



Report on TRB session 134, “Bus rapid transit systems”

(Edward Fleischman, Session Moderator)

A conference session titled “Current Developments and Issues in Bus Rapid Transit Systems” (Session #134), sponsored by our Bus Transit Systems Committee, was held at the 79th Annual Meeting of TRB on Monday afternoon, January 10, 2000. The provision of high quality express bus service using bus priority is not a new idea. This committee has sponsored a number of TRB sessions spanning over 25 years relating to the provision of priority highway treatment for buses. However, Bus Rapid Transit is the subject of a major new initiative launched recently by the Federal Transit Administration (FTA).

Last year at the TRB Annual Meeting, a session was sponsored by our committee simply titled “Bus Rapid Transit.” Then FTA Administrator Gordon Linton led the discussion of a systems approach to providing bus rapid transit in-

volving infrastructure, operations, and technology, i.e., a coordinated effort to provide high speed reliable bus transit. This year’s session continued this discussion.

The first presenter was Bert Arrillaga, Chief of the Service Innovation Division of the Federal Transit Administration, who has managed the FTA Bus Rapid Transit Program for the last three years since its inception. Mr. Arrillaga explained that the Bus Rapid Transit Initiative was launched to improve the speed, reliability, and convenience of bus service, to enhance the mobility and access needed for thriving communities, and to promote a healthy environment.

Mr. Arrillaga stated that the FTA-sponsored Bus Rapid Transit Demonstration Program was initiated in January 1998. A request for participation was issued and selections were made. The successful applicants are working with FTA in designing the demonstrations. Comprehensive evaluations

continued on next page

IN THIS ISSUE

- 3 Report on Session 304, Current issues in bus design
- 5 Report on TRB Session 267, Current developments in bus transit operations
- 6 Summary of TRB Session 163, Updated tale of two cities: Current experiences with electronic passes—New York and Chicago

Report from Committee AIE01 Chairman John Dockendorf

As a long-time member of the TRB Bus Transit Systems Committee, I have always felt that we could, and should, do more than we were doing. Therefore, when the opportunity to become Chairman became available, I made a personal commitment to activate the committee more in the future. In 1998, we made good progress and ended up sponsoring two paper sessions, one joint conference session, and one joint poster session. Also, our

continued on next page

Bus Transit—continued

of the selected demonstrations will be made, and dissemination of the results will be done nationwide.

The next presentator was Mr. Stephen Andrie, Director of the Center for Transportation Research and Education at Iowa State University. Mr. Andrie's topic was the TCRP research project "Implementation Guidelines for Bus Rapid Transit Systems." Until recently, he was in charge of this project at TCRP. The research problem statement was posted on August 20, 1999, and a selection of the winning contractor will be announced shortly.

Phase I will consist of the development of a descriptive brochure and a public information video that illustrates service characteristics of the various types of Bus Rapid Transit. Phase II will develop descriptive information and technical guidance to assist in the development of additional projects.

Mr. Roderick Diaz, a senior consultant with Booz-Allen & Hamilton, then provided an overview of a number of international bus rapid transit projects that are currently in operation. These projects use innovative applications to improve conventional bus transit service to the level of bus rapid transit. He stated that key characteristics of successful projects include open communication, information sharing, empowering transit employees, and decisive leadership.

The final presentator was Mr. Bruce Ahern, Assistant General Manager for Business Development and Planning at the Port Authority of Allegheny County in Pittsburgh. He discussed the existing PAT busways and the status of construction of the Airport Busway.

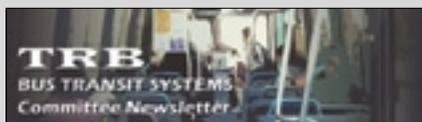
A lively question and answer session followed the presentations. ♦

Committee chairman report—continued

committee was one of only three in Section E to participate in TRB's new Emeritus Member Program, which resulted in Herbert Levinson's receiving this prestigious honor. Finally, with the help of dedicated and energetic volunteers Donn Fichter, Herbert Levinson, Ronald Hudensky, Ali Haghani, and Charles Prestrud, we were able to get a head start in preparing our committee's submission for TRB's proposed compendium of Section E Committee papers on this subject. Only 8 of the 12 Section E Committees ended up participating in this initiative.

In 1999, even more progress was made. The aforementioned New Millennium paper was completed and presented at the 2000 Annual Meeting. Due to TRB's tight deadline, the finalization of this paper was not done collectively by the entire subcommittee as planned; however, their work made my job of organizing and finetuning their input relatively easy. Especially deserving of recognition is Herb Levinson for his assistance in reviewing preliminary drafts of this paper.

In addition to presenting the New Millennium paper, our committee sponsored two paper sessions, one conference session, and one joint conference session at this year's Annual Meeting. Each of these sessions is summarized in this newsletter. My personal thanks to Ed Fleischman, Frank Spielberg and David Sampson for both doing an effective job moderating each of these respective sessions and providing this helpful summary for the benefit of committee members, friends and others who may not have been able to attend these sessions. Also, my thanks to all members of the committee for your effective and timely



Vol. 1, No. 1, 2000

TRB Bus Transit Systems Committee Newsletter is produced by the Center for Urban Transportation Research (CUTR) at the University of South Florida in Tampa.

Mission Statement:

To stimulate research, disseminate research findings and to encourage the application of research findings on bus transit systems.

Editor: Dennis Hinebaugh

Design by Wendy Castleberry

© CUTR 2000

Contact us at:

TRB Bus Transit Systems Committee Newsletter
Center for Urban Transportation Research

University of South Florida

4202 East Fowler Avenue, CUT 100

Tampa, FL 33620-5375

E-mail: hinebaug@cutr.eng.usf.edu



review of the 16 papers forwarded to our committee this year. My special thanks to Frank Spielberg for once again doing such an efficient job in coordinating the review of this year's papers.

In addition, last year the committee experienced its triennial TRB rotation, which was smoothly handled by Secretary David Sampson. Dave and I are pleased to report that the following new members have joined our Committee:

- Steven Andrie, Iowa State University (formerly with TCRP)
- Scott Bush, University of Wisconsin
- Sally Hill Cooper, former FRA Executive
- Andrew Hollander, New York City DOT (and former Committee member)
- Kevin St. Jacques, Wilbur Smith & Associates
- Peter Schauer, Peter Schauer Associates

We still have a few vacancies, so if anyone knows of a good candidate who is interested and willing to participate in our activities, please let Dave or me know.

In Year 2000, I expect the committee will even be more active. With the able help of George Pierlott, I expect to submit our committee's Self Evaluation, reflecting your input, to TRB for its review. Based on other committee reviews, I expect that we will receive some helpful sug-

gestions. Also, thanks to the help of Dennis Hinebaugh of the Center for Urban Transportation Research, our committee was able to publish what I believe is its first newsletter. This product is long overdue, and I sincerely hope more issues will follow. However, this won't happen unless all members periodically get involved and contribute material. The old cliché that "you only get as much out of an activity as you put into it" is most appropriate, so I encourage everyone to take some time this year to support this beneficial initiative.

Last, but not least, it appears that our committee will take the lead in sponsoring a special TRB Section E Mid-Year 2001 Conference on Bus Rapid Transit. This meeting is likely to be in a midwest or east-coast city (e.g., Cleveland, Pittsburgh or Ottawa) in August 2001. I greatly appreciate the willingness of members Edward Fleischman, Brendon Hemily, Kevin St. Jacques and Frank Spielberg to help with this project. I expect more information on this subject to be available in our next newsletter.

Thanks for all of your past support. Please keep in touch, and if you have any suggestions to improve our newsletter, please let Dennis or me know. Also, if you have any recommendations regarding the committee and its activities, please let me know. I can be reached by phone at (717) 787-7540, by fax (717) 772-2985, and by email at res18@psu.edu. ♦

Report on TRB session 304, "Current issues in bus design"

(David Sampson, Session Moderator)

The session on current issues included four areas covering a wide range of topics, all linked by a common objective: making bus transit services as safe, reliable, and customer-focused as possible.

The first paper, "Automated Bus Dispatching, Operations Control, and Service Reliability: The Initial Tri-Met Experience," presented by Dr. James Strathman, presented findings on the initial changes in service reliability following deployment of a new dispatching system using AVL and auto-

matic passenger counter technology. The variance of operating performance for three key indicators of service reliability—on-time performance, headways and run time—were reviewed for the pre- and post-implementation period for eight study routes covering radial, crosstown, and feeder services. Overall, on-time performance increased by 9.4 percent. There was a 5 percent reduction in the coefficient of variation for headways indicating an improvement in service regularity. Running times, too, were decreased, and the authors estimated that in-vehicle travel times were reduced by about 3 percent. In conclusion, the

paper found that, in practice, these new technologies do appear to meet the optimism of the transit industry with regard to expectations.

The second paper, “To Dwell or not to Dwell? Running Time and Dwell Time Relationships for Bogota’s Exclusive Busway,” presented by Dr. Daniel Rodriguez, developed dwell time and running time relationships for a high-frequency, high ridership exclusive busway. Model results indicate that dwell times, both cumulative and marginal, are very low when compared to similar services in other countries; but that, despite low dwell times, the running time delays imposed by a high number of stops is considerable in Bogota. This, in turn, relates to public policy and the manner in which buses operate over the busway; given the highly competitive environment and the resulting low profit margins of the operators, stopping for every possible rider is worthwhile, even if the buses

are stopping at non-designated stops or in the middle of traffic. The frequency of stops, in turn, slows travel speeds, creates more pollution, and decreases fuel efficiency and vehicle utilization. The model goes on to evaluate the results of proposed improvements planned for the busways that would better organize operations and improve service effectiveness.

The third paper, “The Microscopic Modeling of Kerb Guided Bus Schemes,” presented by Mr. James Tate, described traffic management measures for guided bus schemes in the United Kingdom. The paper highlighted the advantage of kerb guided bus priority schemes over more conventional bus priority measures, as well as rail transit services, using a microscopic traffic simulation package. The paper focused on services in Chester and Kingston-upon-Hull, and the conclusions drawn demonstrated significant travel time savings for buses

over automobiles in these locations, reaching travel time savings of 20 to 30 percent in these applications.

The final paper, “Traction Performance of Transit and Paratransit Vehicles During Winter Season,” presented by Dr. Jian John Lu, looked at traction performance in icy or snowy conditions during stopping, starting, cornering, and hill climbing. Field tests were conducted for three types of vehicles—a 41-passenger bus, a 32-passenger bus, and a 9-passenger paratransit vehicle—using highway tires, snow tires, studded-siped tires, highway 3-rib tires, all season tires, and snow-siped tires in a variety of combinations and conditions. Results indicate that winter traction performance is significantly influenced by vehicle type, tire combination used, and road surface conditions. Findings and recommendations for appropriate tire combinations were presented. ♦

Report on TRB Session 267, “Current developments in bus transit operations”

(Frank Spielberg, Session Moderator)

This session included four high quality papers reporting on aspects of bus operations. Two papers used data collected in the field in conjunction with analytic methods to identify what would improve field operations. Two other papers reported on faculties in current operation. An audience of more than 60 attended to hear

the papers and question the presenters.

Dr. Peter Furth on Northeastern University was a contributor to both of the papers that applied analytic procedures to questions of bus operations. The first of these papers, “Conditional Bus Priority at Signalized Intersections: Better Service Quality with Less Traffic Disruption”, written in collaboration with and presented by Theo. H. J. Muller of Delft University

of Technology, discussed the application of bus priority procedures at signalized intersections. The studies reported examined two strategies for granting priority to public transit vehicles. In the first and most simple strategy, a transit vehicle receives priority, either extending a green phase or triggering an early termination of a red phase, regardless of whether

continued p. 6

Summary of TRB session 163, “Updated tale of two cities: Current experiences with electronic passes - New York and Chicago”

(Jointly Sponsored by the AIE01 and AIE06 Committees)

This year's conference session was a sequel to a similar session held last year. The rider response to the fare reductions and the introduction of electronic passes in Chicago and New York was dynamic. It was decided more time was needed to document these impacts and to determine if these impacts represented a long-term trend. Also, some new factors, such as a major service increase in New York occurred since last January, which warranted this updated report.

Mr. Tucker and Mr. Stuart of MTA's New York City Transit Authority (NYCTA) reported that system ridership has increased over one million riders per day since the Authority introduced its new Metrocard and offered free transfers between its bus system and its subway system in July 1997. This growth in ridership was enhanced by the introduction of an unlimited 30-day pass for \$63, as well as the introduction of a new daily unlimited ride pass for \$4.00 in January 1999. In addition, the Authority began a multiyear plan in 1998 to significantly increase bus service.

The result of these ridership inducement policies has been remarkable. Mr. Tucker indicated that the results of NYCTA's new policies represented the largest increase in transit ridership in the United States since 1947! For the first time in decades, the Authority is experiencing the problems of a “growing industry” rather than a declining industry. Even the demand for “owl” service on selected subway routes has required the agency to offer 10-minute headways to avoid overcrowding. Also, the response by the public to the Metrocard has been very favorable. Over 78% of daily riders now use this fare instrument.

Naturally, this ridership revolution did not come without cost. NYCTA had to reassign a large number of new individuals to clean their new Metrocard readers to keep them from malfunctioning. Also, the cost of adding Metrocard vending machines to its 468 subway stations has been significant. In addition, there has been an adverse impact on

operating revenue. Overall, NYCTA estimates its average fare has declined from \$1.38 to \$1.08; its revenue/expense ratio has declined from 74% to 64%; and its overall level of operating revenue declined by 3% last year. Last, but not least, the Authority adopted a new \$17.5 billion five-year capital program, of which \$3 billion is dedicated to rebuilding existing new vehicles and procuring some new vehicles to help accommodate the increases in ridership.

Mr. Foote and Mr. Baker of the Chicago Transit Authority (CTA) did not have as dramatic a story to tell as NYCTA's experience; however, they did report that the Authority experienced ridership growth of approximately 2% in 1998, and over 4% in 1999, reversing a 15-year trend of declining ridership. This positive result was largely due to the introduction of a new Automated Fare Collection (AFC) electronic stored value card in late 1997, along with the reduction in the cost of CTA's unlimited ride monthly pass from \$88 to \$75 in 1998, and the introduction of a new daily unlimited ride pass for \$5 in 1999. Also contributing to this upward trend in ridership was the 10% discount offered on the sale of 10-ride tickets, the “11 for 10” program, and the introduction of a 7-day unlimited ride pass for \$20. Like NYCTA, CTA's AFC pass was tremendously successful. Today, over 82% of daily riders use this fare instrument, and the agency has eliminated the use of tokens.

Like NYCTA, there was a cost to CTA's ridership success. The Authority reported a 3% decline in its average fare to \$.82 and an increase in operating costs related to the installation and maintenance of its AFC machines. However, CTA did not experience a reduction in total operating revenue or a decline in its revenue recovery ratio.

This “tale of these two cities” is not over, as the impacts of these dynamic ridership enhancement policies will be felt for many years to come. Hopefully, we will be able to entice these and other speakers from NYCTA and CTA to update us later on the future results of their respective agency's activities. ♦

Current issues in bus design—continued

it is behind schedule. In the second strategy, transit vehicles receive priority action only if they are behind schedule. The paper reports on an experiment in Delft in which three strategies—no priority, absolute priority and conditional priority—were applied to the operations of an existing bus route. The data reported and analyzed in the paper show that both priority schemes lead to substantial improvement in bus on-time performance. Absolute priority, however, can result in significantly greater delays for non-transit vehicles while conditional priority lead to similar gains in bus performance with almost no increase in non-transit vehicle delays.

Dr. Furth also reported on work investigating strategies for the placement of bus stops he had done in collaboration with Adam Rahbee, a student at Northeastern at the time the studies were conducted. The paper, “Optimal Bus Stop Spacing Using Dynamic Programming and Geographic Modeling”, discusses various strategies for determining the interval (distance) between bus stops along an urban bus route with varying types of adjacent activity. The objective is to minimize generalized delay to all users of the system, including patrons riding on the bus and patrons walking to and from the bus. Operating cost impacts are also taken into account. The paper illustrated the method

with an application to MBTA Route 39, a 7.2 km route operating between Forest Hills and Northeastern University. This route currently has 37 stops with an average spacing of 202m. The reported optimum would have 19 stops with an average spacing of 404m.

Papers reporting on strategies in use to provide faster bus running speeds, less variability, and greater reliability were presented by Roderick Diaz and B. Kent Lall. Mr. Diaz, of Booz-Allen & Hamilton, Inc., reported on work done with Donald Schneck, also of BAH, to review bus rapid transit operations in: “An Overview of Bus Rapid Transit Technologies in the Americas”. Eight transit operations are documented, three in Canada (Montreal, Ottawa and Quebec City) and five in South America (Curitiba, Porto Alegre, Quito, and two in Sao Paulo). Specific features, attributes, and costs of the systems vary widely, but they all are directed toward improving service speed, system reliability and user-friendliness.

B. Kent Lall of Portland State University along with Debbi Lucas of Tri-Met authored a paper, “Smart Ramp—Oregon’s Experience with Bus Bypass Lane Operation”, that documented a one-year study of a metered freeway entrance ramp on which a queue by-pass lane for buses and HOV’s was implemented. Even with a relatively high violation rate, the bypass has encouraged greater use of the ramp by carpools while providing an advantage to Tri-Met buses. ♦



**Center for Urban Transportation Research
College of Engineering, University of South Florida
4202 E. Fowler Avenue, CUT 100
Tampa, FL 33620-5375**

PLACE
STAMP
HERE