Abstract

Parking demand in India, being derived of automobile travel has increased significantly in the recent years. In the coming years automobile travel demand is expected to rise significantly, leading to rise in automobile parking demand. A major portion of the automobile ownership in India is concentrated in the cities. Most of the cities in India lack adequate off-street parking facilities, and therefore, on-street parking lanes are extensively used. On-street parking occupies a lane on either one or both sides of the carriageway.

In major Indian cities, the rise in vehicular traffic has almost exhausted the capacity of the urban arterials. Capacity improvement by lane addition is limited in the urban core areas due to unavailability of abutting land, vertical expansion is also expensive and often fails to accomplish the purpose entirely. There is a general consensus among planners that, on busy urban arterials on-street parking should be eliminated and the additional lane to be utilized for vehicular movement.

Intervention regarding on-street parking can be of three types - a) elimination of on-street parking, b) introduction of parking curfew hours, i.e. disallowing on-street parking during specific hours, and c) retaining on-street parking with collection of appropriate parking fee.

In this study, a methodology for rationalizing the choice of appropriate intervention regarding on-street parking on a particular road link has been developed. A methodology is also suggested for determining the on-street parking fee with adequate attention to the externalities.

The rationale of cost-benefit analysis is adopted for the choice of appropriate interventions. The social cost of on-street parking is assessed from the loss of social welfare due to loss of user time due to traffic delays along that particular link. The social benefit of on-street parking is estimated from the willingness-to-pay by the users of the on-street parking facility. If the social benefit accrued by the community is found to be more than the social cost inflicted, there will be potential pareto improvement in retaining on-street parking on that link. Actual pareto improvement takes place when the revenue collected exceeds the social cost incurred.

The marginal cost pricing approach is adopted to arrive at an optimum on-street parking fee. The optimum parking fee is the fee for which the net social benefit is maximized.

As a corrective measure to the distributional ill-effects in the cost-benefit analysis as well as in the marginal pricing approach, the consumer surplus to the users of the on-street parking

facility may be valued less than the social cost inflicted on the community or the revenue collected from parking fees.

The methodology is operationalized in the city of Kolkata by choosing three selected road links with on-street parking facility. They are Surya Sen Street, Camac Street and Prince Anwar Shah Street. The required data are collected through traffic surveys and willingness-to-pay surveys carried out on the selected road links. Monetary values of the travel time savings for each mode are also assessed.

On Surya Sen Street and Camac Street, at present there will be only potential pareto improvements in restricting on-street parking during the peak hour of traffic. But, on Prince Anwar Shah Street there will be potential pareto improvement in restricting on-street parking. The suggested interventions changes if the social valuation of the consumer surplus is less than the personal valuation. On Camac Street, if 1 Rupee of consumer surplus is valued less than 0.74 Rupee of revenue collected or social cost inflicted, then there will be potential pareto improvement in restricting on-street parking. Similarly, if the on-street parking fee specified by KMC is charged in Prince Anwar Shah Street and if the society values 1 Rupee of consumer surplus less than 0.29 Rupee of revenue collected or social cost inflicted by on-street parking, there will be potential pareto improvement in restricting on-street parking on that particular hour.

Optimum on-street parking fees in the selected road links are higher than the existing parking fees charged. This further increase if the social valuation of the consumer surplus is less than the personal valuation.

Automobile usage in the congested urban core areas can be discouraged by valuing the consumer surplus to the users of the on-street parking facility less than the social cost incurred or the revenue collected from parking fees. The stronger the motive to discourage automobile usage the lesser is the social valuation of user's consumer surplus of the on-street parking facility in comparison to the social cost incurred or the revenue collected.

In this illustrative study, due attention has been given so that the focus of the study is not lost in the mathematical foliage or complexity of assessment techniques.

Key words

On-street parking, shock wave, on-street parking related disturbances, travel time savings, social cost, social benefit, consumer surplus, potential pareto improvement, actual pareto improvement, distributional ill-effects, marginal cost pricing.