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FACTORS CONTRIBUTING TO TRAFFIC FLOW CONGESTION IN HETEROGENOUS TRAFFIC CONDITIONS

John Mahona[1], Cuthbert Mhilu[2], Joseph Kihedu[3], Hannibal Bwire[4]

[1] *Department of Transport Engineering and Technology, National Institute of Transport, P.O.BOX 705, Dar es Salaam, Tanzania*

[2, 3] *Department of Mechanical Engineering and Industrial, Collège of Engineering and Technology, University of Dar es Salaam, P.O.BOX 35131 Tanzania*

[4] *Department of Transportation and Geotechnical Engineering, Collège of Engineering and Technology, University of Dar es Salaam , P.O.BOX 35131 Tanzania*

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Abstract: Most of the urban roadways do experience traffic flow congestion at various road sections called critical traffic points, which is partly contributed by the presence of various factors on the roadways. A number of studies have used travel time indices to determine congested links of the road networks. However, the travel time-delay based indices have found less application in the identification and quantification of congestion levels in the road networks. As a result, a limited number of studies have examined the factors contributing to the propagation of congestions at various road sections using the travel time-delay indices. This paper aims to identify factors contributing to propagation of traffic congestions at frequently congested traffic critical points and to estimate their influence on the entire road network using travel time-delay data. Travel time-delay data were collected by using test moving cars. The results indicate that low travel-delay transition index below 0.70 signify the jam and crowded traffic flow condition, while higher values greater than 0.70 indicate free flow phenomena. On the other hand, high congestion index values indicate jam and crowded flow conditions whereas the low values below 0.5 signify free flow conditions. Further, the results showed that low transition index and high congestion index values were associated with roadway design factors such as T-joints, cross joints, bus stops, humps and traffic lights, which are considered to be static bottlenecks which impedes the vehicle flow.

Keywords: congestion, travel time-delay, transition index, congestion index, Critical Traffic Points.

1. Introduction

Traffic congestion has become a serious problem in many cities of developing countries as most of their Central Business Districts (CBD) are located in the city centers (Chauhan *et al.,* 2017; Kumar and Sivanandan, 2017). Motorized traffic movements in major cities of developing countries exhibit heterogeneous traffic conditions. Congestion around urban roadway stretches are found at the salient locations called the critical traffic points (CTPs) where congestion is settled (Chauhan *et al.,* 2017).

Measures of congestion are intended to evaluate the performance of the road network

[1] Corresponding author: john.mahona@nit.ac.com