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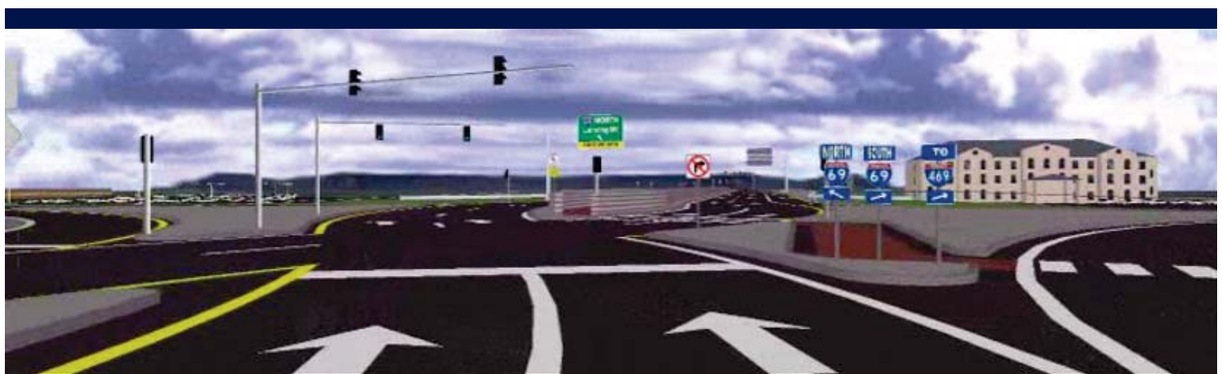


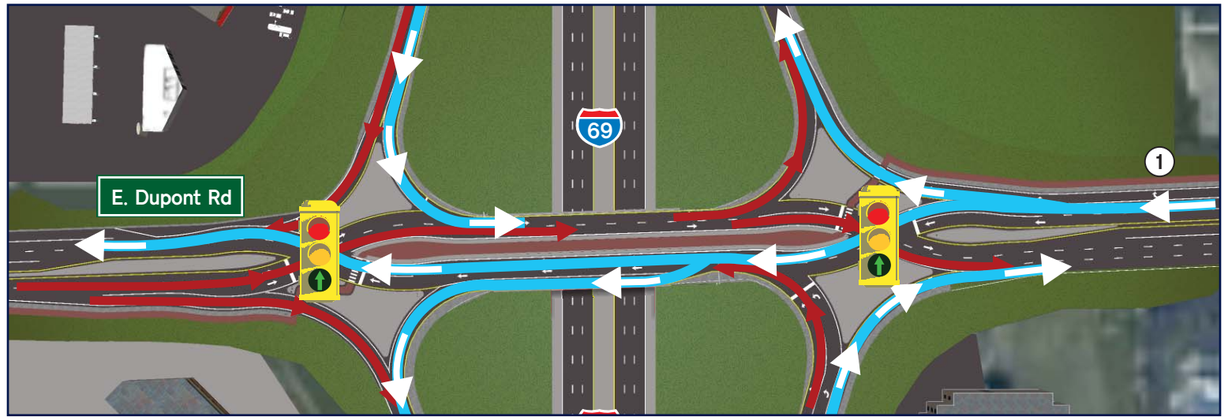
I-69 and SR 1/DuPont Road Diverging Diamond Interchange

An Educational Guide

Indiana
A State that Works

Diverging Diamond Interchange (DDI)

Diverging Diamond Interchanges are designed to be safer, more efficient and more cost effective than traditional diamond interchanges. DDI elements, such as ramps, traffic signals and medians can be found in most highway interchanges. The difference from a traditional interchange is how the DDI operates.



How it Works

The DDI accommodates high volumes of left turns at signalized intersections by eliminating the need for left-turn phase (green arrow) at the signals. On the crossroad (SR 1), traffic crosses over from the right side to the left side of the road between the ramps. Once on the left side of the road, vehicles can turn left at the ramp and enter the freeway without stopping and conflicting with through traffic.

Driver Guidance

The DDI design requires drivers to cross to the opposite side of the road for a limited distance, and then cross back to the traditional side. Several key design elements are utilized to help prevent driver error.

- Roadway geometry is used to control vehicle speed and direct the driver through the crossing intersections
- Barrier and/or glare screens block the view of opposing traffic and give the driver the feel of traveling on a one-way street
- Green arrows are used on the traffic signal heads instead of the traditional solid green light.

In a DDI simulation study conducted by FHWA, out of 1,041 participants, there were no participants observed driving the wrong direction at the crossovers or turning into an oncoming traffic lane.

[1]U.S. Department of Transportation Federal Highway Administration, TechBrief: Drivers' Evaluation of the Diverging Diamond Interchange http://www.tfhrc.gov/safety/pubs/07048/index.htm.

The DDI Advantage

The Federal Highway Administration (FHWA) advocates innovative intersection designs such as the DDI to promote safety, increase capacity, decrease congestion and minimize the cost of new infrastructure.[1] DDI advantages include:

Efficiency

Traffic congestion is reduced by eliminating the left-turn phase from the traffic signal cycle. This increases capacity and allows traffic to flow through the interchange faster.

Safety

Generally, reducing conflict points, where one vehicle path crosses another, reduces crashes. The DDI design reduces the number of conflict points by eliminating left turns that cross opposing traffic. DDIs have two crossing conflicts. Conventional diamond interchanges have four.

Cost Savings

Often the cost to construct a DDI is less than a traditional diamond interchange. A DDI typically needs fewer lanes to accommodate the same number of vehicles. Many times, the bridge will not need to be widened for traffic. This reduces construction time and public inconvenience.

Right-of-Way

Right-of-Way acquisition is usually not needed or is minimized due to the compact nature of the interchange.

DDI as the Right Solution

Traffic studies and models are used to determine if a DDI is the best interchange alternative.

I-69 Interchange Modification at SR 1/DuPont Road Allen County, Indiana

Project Overview

This interchange will be converted from a traditional diamond interchange to a Diverging Diamond Interchange. With this design, traffic passing through the interchange on SR 1/ DuPont Road will cross over to the opposite side of the roadway between the two ramps, allowing efficient movements to and from I-69. The crossover movements are safely handled by traffic signals at the intersections.

Construction Phasing

Typically, a DDI can be built half at a time, i.e. eastbound construction, then westbound construction. Traffic typically can be maintained during construction, but as of this publication, all ten of the DDI's built in the United States have utilized a weekend closure to switch the traffic pattern from a conventional diamond to a DDI.

The SR 1/DuPont Road Diverging Diamond will utilize a similar type of construction phasing. While lane closures may occur, the roadway will continue to provide mobility and access throughout construction with the exception of a weekend closure.

The Indiana Department of Transportation (INDOT) is coordinating with the Hospitals, City of Fort Wayne and Allen County.

Are DDIs Pedestrian Friendly?

It is important to provide safe crossings for pedestrians. The pedestrian path can influence the number of signals and the capacity of the interchange. This project will navigate the pedestrians through the interchange via a barrier separated median.

To view the animation of this DDI, please visit the project website.

http://www.in.gov/indot/2894.htm

Existing I-69 at SR 1/DuPont Road Interchange

Diverging Diamond Interchange Rendering with Pedestrian Trail Shown in Red

Pedestrian Trail in the Middle of the Cross Route