

ABSTRACT

In developing countries the flow of traffic is heterogeneous in nature and there is no lane discipline so it is very difficult to study the traffic flow parameters. Congestion results in immense delays, fuel consumption economic loss and environmental issues. In the field of transportation, the traffic flow modelling and management is very important. There are number of mathematical models that have been developed and these models are applicable in many countries where lane behaviour is present. In developing country, the lane behaviour is scarcely observed. The lane discipline is also not observed by the drivers which results in varying number of traffic lanes on a road. Therefore, most of the existing traffic flow models/ simulation packages developed for disciplined traffic streams cannot be applied to model traffic streams without lane-discipline. Extensive field data is collected from a selected arterial in Karachi for development of fundamental traffic flow diagram. The piecewise linear flow-density relation is developed by optimally estimating the breakpoints. Results show that quadrilateral and pentagonal shaped fundamental diagrams fit better with the collected data in comparison with triangular shaped fundamental diagram. For real time traffic state estimation, planning, design and operation of traffic entities, dynamic decisions are made and for these decisions traffic models are used. CTM (CELL TRANSMISSION MODEL) is used worldwide in different packages for the simulation and optimization purpose of macroscopic traffic flow modelling.

This research calibrates the CTM for non-lane macroscopic heterogeneous traffic flow, observed in Pakistan and different developing countries. There is no such package that is used for the non-lane-disciplined traffic and is not calibrated according to the local traffic conditions.

The flow density diagram extensive data is collected from the University Road Karachi, Pakistan, and the calibrated model of CTM is validated by different roads and it performed very reasonably.