ESTIMATION OF PCUs FOR DIFFERENT TYPES OF VEHICLES ON URBAN ROADS: A CASE STUDY OF VADODARA CITY

M Tech Dissertation
Submitted in
partial fulfillment of the requirements
for the degree of

MASTERS OF TECHNOLOGY

in

Civil-Transportation Engineering

by

Parth Sanjaykumar Thakkar

160303211021

Under the supervision of

Prof. Siddharth Gupte
Prof. Jayesh Juremalani

May 2018

DEPARTMENT OF CIVIL ENGINEERING

PARUL INSTITUTE OF ENGINEERING & TECHNOLOGY

FACULTY OF ENGINEERING & TECHNOLOGY

PARUL UNIVERSITY

P.O. Limda – 391 760, GUJARAT, INDIA

ABSTRACT

The second edition of the Highway Capacity Manual of the United States (HCM 1965) introduced the concept of the passenger car unit (PCU) as a measure to convert all types of vehicles in a traffic stream into an equivalent number of passenger cars. Indian Road Congress (IRC):- 106-1990 "Guidelines for capacity of urban roads in plain areas" delivers Passenger car unit factors for different classes of vehicles and capacity of urban arterial roads. The PCU factors suggested by IRC-106 have been derived considering the effect of lane width, percent grade, heavy vehicles etc. These guidelines are very old, and vehicles and construction technology of road have undergone considerable changes during the last two decades. This study presents a concept of dynamic passenger car unit suitable for the mixed traffic flow and shows that the PCU values for various types of vehicles are not a static factor as generally assumed. Data are collected on two different urban roads of Vadodara city having varying carriageway width, to determine PCU factors of different types of vehicles using Chandra's method, Homogenization coefficient method and modified density method. so that comparisons of different methods for estimation of PCU factors are possible to each other and PCU factors delivered by Indian road congress (IRC-106:1990). The result shows that PCU value for a vehicle type varies with traffic volume and composition on the road and the carriageway width of the road being used. Flow - density relation is developed based on the 5-minute data extracted from the field survey. Using flow - density relationship, capacity of roads are estimated using static as well as Dynamic PCU values. The result shows that the capacity increase with the increase in carriageway width.