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Synchronizing Transit Schedules to Reduce Transfer Times and Operating Costs

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ISSUE

To increase the number of riders who take transit to downtowns, commuter rail “trunk” lines need good, synchronized “feeder” bus lines. Feeder buses collect riders from scattered locations and deliver them to the rail system. A challenge is to coordinate the two to avoid delays in making a transfer and crowding inside trains and buses. Integrated rail-bus services are essential to meeting the overall mobility needs of a diverse and growing state like California. Such improvements will more likely occur if not only customers but also the operators of feeder and trunk lines directly benefit.

RESEARCH FINDINGS



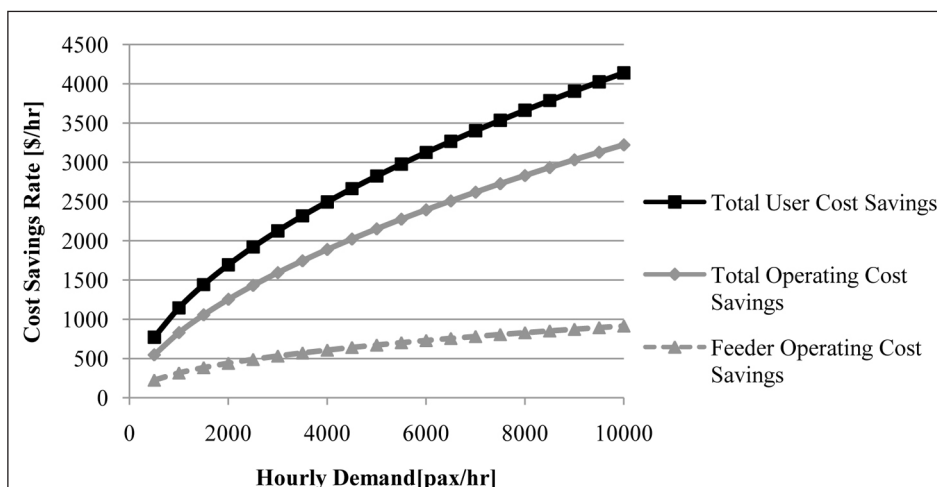
The Bayfair station in Alameda County, California, where AC Transit buses and Bay Area Rapid Transit (BART) trains share a transfer point.

Schedule adjustments are the easiest and least costly way to better coordinate feeder bus and commuter-rail services. We developed a model that identified optimal frequencies of feeder and trunk services that would be acceptable to both riders and operators in terms of transfer times and operating costs. Our model showed that running buses and trains on the same schedule can yield benefits to both users and agencies. If suburban buses run every 15 minutes in a region where commuter trains run every 20 minutes, many bus riders will waste time transferring, which studies show is the most dreaded part of a transit trip. Matching the bus and train schedules means that bus riders would have to wait slightly longer—2.5 minutes on average—to catch a bus, but their transfer time would drop to zero. Also, bus operators would save money since fewer vehicles would be needed.

Even if commuter trains ran more frequently than buses—every 10 minutes, for example—the feeder bus operator could still benefit from matching the trunk line’s frequency. The higher cost of having to operate more

buses could be reduced, in part, by increasing the spacing between feeder bus routes. While time spent reaching bus stops would increase for some, this could be more than offset by less time spent transferring from bus to rail.

The biggest benefits from coordinated services would occur when both rail and bus operators adjusted their schedules to match each other. For example, if the commuter rail and feeder bus operators agree to run vehicles every 25 minutes on synchronized schedules, users would experience no wait for a transfer, and both operators would enjoy lower operating costs.



The graph at left shows the hourly dollar amounts that riders and transit can save by synchronizing “trunk line” and “feeder” bus services when costs (e.g., value of time, operating expenses per mile) are relatively high.

RECOMMENDATION

Local bus operators can reduce costs and better serve their customers by matching service frequencies to those of the regional trunk lines that pass through their jurisdictions. For an entire region, trunk line and local bus operators should coordinate their schedules and the carrying capacities of their fleets. Metropolitan Planning Organizations (MPOs) are in a position to encourage this through their purse-string powers and ability to provide financial incentives. For future investments, facilities should be designed to allow quick and efficient transfers not just between the same types of vehicles (e.g., cross-platform transfers for rail systems), but also between different types of vehicles across different systems (e.g. small feeder buses and commuter rail lines).

Before implementing these changes, several issues should be considered. One, additional costs will likely be incurred for technologies that improve scheduling and for upgrading stations. Also, improved bus-rail coordination can lengthen headways, thus reducing the frequency of services. Additionally, not all local feeder bus riders are destined for trunk line stops. Thus, the benefits of coordination should be weighed against the additional waiting times experienced by those riders.

