

## ABSTRACT

The growing inefficiencies of the public transport systems in many Indian cities are gradually increasing the transport gap between these modes and the private automobiles, in terms of comfort, convenience and temporal reliability. Contract carrier buses are recently filling up this transport gap by providing reliable and comfortable service to the urbanites during their work-trips.

In this research an attempt is made to study the present contract carrier systems operating in Calcutta so as to identify the quality and quantity of the service and the class of users. Contract carriers provide non-stop bus service from origin to destination for a given set of passengers who travel seated every working day by making contractual agreement with the operators on the basis of monthly payment. The potential demand for contract carrier service is not effectively met due to the prevailing regulatory constraints. As a result this service is provided by the private operators using old buses in a haphazard and disorganised manner.

An enquiry through a self-administered questionnaire survey reveals that contract carriers provide specialised service to a specific class of users belonging to a distinct income group during their work-trips. The exclusive service provided by contract carriers results in higher fare compared to that of conventional public transport system. Since fare sensitivity of Indian urbanites in general is high, the

patronage of the mode greatly depends on the fare structure which is dictated by the cost of providing the service along with proper routing and scheduling of the buses. The data obtained from the secondary sources have been used to establish the relationship between family income of the urbanites and their expenditure on conveyance.

A critical review of literature has been carried out to find out the methodologies available for solving routing and scheduling problems in general and to determine their applicabilities to the present problem of contract carrier operation. Literature survey has also been conducted on pricing policies for bus transport, impact of subsidy and on the effect of fare change on ridership and revenue. So far, no study seems to have been conducted on fare-responsive routing and scheduling of vehicles which is the contention of this research. However, fare-sensitivity of public transport users have been widely recognized in the literature. Thus there is a need to develop an appropriate model for the contract carrier operation.

The elasticity of ridership with fare structure is the basic premise on which the model for fare-responsive routing and scheduling of contract carriers has been formulated. It has been established in this research that a simple recursive process with a generalised model having a minimum-cost objective can not only decide the contract carrier

routes and schedules but also its patronage. The demand for contract carriers being endogenous in the interactive model relieves the burden of frequently estimating the demands separately with changing socio-economic characteristics of the urbanites over space and time. The model has been tested using a sample problem and has also been applied to the city of Calcutta with alternative plans to obtain optimal feasible results for contract carrier operation. This service is complementary to the conventional public transport system as it reduces the peak hour demand of the latter. It can also attract some of the commuters using personalised modes thereby reducing congestion and energy problems.

The studies on contract carriers made in this research alongwith the areas recommended for further research, are expected to give new direction in the field of transportation planning in the developing countries where the ownership of automobile is low and will continue to remain low in the foreseeable future.