



Interstate 44 and Missouri Route 13, Springfield, MO

DIVERGING DIAMOND INTERCHANGE

THE PROBLEM

The original, conventional diamond interchange averaged more than 100 crashes a year from 2004 to 2008. In addition, traffic in the left turn lanes often caused 1 to 3 mile back ups in the through lanes.

THE SOLUTION

Installation of the Nation's first Diverging Diamond Interchange with widespread outreach to gain public acceptance by highlighting the mobility and safety enhancements inherent in the design.

THE OUTCOME

- Total crashes declined by 24 percent, from 91 in 2008 to 56 in 2010.
- Minor injury crashes decreased by 72 percent from 2008 to 2010.
- Significantly reduced interchange related congestion along the crossroad.
- Nearly 95 percent of Springfield residents agreed the DDI resulted in a less congested roadway.

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INTERCHANGE LOCATION

37°15'01.7"N 93°18'38.4"W

Background

In June of 2009, the Nation's first Diverging Diamond Interchange, or DDI, opened in Greene County, Missouri. Located in Springfield at the Interstate 44 and Missouri 13 interchange, the DDI has two travel lanes in both directions and averages approximately 34,000 vehicles per day.¹

Challenges

The previous conventional diamond interchange at this location averaged over 100 crashes a year from 2004-2008,² so safety was a primary concern. Another important concern was delay. The spacing and location of the adjacent signals along Missouri 13 meant that, during peak traffic, the signalized left turns onto the freeway would frequently back up into the through lanes. On a normal day, backups could reach nearly a mile. During events at the nearby fairground, backups could be as long as 3 miles, creating lengthy delays and contributing to unsafe conditions.³ Furthermore, because this DDI was the first of its kind in the United States, public acceptance was also a factor. Missouri DOT (MoDOT) had to convince citizens that the facility was going to provide real improvements by reducing congestion and improving safety.



Computer Simulation of the Proposed Interchange
Source: DDI Case Study Video FHWA-SA-14-047

Approach

To address public concerns about safety and delay, the agency used a simulation tool and projected traffic volumes over the next 25 years to model the new interchange. MoDOT then created a video explaining how the DDI could reduce delay by 10 to 35 percent through to 2035 and improve safety by eliminating just over 50 percent of vehicle conflict points.⁴

Cost-effectiveness also was an important factor in MoDOT's decision to build the DDI. The agency chose the DDI design because it didn't require a new bridge, could be completed in 6 months, and, at \$3.2 million, was one-third the cost of the next best alternative.⁵

Results

In a post installation MoDOT driver survey 95 percent of Springfield residents agreed the DDI resulted in a less congested roadway.⁶ Less congestion also meant fewer crashes. Total crashes declined 46 percent when comparing the average across the 5-year baseline to the one-year post-construction period; minor injury crashes decreased 72 percent.⁷ Pedestrians and bicyclists also have benefitted from the DDI; they now can use an illuminated and protected median walkway to cross the interchange.

¹ Missouri DOT, *Diverging Diamond Interchange Performance Evaluation (I-44 and Route 13)*, OR11-012 (2011). Available at: <https://ntrlrepository.blob.core.windows.net/lib/36000/36000/36038/or11012.pdf>

² Missouri DOT, OR11-012 (2011).

³ Interview with Don Saiko, Springfield, MO, November 1, 2013.

⁴ Missouri DOT, OR11-012 (2011).

⁵ American Council of Engineering Companies, "Diverging Diamond Interchange," presentation, February 2011. Available at: <https://www.acecmi.org/pdf/DDI.pdf>

⁶ Missouri DOT, *Diverging Diamond Interchange - Results from the Right Transportation Solution Survey*, January 2010. Available at: <https://rosap.nrl.bts.gov/view/dot/17862>

⁷ Missouri DOT, OR11-012 (2011).