complete: 30%

Direct Cost: \$37,163

Aggregate Structural Equations Modeling of the Relationships Between Consumer Expenditures on Communications and on Travel

Principal Investigator:

Patricia Mokhtarian
UC Davis

Email: plmokhtarian@ucdavis.edu

External Project Contact : All UCTC projects are co-sponsored by Caltrans, Contact Sallybeth Scott, Caltrans, 1120 N St., Sacramento, CA 94305, tel. 916 324-2440

Abstract: Two aggregate studies of the relationships between communications and travel found apparently contradictory results: An input-output (I-O) analysis of relationships between transportation and communication input intensities across industries in Europe (1980) found complementarity (Plaut, 1997), while simultaneous equation models of aggregate consumer expenditures in Australia and the UK (1960- 1986) found pairwise substitution among private transportation, public transportation, and communication (Selvanathan and Selvanathan (S&S), 1994). Given technological advances such as mobile telephony and the Internet, it is possible that consumer relationships between communications and travel have changed substantially in the 17 years since the most recent data used in the latter study. A currently-funded UCTC study is replicating the Plaut industry analysis on US data, and extending it across 1947-1997. The proposed study would apply the S&S consumer analysis to US data, extending to at least the year 2000. Taken together, the two studies will provide complementary evidence on aggregate relationships between communications and travel for industry and consumers, controlling for spatial and temporal factors. The proposed study in particular will provide at least suggestive indications (through comparison to the S&S study) of how those relationships for consumers might be changing with advances in communication technology. The result will be a more informed view of the extent to which it is realistic to expect telecommunications to substitute for travel, especially in the consumer context.

Key Words: telecommunications, travel substitution

Objective: model and compare telecommunications and travel I/O relationships and consumer consumption of telecommunications and travel using US data

Tasks: Review previous work on the topic, assemble data, analyze data, and prepare reports.

Milestones, Dates: Official start date Aug. 1, 2003, end July 31, 2004

Student Involvement: Graduate Student Researcher

Technology Transfer Activities: Publications will be posted on UCTC's Website and distributed in hard copy, in most instances free of charge. .

Relationship to Other UCTC Research: new project

Potential Benefits: better understanding of the role of telecommunications in travel substitution, travel growth

Work Completed to Date: We have completed the literature review and evaluation.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2004

Other Accomplishments:

None to date

Percent Complete: 30%

Direct Cost: \$56,498

Auctions for the Procurement of Transportation Service Contracts

Principal Investigator:

Amelia Regan

UC Irvine

Email: aregan@uci.edu

External Project Contact : All UCTC projects are co-sponsored by Caltrans, Contact Sallybeth Scott, Caltrans, 1120 N St., Sacramento, CA 94305, tel. 916 324-2440

Abstract: Large shippers have moved from lane by lane negotiation for trucking services to combinatorial auctions, in which several lanes are put out to bid together and trucking companies may bid for more than one package of services. The bid construction and valuation problem is a difficult one involving NP-hard sub problems. This research develops tractable approximation methods for solving these problems and identifies ways that smaller carriers can work together to capture the benefits available to larger carriers.

Key Words: trucking, combinatorial auctions, algorithms

Objective: develop tractable approximation methods for freight service bid construction and valuation

Tasks: Review previous work on the topic, assemble data, analyze data, and prepare reports.

Milestones, Dates: Official start date Aug. 1, 2003, end July 31, 2004

Student Involvement: Graduate Student Researcher

Technology Transfer Activities: Publications will be posted on UCTC's Website and distributed in hard copy, in most instances free of charge. .

Relationship to Other UCTC Research: new project

Potential Benefits: improve health of trucking industry by supporting more effective bidding

Work Completed to Date: A literature review has been carried out. Exploratory analyses have been conducted.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2004

Other Accomplishments:

None to date

Percent Complete: 30%

Direct Cost: \$51,603

Identification and Measurement of Freeway Congestion

Principal Investigator:

Alexander Skabardonis
UC Berkeley

Email: skabardonis@ce.berkeley.edu

External Project Contact : All UCTC projects are co-sponsored by Caltrans, Contact Sallybeth Scott, Caltrans, 1120 N St., Sacramento, CA 94305, tel. 916 324-2440

Abstract: The objective of the proposed research is to develop a methodology to identify and measure total, recurrent, and non-recurrent congestion delay on urban freeways. The methodology will be applicable to urban freeways that are instrumented with loop detectors or other surveillance systems. The proposed methodology calculates the average and the probability distribution of congestion delays by cause (recurrent, incident related, weather and other factors). The methodology also will quantify the congestion impacts on travel time and travel time variability. The proposed work is based on recent research by the investigator. The findings to-date indicate that reliable measurement of congestion should provide measures of uncertainty in congestion. In applications on two real-life corridors, incident-related delay is found to be between 13 to 30 percent of the total congestion delay during peak periods.

Key Words: recurrent, congestion delay, freeways, surveillance, incident travel time, measurements

Objective: develop methods for measuring freeway delay using surveillance devices estimate uncertainty in delay estimates and delay due to incidents and recurrent congestion

Tasks: Review previous work on the topic, assemble data, analyze data, and prepare reports.

Milestones, Dates: Official start date Aug. 1, 2003, end July 31, 2004

Student Involvement: Graduate Student Researcher

Technology Transfer Activities: Publications will be posted on UCTC's Website and distributed in hard copy, in most instances free of charge. .

Relationship to Other UCTC Research: new project

Potential Benefits: improved congestion management and delay estimation

Work Completed to Date: Data have been assembled and exploratory analyses have been conducted.

Papers to Date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2004

Other Accomplishments:

None to date

Percent Complete: 30%

Direct Cost: \$38,281

Capacity Provision and Pricing in Road Transport Networks in an Imperfectly Competitive Economy

Principal Investigator:

Kurt Van Dender

UC Irvine

Email: kvandend@uci.edu

External Project Contact : All UCTC projects are co-sponsored by Caltrans, Contact Sallybeth Scott, Caltrans, 1120 N St., Sacramento, CA 94305, tel. 916 324-2440

Abstract: The standard economic prescription for managing network congestion relies heavily on the internalization, through tolls, of the congestion externality. Two basic insights are that (a) charging appropriate tolls reduces congestion to –in principle optimal levels, and (b) decisions on infrastructure expansion or contraction are less likely to be misguided when tolls are present. These basic principles rely on the assumption that markets are perfectly competitive. More precisely, a trip is undertaken for one or more purposes, and the prices related to these purposes are competitive. That is, a commuting trip is undertaken to earn a competitive wage, and a shopping trip involves paying the competitive price for purchased goods. This project will assess the impact of accounting for imperfect competition on the economic prescriptions for road infrastructure pricing and its provision. The motivation is that the assumption of perfect competition is not realistic. It also is at odds with developments in mainstream economics, where imperfect competition models become the rule rather than the exception, precisely because of their higher degree of realism. First, a model of the interactions between transport network management and competitive conditions in the economy is required. Preliminary work indicates that even small departures from the perfect competition assumption have major effects on policy prescriptions. In fact, it shows that congestion itself generates non-competitive market results. Second, empirical evidence is sought in order to determine which of the available models best approximates real conditions. The data will be used to construct numerical models for policy analysis.

Key Words: imperfect information, road pricing

Objective: account for the effect of imperfect information on road pricing and infrastructure provision

Tasks: Review previous work on the topic, assemble data, analyze data, and prepare reports.

Milestones, Dates: Official start date Aug. 1, 2003, end July 31, 2004

Student Involvement: Graduate Student Researcher

Technology Transfer Activities: Publications will be posted on UCTC's Website and distributed in hard copy, in most instances free of charge. .

Relationship to Other UCTC Research: new project

Potential Benefits: more realistic models and estimates of the effects of pricing policies

Work Completed to Date: A review of the current literature and emergent theory has been completed, as has data assembly.

Papers to Date:

None to date

Conferences Attended:

None to date

Other Accomplishments:

None to date

Percent Complete: 30%

Direct Cost: \$51,409

Family Caregivers, the Elderly, and Land-Use: An Evaluation of Transportation in Two California Communities

Principal Investigator:

Martin Wachs
UC Berkeley

Email: mwachs@uclink.berkeley.edu

External Project Contact : All UCTC projects are co-sponsored by Caltrans, Contact Sallybeth Scott, Caltrans, 1120 N St., Sacramento, CA 94305, tel. 916 324-2440

Abstract: The transportation research literature has paid increasing attention to the importance of informal caregiving networks for maintaining the mobility of senior citizens who have lost the ability to drive. Still, significant gaps exist in the identification of the travel patterns and needs of both the seniors who are reliant upon caregivers and those providing the caregiving services. We will conduct a transportation needs assessment of caregivers and seniors in two communities in the suburban California county of Contra Costa using quantitative and qualitative measures. Our study population of caregivers will comprise individuals in low-income brackets who provide care to an elderly family member. Finally, only seniors who have gone through driving cessation (and their associated caregivers), but who are not entirely homebound (making at least one trip per week) will be in the study population. Of the two study communities to be chosen for this research, one will have relatively high-density development and be composed of mixed land uses and the other will be characterized by lower density and with more segregated land uses. Our second goal is to identify whether, controlling for other variables, these land-use differences affect the travel behavior and experiences of seniors and caregivers in our two communities. The relationship between land-use characteristics and travel remains an important question in the literature and practice.

Key Words: informal caregiving networks, mobility, senior citizens, Contra Costa, low-income, driving cessation, land-use

Objective: identify travel needs of caregivers and the elderly adults they attend

Tasks: Review previous work on the topic, assemble data, analyze data, and prepare reports.

Milestones, Dates: Official start date Aug. 1, 2003, end July 31, 2004

Student Involvement: Graduate Student Researcher

Technology Transfer Activities: Publications will be posted on UCTC's Website and distributed in hard copy, in most instances free of charge. .

Relationship to Other UCTC Research: new project

Potential Benefits: more effective transportation policies and services for elderly adults

Work Completed to Date: Literature review, survey design, and initial survey mailings are completed.

Papers to Date:

None to date

Conferences Attended:

Lake Arrowhead Conference, 2003
Transportation Research Board Annual Meeting, 2004

Other Accomplishments:

None to date

Percent Complete: 50%

Direct Cost: \$33,075

Transportation Policy Development: Labor as a Missing Stakeholder

Principal Investigator:

Margaret Weir
UC Berkeley

Email: mweir@socrates.berkeley.edu

External Project Contact : All UCTC projects are co-sponsored by Caltrans, Contact Sallybeth Scott, Caltrans, 1120 N St., Sacramento, CA 94305, tel. 916 324-2440

Abstract: For over a decade, federal transportation policy has sought to open regional transportation decision-making to new voices and to facilitate the use of transportation funds on an expanded array of transportation modes. Much of the impetus for these changes in federal legislation came from environmentalists and advocates for low-income communities, who believed that existing decision-making processes advantaged developers and highway interests. However, these processes have rarely engaged labor unions. This research project seeks to understand the role of labor in the development of transportation policy. The research takes a two-pronged approach: first, it examines the processes of coalition building in which labor has engaged as it seeks to participate in transportation policymaking. Second, the research analyzes the problems of consensus building around transportation policy within the labor movement, where institutional complexity, the potentially divergent interests of different unions, and a culture organized around the immediate goals of collective bargaining make it difficult for labor to engage effectively. The research will be conducted in two states: Illinois, where transit unions have launched a statewide coalition to increase state spending on public transit; and California, (both Los Angeles and the Bay Area), where central labor councils have taken the lead in bringing labor into transportation policymaking.

Key Words: transit labor, coalition-building

Objective: document and analyze coalition-building strategies used by labor to influence transportation policy

Tasks: Review previous work on the topic, assemble data, analyze data, and prepare reports.

Student Involvement: Graduate Student Researcher

Technology Transfer Activities: Publications will be posted on UCTC's Website and distributed in hard copy, in most instances free of charge. .

Relationship to Other UCTC Research: new project

Potential Benefits: improved understanding of labor issues and concerns; more effective policies

Work Completed to Date: The literature review and preliminary site visit arrangements are completed.

Papers to Date:

None to date

Conferences Attended:

None to date

Other Accomplishments:

None to date

Percent Complete: 30%

Direct Cost: \$41,698

C. Project Financial Status

It is the UCTC’s longstanding policy to commit all funds authorized by our sponsors, the US Department of Transportation and the California Department of Transportation, in the year that they are authorized. Occasionally funds are not fully expended in the year they are allocated, and in such cases the funds may be carried over into the next fiscal year with the permission of the UCTC Director. Carry-over funds remain committed to the categories to which they were initially allotted, except for Headquarters funds, which differ in some cases from amounts initially budgeted because of changes in salaries or expense items, or reallocations of administrative budget amounts to research and technology transfer accounts.

Our 2003-2004 program allotments commit all funds approved by USDOT and Caltrans at the start of the Year 16 (2003-2004) grant cycle.

Table 4. Allocated Amounts as of February 2004

**University of California Transportation Center
University Transportation Centers Program
Grant Year: Aug. 1, 2003 - July 31, 2004 (Year 16)**

| ITEM | BUDGET |
|--------------------------------------|------------------|
| Center Director Salary | 65,000 |
| Faculty Salaries | 75,847 |
| Administrative Staff Salaries | 68,500 |
| Other Staff Salaries | 96,000 |
| Student Salaries | 272,867 |
| Staff Benefits | 66,950 |
| Total Salaries and Benefits | 645,164 |
| Scholarships | 901,900 |
| Permanent Equipment | 5,000 |
| Expendable Property & Supplies | 23,523 |
| Domestic Travel | 43,013 |
| Foreign Travel | 0 |
| Other Direct Costs (Specify) | 170,000 |
| Total Direct Costs | 1,788,600 |
| Facilities & Admin. (Indirect) Costs | 23,400 |
| TOTAL COSTS | 1,812,000 |
| Federal Share | 906,000 |
| Matching Share | 906,000 |
| TOTAL AVAILABLE FUNDS YR. 16 | 1,812,000 |

Appendix. Completed Projects Since Start of Grant

YEAR 12 (1999-2000) PROJECTS (20 PROJECTS)

Induced Travel Demand: A Systems Analysis of Longer Term Impacts of Road Expansion

Robert Cervero, City and Regional Planning, Berkeley

Measuring the Impact of the Internet on the Trucking Industry

Carlos Daganzo, Civil & Environmental Engineering, Berkeley

Roadway Tunnel Measurements of Carbon and Nitrogen-Containing Air Pollutants

Robert Harley, Civil & Environmental Engineering, Berkeley

Estimation of Latent Pavement Properties Using Condition Survey Data

Samer M. Madanat, Civil and Environmental Engineering, Berkeley

Online Versus Rolling Horizon Algorithms for Dynamic Service Fleet Operations

Amelia Regan and Sandra Irani, Civil & Environmental Engineering

Regional Transportation Infrastructure Finance in the U.S.

Martin Wachs, Institute of Transportation Studies, Berkeley

Estimating Freeway Traffic Stream Modal Activities for Air Quality Modeling

H. Michael Zhang, Civil and Environmental Engineering, Davis

The Transportation Behavior and Needs of Welfare Recipients

Evelyn Blumenberg, Public Policy and Social Research, Los Angeles

New Highways and Urban Growth Patterns: Using Locally Weighted Regression to Measure the Development Impacts of the Orange County Toll Roads

Marlon Boarnet, Urban & Regional Planning, Irvine

GPS-Based Data Handling for Activity Based Modeling

Reginald G. Golledge, Department of Geography, Santa Barbara

Impacts of Shipping Changes on the Efficiency of the Freight Transportation Network

Tom Golob and Amelia Regan, Institute of Transportation Studies, Irvine

The Effects of Urban Land Use Patterns on Household Trip-Making Behavior: An Empirical Analysis

John D. Landis, City & Regional Planning, Berkeley

Putting Behavior in Household Travel Behavior Data: An Interactive GIS-based Survey Via the Internet

Michael G. McNally, Institute of Transportation Studies, Berkeley

Measuring the Role of Transportation in Facilitating the Welfare-to-Work Transition

Paul M. Ong, Public Policy and Social Research, Los Angeles

Development of Estimation Procedures for Activity-Based Model Forecasting

Will Recker, Institute of Transportation Studies, Irvine

Evaluating a University Transit Pass Program

Donald Shoup, Institute of Transportation Studies, Los Angeles

Journeys to Crime: Documentation and Evaluation of Crime Incidence on and around Railway Stations in Los Angeles

Anastasia Loukaitou-Sideris, Urban Planning, Los Angeles

The Viability of Value Pricing Demonstrations

Kenneth Small, Institute of Transportation Studies, Irvine

Greenhouse Gas Emissions Trading and the Transport Sector

Daniel Sperling, Institute of Transportation Studies, Davis

Driving for Dollars: How the Politics of Finance Has Shaped the California Highway System

Brian D. Taylor, Urban Planning, Los Angeles

YEAR 13 (2000-2001) RESEARCH PROJECTS (15 PROJECTS)

Does Commuting Distance Matter? Commuting Tolerance and Residential Change

William A.V. Clark, Geography, UCLA

An Evaluation of Local Option Transportation Taxes in California

Professor Martin Wachs, Institute of Transportation Studies, UC Berkeley

Stationary Traffic Models and Freeway Geometry

Michael Cassidy, Civil and Environmental Engineering, UC Berkeley

E-Commerce and the Efficiency of the California Freight Network: Perspectives of Shippers, Carriers and Third Party Logistics and Information Services Providers

Thomas F. Golob and Amelia C. Regan

Assessing the Influence of Residential Location Changes on Travel Behavior

Michael G. McNally, Civil and Environmental Engineering, UC Irvine

The Impact of Attitudes toward Mobility, Adoption of Previous Strategies, and Demographic Characteristics on Responses to Congestion

Patricia L. Mokhtarian, Civil and Environmental Engineering, UC Davis

Measuring the Role of Transportation in Facilitating the Welfare-to-Work Transition (Third Year)

Paul Ong, Urban Planning, UCLA

Systematic Transport Access and Policies for Low Wage Labor Markets

John M. Quigley, Public Policy, UC Berkeley

Activity-Based Forecasting Model for Planning Applications

Will Recker, Institute of Transportation Studies, UC Irvine

Inventory Theoretic Models of Freight Demand: Revisiting the Past in Light of the New Economy

Amelia Regan, Civil Engineering, and Charles Lave and Amihai Glazer, Economics, UC Irvine

The Environment - Transit Crime Connection: Continuing Study of the Metro Green Line and its Vicinity

Anastasia Loukaitou-Sideris, Urban Planning, UCLA

Has Parking Cashout Failed in California?

Don Shoup, Public Policy and Social Research, UCLA

Reconsidering the Effects of Fare Reductions on Transit Ridership

Brian D. Taylor, Urban Planning, UCLA

Planes, Trains, or Camionetas (little buses)? A Baseline Study of an Informal Travel Mode

Abel Valenzuela Jr., Public Policy and Social Research, UCLA

Understanding and Modeling Driver Behavior in Dense Traffic Flow

H. Michael Zhang, Civil and Environmental Engineering, UC Davis

YEAR 14 (2001- 2002) RESEARCH PROJECTS (15 PROJECTS)

How Does Travel Behavior Change When Households Change Jobs?

William Clark, UCLA

Design of Vehicle Routes and Driver Shifts for Systems with Uncertain Demand

Carlos Daganzo, UC Berkeley

Effect of Driving Mode on Light-Duty Vehicle Emissions Measured On-Road

Robert Harley, UC Berkeley

Using the Spatial Configuration of Cities to Estimate The Impact of Commuting Time on Hours of Work
Antonio Bento, UC Santa Barbara

Evaluation of the California Safe Routes to School Program
Marlon Boarnet and Kristen Day, UC Irvine

Forecasting Demand and Values of Travel Time Savings for Freeway HOV, Toll and HOT Facilities: Incorporating Attitudes and Perceptions into Commuter Choice Models
David Brownstone and Thomas Golob, UC Irvine

Transit-Based Housing: Residential Sorting and Its Influence on Mode Choice
Robert Cervero, UC Berkeley

Real-time Travel Data Collection System Augmented with Speech Interface
Reginald Golledge, UC Santa Barbara

Life -Cycle Environmental and Economic Assessment of Using Recycled Materials for Asphalt Pavements
Arpad Horvath, UC Berkeley

Reinforcement Learning in Transportation Infrastructure Management
Samer Madanat, UC Berkeley

Dissonance between Desired and Current Residential Neighborhood Type: Relationships to Travel-Related Attitudes and Behavior
Patricia Mokhtarian and Ilan Salomon, UC Davis

Optimal Control Policies for Urban Corridor Management
Wilfred Recker, UC Irvine

The Impact of Motor Vehicle Transportation on Water Quality
Jean Daniel Saphores, UC Irvine

Putting Back the Pleasure in the Drive: Reclaiming Urban Parkways for the 21st Century
Anastasia Loukaitou-Sideris, UCLA

Equity and Environmental Justice in Transportation
Martin Wachs, UC Berkeley

YEAR 15 (2002-2003) RESEARCH PROJECTS – COMPLETED PROJECTS ONLY

Judging the Speed of Pedestrians and Bicycles at Night
Karen K. De Valois, UC Berkeley

Policies for Safer and More Efficient Truck Operations on Urban Freeways
Thomas Golob and Amelia Regan, UC Irvine

Incorporating Seismic Risk Considerations in Transportation Infrastructure Management
Samer Madanat, UC Berkeley

Car Ownership, Insurance Premiums and Employment Outcomes
Paul Ong