RESEARCH NEWS

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OPERATIONAL IMPROVEMENTS --AN OVERVIEW

By Herbert S. Levinson, Icon Mentor
University Transportation Research Center

Traffic operational treatments are important complements to major rail and road improvements. They are also adjuncts to demand and land use management actions. They can be implemented quickly; their costs are modest; and their environmental impacts are minimal. And they help reduce congestion in places where it is neither practical nor possible to introduce major physical changes.

Some General Observations

Since the beginning of the Twentieth Century when there was chaos on city streets. They have grown in extent and sophistication to bring order to street use and to reduce delay .

In general, these engineering strategies rely the existing infrastructure. Sometimes, however, they may require physical changes. Examples include widening a street to provide turning lanes and extending streets to provide better route continuity. And in some cases, even grade separations have been developed as part of an overall operations plan.

In developing improvements, it is important to look at an entire roadway to avoid transferring problems from one location to another.

The type of treatment and the benefits derived are site-specific. Benefits are usually the greatest where the congestion is the worst. One-way streets, for example, have achieved 20 to 60% improvements in speeds in Manhattan as compared to only 10% in Denver.

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UTRC Assists the New York State Advisory Panel on Transportation Policy for 2025

During the summer of 2004 the University Transportation Research Center, Region 2, at City College assisted the New York State Department of Transportation (NYSDOT) in gathering public input and formulating policy for the revision of their 20-year Statewide Transportation Master Plan. Under the guidance of the DOT commissioner, Joseph Boardman, an advisory panel of 12 transportation experts was convened to hold nine public hearings statewide to listen to public comments and then work with the DOT to update the plan.

The UTRC was given the task of recording and developing summaries of these hearings for use by the panel. Ross Weiner, Associate Professor of economics at City College, and Camille Kamga, an Assistant Director of the UTRC coordinated this effort. The work was carried out by Chris Andrichak, a Master's Degree Candidate at Hunter College and four summer undergraduate interns from the CUNY Honor College. The reports were developed in a very timely way to provide input to the DOT Executive Team during the hearing process, and served to develop the final advisory panel report of findings and recommendations.

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ROBERT E. PAASWELL, Ph.D.

DIRECTOR

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Director's Message

Robert "Buz" Paaswell, Ph.D.
Director & Distinguished Professor

We at UTRC want to congratulate our close colleagues at the New York Metropolitan Transportation Council (NYMTC), our regional MPO as they celebrate their move to 199 Water Street in Manhattan. Their difficult voyage from the 82nd floor of One World Trade Center to Water Street has been accomplished in real style; their recent housewarming was testament to their strength, accomplishments and stature within our region – and, among MPOs nationally. The administrative triumvirate, Gerry Bogacz, Alan Borenstein and Kuo-ann Chiao has insured that NYMTC will continue to provide vision as well as accountability to the Metropolitan area's transportation projects..

UTRC is joining NYMTC in commemorating the lives of the three NYMTC staff who perished on September 11, 2001. NYMTC has established the September 11th Memorial Program to honor the memory of Ignatius Adanga, Charles Lesperance, and See Wong Shum, the three NYMTC employees lost during the horrible attack on the World Trade Center. The program seeks to educate and motivate people interested in transportation technology and planning and to encourage innovations in planning activities throughout the NYMTC region. A significant component of the program will be support for projects and studies conducted in coordination with the University Transportation Research Center (UTRC), staffed by students receiving stipends, with subject areas aligned with interests/background of those being honored. Such a program will attract the brightest of those who want to make a difference in the workings of our region; it will help students take what they learn or theorize in the classroom and apply it in the planning context of New York.

And New York is ready for them. Gripped in the growing debates of what worthy transit project should have funding priority, what should be done with the Tappan Zee Bridge, what will happen to the regional ferry system that emerged post 9.11, and, how will we ever move freight efficiently throughout (and through) the region, these students will be well challenged to provide answers. The energy and innovativeness of the region will be their stimulation. The strength of NYMTC and spirit of their staff show that no problems are too daunting for this region to address.

Recent Publications

The University Transportation Research Center Recently published, "**Impact of Traffic Congestion on Bus Travel Time in Northern New Jersey**," in Transportation Research Record No. 1884, 2004. The study developed a model to estimate the bus travel time if cars were traveling under free-flow conditions and the results were compared with observed bus travel times.

The Rudin Center for Transportation Policy & Management at NYU recently published "**At Capacity: The Need for More Rail Access to the Manhattan CBD**" which examines the relationship between proposed transit system capacity improvements in the downstate metropolitan area, the updated post 9-11 job projections for the Manhattan Central Business District, and regional economic growth. Availbable: www.nyu.edu/wagner/rudincenter.

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Improvement Types and Benefits

Operational improvements have been found to be effective along both freeways and city streets. Tables 1 to 3 are shown on page 5 and give examples of various treatments and their reported benefits in terms of travel times and speeds.

The common freeway improvements include incident and corridor management; providing additional travel lanes by using shoulders and/or, narrowing existing travel lanes; metering ramps (including HOV bypass lanes); one-way toll collection; and HOV and bus-only lanes. A 20% gain in travel speeds is typical. HOV -lanes can save travelers up to 10 minutes per mile on approaches to water crossings such as the East and Hudson Rivers and up to 2 minutes per mile along an entire corridor (Table 1).

Arterial street treatments include restricting on-street parking; prohibiting left and/or right turns; installing left-turn lanes; operating reversible lanes; and establishing one-way streets. Speeds are generally increased about 20% with a corresponding reduction in travel times. Sometimes even greater gains have been achieved. For example, converting Fifth Avenue to one-way traffic achieved nearly 40% reduction in travel times (Table 2).

Traffic signal improvements also reduce congestion. They include improving local timing, coordinating isolated signals, and placing signals on computerized systems. Major benefits result where isolated signals are interconnected. Converting unsynchronized signals to a computerized system can achieve a 30% improvement. Computerized systems achieve gains of about 10% as compared with an effectively timed multi-dial systems.

Challenges and Opportunities

Operations improvements have been implemented throughout the New York metropolitan Area for many years. Still, there are opportunities for additional improvements, both in the City and in surrounding suburbs.

Manhattan Business District

Improvement opportunities include: (1) Reducing conflicts at complex intersections such as Herald Square by eliminating and/or redirecting certain movements; (2) Ensuring that Bridge and Tunnel access routes do not spillback onto North-South Avenues and (3) Extending curb parking restrictions and intensifying their enforcement; (4) Expanding East-West "express streets" and bus-taxi streets; and (5) Possibly providing "interior" (or dual) bus lanes on selected Avenues.

Water Crossings

The existing system of bus-lanes on the approaches to Manhattan should be expanded, by exploring bus-only lanes through the Holland Tunnel and on the Verrazano Bridge as part of a gateway transit-first policy. Establishing one-way, tolls on all East River Crossings is now feasible thanks to ITS technology and Easy-Pass.

Outer Boroughs

There is a need to improve operations on the existing freeways and parkways by adding lanes in key places and metering selected entry ramps. (One example: an additional lane on the Major Deegan Expressway, between the Grand Concourse, and Willis Avenue.)

Additional one-way street operations, upgraded traffic signal control systems, and improved intersection designs will help reduce congestion. Better balancing the use of arterial street space among buses, moving traffic, curb parking, and pedestrians is essential.

Suburban Areas

The suburban areas surrounding New York City are replete with traffic congestion. Contributing factors include population and employment growth; proliferation of strip commercial developments along arterial roadways; and placing major shopping centers and office parks near freeway interchanges.

An absence of continuous arterial roadways concentrates traffic on relatively few roads. This results in heavy left turning movements where two arterials cross, and requires multi-phase signal operations on long cycle lengths with attendant queues. In some cases, a multiplicity of jurisdictions makes coordinated improvements difficult. And unlike New York City, walking is difficult and transit service is sparse.

There are several ways that the suburban traffic congestion can be reduced. These include: (1) Providing more continuous arterial (or collector) streets; (2) better managing access to roadside developments; (3) better accommodating left turns; and (4) requiring major traffic generators to locate near rail and bus lines.

Better ways of dealing with left turns are essential from both a capacity and safety standpoint. Left turn entering

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and exiting movements should be separated at major developments to allow two-phase signal operations. New Jersey uses 'jug handles" on its multi-lane median-separated highways to simplify intersection conflicts and reduce signal phases. Indirect left turns, such as used in Florida and Michigan both improve safety and reduce delay.

The Michigan indirect left turns (the Michigan U) prohibits all left turns at signalized intersections by providing far side 'U' turn opening that serve left turns from both roadways, and by adding right turn lanes on all approaches to the main signalized intersection. Two-phase traffic signal operations permits shorter cycle lengths, facilitates progressive flow and reduces delays. Capacity gains, about 15 to 20% have been achieved as compared to a typical six-lane highway with dual left turn lanes. While this treatment requires wide medians, the use of "loons" (outside pavement widening) makes this treatment practical on highways with narrow medians.

Access management is a means of improving safety and mobility while simultaneously preserving access to land development. It has been applied in New Jersey, Colorado, and Florida for more than a decade and in several urban areas. It should be considered by the counties surrounding New York City.

Its key elements include: (1) Classifying roadways in terms of their basic function; (2) defining allowable access for each class of roadways; (3) establishing spacing standards for corner clearances, signalized intersections, and un-signalized intersections, and (4) providing a mechanism for granting variances to ensure reasonable access to properties. Typically, there is a statewide access management code (New Jersey). But it also can be achieved by modifying local zoning ordinances, establishing corridor overlay zones, and reusing geometric design standards.

Limiting the number of driveways and requiring uniform and wide spacing of traffic signals results in improved travel speeds and safety. Each additional traffic signal per mile, reduces speeds by about 2 to 3 miles per hour; thus an increase from 2 to 4 signals per mile would result in a 16% reduction. The Highway Capacity Manual (HCM) estimates that free-flow speeds reduce 0.25 mph for every access point up to a maximum 10 mph reduction for 40 access points per mile. Right turn volumes of more than 90 VPH would impact more than 20% of the through vehicles in the same lane (unless a right turn lane is provided) and doubling the number of driveways per mile results in 40% increase in the accident rate.

However, as long as "big boxes" large office complexes, and other types of dispersed high-density developments continue to proliferate in suburban settings, they will usurp the capacity and travel time benefits achieved from applying operational measures. The long term challenge therefore, is to strengthen development policies - to cluster major activities where they can be well served by transit, and to limit large developments to locations within a short walk from a rail station or bus stop.

In Prospect

Traffic operations and engineering actions will continue to complement other actions in dealing with congestion, both in the short and long run. Collectively, these actions can keep congestion at manageable levels as New York City and its metropolitan area continue to grow in population and economic activity in the years ahead.

www.utrc2.org

TABLE 1

REPORTED TRAVEL TIME BENEFITS ALONG FREEWAYS FOR VARIOUS TRAFFIC OPERATION TREATMENTS

ACTION	% INCREASE IN SPEEDS	% DECREASE IN TRAVEL TIME	UNIT TRAVEL TIME SAVINGS MIN/MILE	OTHER	SOURCE
Incident Detection And Management (Houston)				Incident Delay Reduced 4500 Veh/Hrs Day	(1)
Corridor Management (Houston)				Recurrent Delay Reduced 6300 Veh/Hrs Day	(1)
Additional Lanes Busing Shoulder And/Or Narrowing Lanes	+20				(2)
Ramp Metering	+20-25		0.3 – 0.4		(2)
Denver	+16	-20			
Long Island	+21	-20			(1)
Minneapolis	+35				
Average – 8 Cities (Including Ramp Delay)	+20	-33			(1)
One-Way Toll Collection				2-3 Min/Car	(2)
HOV/Bus lanes					
At Water Crossings (4)			3.4 – 9.4		(1)
Other (16)			0.8 – 1.7		(1)
HOV Ramp Bypass				1-3 Mins/Ramp	(2)

TABLE 2

REPORTED TRAVEL TIME BENEFITS ALONG ARTERIAL STREETS FOR VARIOUS TRAFFIC OPERATION TREATMENTS

ACTION	% INCREASE IN SPEEDS	% DECREASE IN TRAVEL TIME	UNIT TRAVEL TIME SAVINGS MIN/MILE	OTHER	SOURCE
Curb Parking Restrictions	20-30	+25	0.24 – 2.4		(2)(1)
Left Turn Prohibition	15-35	+10			(2)(1)
Left Turn Lanes	10-20				(2)
Reversible Lanes (Heavy Direction)	20-50				(2)
One-Way Streets	20-40				(2)
	25-50				(3)
Specific One-Way Streets					
Manhattan					
Fifth Avenue	+60	-37	2.4		(3)
Madison Avenue	+21				(4)
3rd, Lexington 7th, 8th, Ave of the Americas		22		65% Reduction In stops	(4)
Denver					
Broadway-Lincoln	+ 9				(1)

TABLE 3

REPORTED BENEFITS OF TRAFFIC SIGNAL TIMING IMPROVEMENTS

Type of Improvement	% Increase in Speed	% Decrease in Travel Time	% Decrease in Delay	% Decrease in Stops	Source
Improved Timing	0-5				(1)
Coordinating Isolated Signals	2-25				(1)
Placing Isolated Signals on Computerized System	30				(1)
Placing Single Dial System on Computerized System	15-20				(1)(2)
Placing Multiple Programmed Signals on Computerized System	6-10				(1)(2)
California Statewide Program	15	7	15	10	(1)
Texas Statewide Program			19	9	(1)

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Preliminary findings from the Evaluation Study of the Port Authority of New York and New Jersey's Value Pricing Initiative,

by Jose Holguin-Veras, Ph.D., Rensselaer Polytechnic Institute

Since its inception of the Value Pricing Pilot Program and its predecessor in 1991, the evaluation of the value pricing projects implemented as part of this program has been a fundamental source of research on the socio-economic impacts of the value pricing projects. To a great extent, this is a consequence of the Congressional mandate that specified the evaluation and monitoring of the pricing projects under the aegis of the Value Pricing Program. A number of important projects have been the subject of comprehensive evaluations, most notably the SR-91 in Los Angeles, and I-15 in San Diego.

This article provides a brief summary of findings related to one of the largest and most complex, value pricing project in the US: the Value Pricing Initiative at the Port Authority of New York and New Jersey (PANYNJ). In terms of its size, this project affects every single day more than 600,000 autos, 60,000 trucks, and several hundred thousand transit users. These numbers provide an indication of the size and complexity of the operation.

In addition to dealing with such a complex application of value pricing, this evaluation may be one of the most challenging ones due to the time that has elapsed between the implementation of value pricing and the actual evaluation project. This is the result of a number of events that delayed the start of the project. Among them it is important to highlight: the September 11th attacks, the enactment of single driver occupancy restrictions in New York City, and the financial crisis that brought massive changes in the departments of transportation.

The project team implemented a comprehensive approach aimed at assessing the behavioral impacts brought about by the pricing implementation. This involved the use of focus groups with both passenger car driver and trucking company dispatchers, as well as behavioral surveys targeting car drivers and trucking companies.

Preliminary findings indicate that among those who can recall the 2001 toll increase, 12.8% changed their travel behaviors because of the Value Pricing, which accounts for 7.4% of interviewed individuals. The analyses indicate that users responded in a combination of ways to the new toll schedule. This includes: Decrease travel by car + increase use of transit (2.6%); Increase use of transit + increase / start carpooling (1.8%); Decrease number of trips during peak and increase during off peak (1.5%); Decrease number of trips during both peak and off peak (1.3%); and Increase use of public transportation + switch to E-ZPass (1.2%). The most recent reports can be found at: http://www.rpi.edu/~holguj2/pa/index.html.

Rudin Center News
Annual Leadership in Transportation Awards

NYU Wagner Rudin Center for Transportation Policy & Management

Each year, the NYU Wagner Rudin Center for Transportation Policy & Management, in conjunction with the Council on Transportation, honors individuals who have made a significant contribution to the field of transportation within the New York metropolitan region.

Three types of awards are given on an annual basis: Public Agency Award in recognition of a specific project or history of accomplishment in transportation; Public Servant Award to an individual in recognition of outstanding achievement in the advancement of transportation; and Civic Leadership, Award in recognition of the role played by an individual in the civic community to lead or foster positive change or action in transportation.

From time to time, Special Tribute Awards are given for transportation related work that does not fall into the previous three categories. The 2005 Annual Leadership in Transportation Awards will take place during the evening of Wednesday, February 2, 2005 on the campus of New York University. This year's recipients are Peter Stangl in the category of Public Servant; Beverly Dolinsky, Executive Director of the Permanent Citizen Advisory Committee to the MTA (PCAC) for Civic Leadership; and a Special Tribute Award will go to Chris Ward, President and CEO of American Stevedoring Inc. Not only was this year's pool of nominees larger than any previous year, but the quality and range of accomplishments of the nominees was impressive, and therefore we are pleased to present awards to this year's recipients for their outstanding achievements.

Peter Stangl, currently retired, was selected for his

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Policy Implications of Local Option Taxes

by Dr. Todd Goldman, Assistant Director, New Initiatives, University Transportation Research Center,

What happens when government steps out of the way and allows transportation investment priorities to be chosen by other means? This experiment has been conducted hundreds of times in cities, counties, and metropolitan areas around the country. Research by Todd Goldman, UTRC Assistant Director for New Initiatives, indicates that local direct democracy is increasingly changing the character of transportation funding and decision-making in the United States.

Earlier research by Goldman and Prof. Martin Wachs of the University of California, Berkeley documented the rise of local option transportation taxes as a dominant model for transportation finance and decision-making in many parts of the country. Dr. Goldman's new research closely examines how four of these taxes came into existence in the San Francisco Bay Area between 1984 and 2000. The research was conducted through extensive analysis of minutes of public meetings, planning documents, newspaper articles, and letters, as well as in-depth interviews with key participants in each of the planning efforts including elected officials, consultants, and advocates.

These four cases illustrate how key decisions are being made that will determine the shape of metropolitan California for decades to come. Because there is not enough support for raising gas taxes statewide, the state has allowed the voters of individual counties to decide whether to raise taxes their own sales taxes for transportation improvements. The state set few rules for how the funding plans must be developed or how the funds may be spent, but set very strict rules governing the process for winning voter approval. In order to reach the ballot, these plans must have achieve support from a majority of county supervisors and a majority of city councils, representing a majority of county residents. Once on the ballot, two-thirds of voters must vote in favor of the proposal for it to be enacted into law.

These tax packages tend to be developed through messy and idiosyncratic planning processes. Typically, voluntary networks of developers, local elected officials, civic organizations, and other business leaders have sought to win funding for a few favored projects by building a broader consensus around their areas' transportation and associated policy problems. Because of the supermajority voter approval requirement, small organized interests, such as environmental groups, bicyclists' groups, and advocates for senior citizens and the disabled, have been able to gain a seat at the table and have a disproportionate influence the outcomes.

These planning processes suffer from many potential problems, including that they potentially undermine the drive toward the achievement of longstanding regional planning goals in favor of more local and short-term objectives. But they have also been able to bring an unusual measure of creativity to transportation policy and program development. In California, various measures have focused on growth management, habitat protection, and socioeconomic equity with a focus and clarity that it has been difficult for traditional metropolitan transportation plans to achieve. For good or for ill, by democratizing decision making, this approach to planning has made the selection of major new transportation investment priorities more responsive to public opinion

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exemplary public service career which, after Chairmanship of the Metropolitan Transportation Authority (MTA), culminated as President of Bombardier Transit Corporation. Beverly Dolinsky was selected for her long-term dedication to PCAC and the transit-riding public. Finally, Chris Ward was selected for his dedication and vision in incorporating good transportation planning into environmental management.

Invitations to the 2005 Annual Awards ceremony can be downloaded from the Rudin Center's website at To register or for more information, please contact the Rudin Center at 212-998-7545 or bella.pierson@nyu.edu.

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On December 15, 2004, the UTRC released the report: "Transportation -- Trouble Ahead: The New York State Advisory Panel on Transportation Policy for 2025" The panel's report documents the extent and importance of New York's complex, highly multi modal and diverse transportation system, outlines recent trends and policy issues, and presents a set of findings and recommendations that, if implemented, will result in an improved transportation system that meets the needs of New York citizens and businesses for years to come. The report emphasizes the trouble that lies ahead if bold leadership is not shown and adequate, meaningful funding is not provided. According to Dr. Robert Paaswell, a modern, effective and efficient transportation system is required to maintain jobs and protect our quality of life. Improvements were made to the transportation system during the 1990's,' but funding programs on both the State and Federal levels are coming to an end. At the same time changes in the global economy, skyrocketing truck traffic and an aging population have placed additional stress on the transportation system.

The panel's report is being provided to transportation decision makers and stakeholders in order to begin a meaningful discussion of the State's transportation needs and funding requirements. The Panel developed three overarching findings from the hearings:

1. New York State's transportation system is under stress and conditions will worsen unless the state changes the planning, investment, management and institutional relationships that drive the system;
2. Multiple transportation operations in the state must be integrated to form a seamless system that delivers improved service while enhancing the environment. The NYSDOT is the only statewide multimodal transportation agency and must lead a comprehensive effort to optimize the transportation system; and
3. New York State must develop a new strategy that provides substantial, sustainable and predictable funding dedicated to transportation investments.

The report is currently available for download from the UTRC's website at http://www.utrc2.org/publications. A copy would be sent by a fax request at 212-650-8374.

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