



Study of a Highly Effective and Affordable Highway Interchange - ITL Interchange

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Abstract

In this paper we present a new solution for the highway interchange, which represents the best compromise between the traffic capacity, the land area used and construction cost. The difference between the known and the new design solution is in the implementation of the opposite directional ramps which are widely separated in the area of the interchange. In the middle, between the directional ramps, some space is created for the left directional ramps. Interchange should be used for four-way highway interchanges or other heavy traffic roads junction in order to increase the capacity and traffic safety at the crossing point. It has no conflict points. ITL Interchange left directional ramps is much shorter than all other known solutions for interchanges. The interchange is built in two levels. These two facts significantly lower the cost of construction. The study compares different types of interchanges. We made a geometric comparison and performance measures. In geometric comparison, the greatest advantages of the ITL interchange are the shortest overall roadway length and the shortest overpasses length. Therefore, such an interchange is advantageous in terms of construction and maintenance costs. When measuring performance, ITL Interchange achieves the best results regardless of the number of vehicles.

Keywords: Highway; ITL Interchange; Left Directional Ramp; Traffic Capacity.

1. Introduction

Modern highway interchanges and other heavy traffic roads interchanges have to ensure the highest possible traffic safety and capacity. As with intersections, left-turning traffic movements are the most challenging to accommodate at interchanges. At interchanges between freeways, or other full-access control facilities, a directional interchange offers the highest level of service by directly serving all movements with minimal or no reductions in speed.

1.1. Types of Interchanges

The most common interchange type is the diamond interchange, named for its diamond shape when viewed from above [4]. The diamond interchange is common because of its economical design and construction, but is limited in capacity. A cloverleaf interchange is typically a two-level, four-way interchange where all turns across opposing traffic are handled by non-directional loop ramps. Assuming right-handed traffic, to go left vehicles first cross over or under the target route, then bear right onto a sharply curved ramp that turns roughly 270 degrees, merging onto the target route from the right, and crossing the route just departed. These loop ramps produce the namesake cloverleaf

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