

Diverging Diamond Interchange/Double Crossover Intersection

Overview

The Diverging Diamond Interchange (DDI), is a recognized design concept to improve traffic flow and reduce congestion. The purpose of this design is to accommodate left-turning movements onto arterials and limited-access highways while eliminating the need for left-turn bays and signal phases at the signalized ramp terminals. Figure 1 shows the typical movements that are accommodated in a DDI. The highway is connected to the arterial cross street by two on-ramps and two off-ramps in a manner similar to a conventional diamond interchange. However, on the cross street, the traffic moves to the left side of the roadway between the ramp terminals. This allows the vehicles on the cross street that need to turn left onto the ramps to continue to the on-ramps without conflicting with the opposing through traffic.

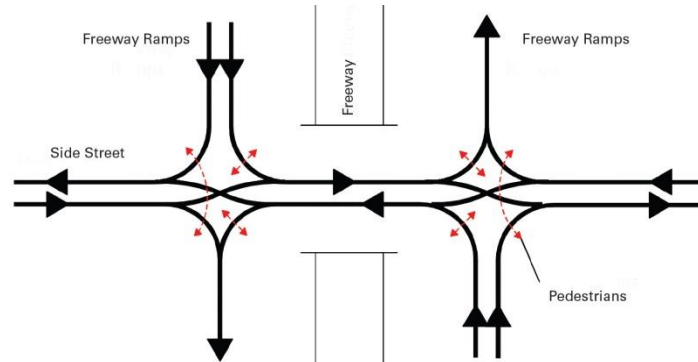


Figure 1 – Diverging Diamond Interchange Movements

The DDI design provides a safety benefit because it reduces the number of potential

conflict points through the elimination of potential crossing conflicts between vehicles turning left onto the freeway and opposing arterial traffic. Although traffic signals are used to separate conflicts between vehicles, and other roadway design features, such as signs and markings, are intended to reduce the probability of driver errors that may result in crashes, safety performance generally is better when the number of conflict points is minimized.

Besides the potential safety benefits of the DDI, the design also offers operational and cost benefits over alternatives at grade-separated interchanges. In locations where the DDI has been implemented, construction costs are approximately half as much as a conventional diamond interchange retrofit because the additional turn lanes typically required during an interchange improvement would require widening the overpassing bridge. Furthermore, traffic modeling suggests that a DDI operates at a much higher level of service and capacity.

Design Criteria

Because of the relatively new design of the DDI and DCX, specific design criteria has not been completely developed. Driver expectation is compromised with the counterintuitive direction of travel between the ramp terminals, and it may be necessary to introduce a greater skew at the crossover junctions and the application of proper signs and markings to avoid wrong-way travel. Early application of this design indicates that the turning radii at the crossover junctions to displace the movements should be approximately 300 feet. These suggested radii must be examined during geometric analyses to ensure the accommodation of the design vehicle.

Specifications:

There are no specifications devoted to the DDI or DCX. Standard specifications that apply to roadway construction are sufficient to govern these designs.

Implementation Plan:

There are eight DDIs under consideration in the State of Florida at time of this publication. The interchange of Interstate 75 at University Parkway in Sarasota County is currently under design as part of the I-75 corridor widening project. A [video presentation](#) produced by FDOT demonstrates the operation of that DDI. Seven more are being considered in preliminary engineering studies.

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