

# Abstracts of Papers

## COMPARISON OF DUAL-MODE TRANSIT SYSTEM WITH VARIOUS TRANSIT BUS OPTIONS

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The annual costs and level of service of a dual-mode transit system (DMTS) are compared with those of exclusive busway bus (EBB), exclusive busway with small bus feeder (EBB/SBF), expressway bus (EB), and conventional bus (CB) systems. Large- and small-bus versions are studied. The systems, defined for Milwaukee in 1990, all provide the same capacity and routes. The Milwaukee Dual-Mode Study base-line data are used. Trip time and transfer characteristics are used as measures of level of service. Construction of busways and creation of reserved lanes increase vehicle speed that, in turn, increases driver-vehicle productivity and decreases travel time. The use of small buses allows for shorter headways, more privacy, and demand-responsive service. But small-bus operations are not economical unless automated operations are used. Transfers may have an unacceptable effect on the ridership of the exclusive busway and small-bus feeder system.

The small-bus dual-mode system and large-bus exclusive busway system are the two most comparable systems: Annual cost of the busway system is 21 percent less, but ridership is expected to be 17 percent lower than that of dual mode because the dual-mode perceived trip time is 27 percent shorter. The busway system can be provided at the lowest cost, and implementation does not involve the large capital investment and construction impact. However, the busway system is only practical in cities with extensive freeway networks and provides an unfavorable cost growth characteristic.

## NATIONAL POTENTIAL FOR URBAN DUAL-MODE SYSTEMS

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This study determined that 44 urbanized areas accounting for 68 percent of the 1990 urbanized area population are potential candidates for urbanwide dual-mode systems. These numbers in themselves would appear to justify further research and development (funded by federal and other sources) of dual mode. However, if

the various constraints and assumptions used in this analysis were relaxed or changed, the potential market for dual mode would expand considerably. For example, if the constraint of urbanwide service with a specified access time were relaxed, the list of dual-mode candidates would expand to include areas with a need and ability to pay for corridor or limited-area circulation systems. A different definition of the size, composition, and operation of the dual-mode vehicle fleet would likewise enlarge the dual-mode market. Perhaps the most far-reaching change in assumptions would be a statutory revision permitting a higher federal contribution to transit project costs. If, for instance, the federal government's share increased to 90 percent, even the small urbanized areas with relatively limited fiscal capabilities could consider dual mode as an alternative transportation system. Since, then, the potential market for dual mode is even larger than that specifically identified in this study (i.e., more than 68 percent of the urbanized area population), it is considered that there is a strong case for continuing to explore the various technological, economic, and social issues related to dual mode.

## PALLET RAIL-CARRIER DUAL-MODE TRANSPORTATION SYSTEM

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One solution to urban transportation problems incorporates a pallet type of rail-carrier dual-mode transportation system. This system is technically feasible and incorporates a fully electrically propelled and controlled pallet rail-carrier vehicle applying ac drive with eddy current clutch and brakes. Present manual mode components of automobiles and buses require limited interface equipment to operate. Automated-mode rail carrier permits speeds as high as 96 to 192 km/h (60 to 120 mph) and is applicable as a means of transportation in urban centers as well as between cities and cross country. Pallet rail-carrier dual-mode systems open the possibility of transforming present automobiles and buses into battery-powered units for electric propelling, which will help reduce considerably the hydrocarbon and nitrogen oxide pollution as well as assist in fossil fuel conservation. The rail system guideway also permits automated operation of rapid transit vehicles or incorporates other mass transit systems with limited additional cost.