Ferrying container cargo between cities or across countries could be performed within the system moving at the same high speeds resulting in an economical and effective distribution system throughout the country.

TOWARD DUAL-MODE USE OF BICYCLES IN PUBLIC RAPID TRANSIT

David M. Eggleston, San Diego State University

It is time to begin using the bicycle as a basic part of the transportation system of the United States. The need for improved public transportation is increasing daily. Because of time delays and funding limitations only a small part of this need can be met by completely new systems and guideways within the next 10 years. With a number of inexpensive changes the capabilities of the bicycle for short trips can be combined with those of existing (or new) public transit systems for longer trips. If a bicycle could be taken aboard public rapid transit, the speed, comfort, and safety of the transit vehicle could be combined with the versatility, energy efficiency, and door-to-door convenience of the bicycle. A car would then be necessary only for some trips, and the need for more than one car per family would be reduced. In this work the facilities and hardware needed for carrying bicycles on buses, planes, trains, and ships are discussed. Results of a bicycle-bus-trailer transportation study sponsored by the California Department of Transportation are presented, including demand analysis, prototype hardware, and operational experience.

CRUSWAY

Paul W. Howells, Edwin H. Lederer, and Robert N. Lothes, Syracuse University Research Corporation

CRUSWAY is a simple dual-mode transit system as personal and as convenient as the automobile. It has the capacity to handle downtown traffic and yet is cheap enough for network coverage in the suburbs. Highlights of its features and performance are as follows: (a) way—elevated, enclosed, continual flow; (b) vehicles—minicars to bicycles, personally owned and driven; (c) user spectrum—senior citizens to school children; (d) network spacing—1 to 2 blocks in the center city and 2 to 4 blocks in the suburbs; (e) trip speed—24 to 32 km/h (15 to 20 mph) compared to 16 to 32 km/h (10 to 20 mph) for the urban automobile and 11 to 16 km/h (7 to 10 mph) for bus or subway; (f) capacity—7200 vehicles/hour in a 2.4-m (8-ft) way compared to 4000 vehicles/hour in a 6-lane street; (g) cost—$312 500/km ($500 000/mile) or 5 to 8 cents/passenger-km (3 to 5 cents/passenger-mile) with above network spacing; (h) fuel economy—about 210 passenger-km/liter (500 passenger-miles/gal) of fuel at the power station; and (i) noise and pollution—negligible. Because it provides a service like that of the automobile with far better economy, CRUSWAY has the potential to attract most urban travelers and ultimately to eliminate the automobile noise, pollution, and congestion in cities and to reduce our national oil consumption by about 30 percent.

DUAL-MODE TRANSPORTATION: AUTO-TRAIN AND BUS-TRAIN

David R. Miller and William H. T. Holden, Daniel, Mann, Johnson, and Mendenhall

Dual-mode vehicle transportation systems of the auto-train and bus-train types are those systems in which one vehicle, adapted for highway use, and so used at one or both ends of a trip, is carried for an intermediate portion of the trip on another vehicle, which in this case is a railroad car designed for this use. These systems are of two types—those adapted to carry passenger automobiles, described as auto-train systems, and those adapted to carry buses and described as bus-train systems. There are two types of auto-train: those for long-haul trips of several hundreds of kilometers in which passengers ride in other passenger cars of the same train and those for short-haul service in which passengers remain in and ride in the automobiles. Bus-train services are adapted to some special classes of service: airport access, commuter service, and possibly moderate-distance interregional travel. The short-haul auto-train is principally of value as a means of traversing a natural barrier, such as a mountain range or a body of water. Auto-trains may also have carrier cars of the bus type in their consist, as well as carrier cars for trucks. The auto-train and bus-train applications of dual mode offer potentials for competitive types of service for both long- and relatively short-haul trips. There is an obvious weight penalty per passenger when a road vehicle containing the passengers is carried on a special railroad car. But under certain conditions, especially those requiring the availability of the automobile at both ends of the rail link, these systems offer capacities greater than those possible with purely highway systems, and also higher speeds. The latter should offset loading delays. Bus-train operation similarly has the weight disadvantage, but provides a one-seat ride and can also take passengers to destinations not on rail lines. It may also permit passengers to be transported in a freight mode of rail operation. In each of these applications, the ultimate criterion is economic: the ability of dual mode to provide competitive service. In particular, dual-mode applications of this type may offer potentials for service in situations where it could not otherwise be provided.

ESTIMATING THE LABOR SAVINGS IN A DUAL-MODE TRANSIT SYSTEM

Ernest Nussbaum, Mitre Corporation

Dual-mode transit systems will be less labor intensive than nonautomated bus operations because a large percentage of the average trip will be made on an automated guideway. The theoretical labor saving is given by the ratio (on-guideway travel time)/(total travel time), but the practical saving will be somewhat lower because of unavoidable inefficiencies of vehicle and driver scheduling. To determine the practical saving achievable, data from the 1971 Milwaukee County Dual-Mode Systems Study were used as input to computer programs to cut and schedule runs to produce driver schedules consistent with vehicle schedules and labor agreement requirements. A practical saving of 58 percent could be obtainable for a case in which the theoretical saving was 66 percent.