



Technical and Economic Evaluation of Pinavia Interchange in Comparison with Roundabout Intersection by AIMSUN

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Abstract

Interchanges that are investigated in this research are roundabout interchange and Pinavia interchange that are simulated in AIMSUN software using traffic data. The parameters that are considered for each interchange are traffic volume, pollutant emissions, fuel consumption, travel time, delay time, construction cost, repair and maintenance cost, travel time cost, fuel consumption cost and safety, so that in technical evaluation traffic volume, pollutant emissions, fuel consumption, travel time, delay time are compared by using two independent sample t – test that are used for comparing of two group of data and It is assumed that the variances are equal. Then In economic evaluation construction cost, repair and maintenance cost, travel time cost, fuel consumption cost and safety are converted into cost by using axis produce way that based on this supposal that storage in exchange for an hour of travel time, increase an hour of production opportunities and construction cost, repair and maintenance cost calculated by executive plans and Related Regulations and finally each parameter is weighted by AHP and obtain the universal (total) cost. Finally due to the total cost of the resulting it can be seen that for twenty-year period Pinavia interchange in compare with roundabout interchange has 49% more efficient.

Keywords: Pinavia Interchange; Roundabout Intersection; Square; Technical and Economic Evaluation.

1. Introduction

With the increase in population and Consequently, Growing travel demand the transportation directors encountered with safe and efficient transport of human and goods due to budget and land acquisition limitations. Especially, in highways and crowded ways (roads) located at urban and suburban areas that there is no way to capacity increasing. Crowded cause increasing travel time, and reduced safety and also unbearable conditions for driver. In 2004, the study performed for intersections of Louisiana in America by Brian velshon in order to find ways to connect better with intersections design and safety. In this research indicated that four main elements of human factors, traffic considerations, physical elements and economic factors as cost, profit, and energy consumption considered to intersections design. Falhorty (1990) performed research about intersections design in London; he found that the required traffic data for intersection design included peak hour transit volume, rotator movements, public transportation plan, history of accidents and parking places. Afandizadeh and his colleges (2008) results that modification of intersection geometry design affected directly on accidents number and indirectly on speed, traffic volume and queue length but in recent years, converting level crossings to interchanges as a promising and undeniable solution considered to intersections effective management due to current substructures that use of this conversion provided potential sources such as safety increasing, travel time improvement, environmental pollutants reduction, saving capital long-time, reduced fuel consumption, and reduced accidents and fatalities [1].

2. New type Road Interchange – Pinavia

Pinavia interchange of four roads (Figure 1) is a two-level intersection with high capacity and no intersecting traffic flows. Due to a unique placement (braiding) of roadways the traffic flows pass each other via four small

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