



## SAFETY DATA CASE STUDIES



Visit: <https://highways.dot.gov/research/safety/interactive-highway-safety-design-model/interactive-highway-safety-design-model-ihsdm-overview>



U.S. Department of Transportation  
Federal Highway Administration

**Turner-Fairbank**  
Highway Research Center

FHWA-HRT-22-030  
HRDS-10/1-22(200)E  
<https://doi.org/10.21949/1521722>

Office of Safety and Operation  
Research and Development

Turner-Fairbank Highway  
Research Center  
6300 Georgetown Pike  
McLean, VA 22101-2296

<https://highways.dot.gov/research/turner-fairbank-highway-research-center/offices/office-safety-research-development>

# Interactive Highway Safety Design Model (IHSDM)-Related “Safety Data Case Studies”

The Federal Highway Administration (FHWA) Roadway Safety Data Program is working with State and local agencies to develop case studies around roadway safety data collection, management, and analysis issues. These case studies help illuminate both the challenges that agencies encounter on data issues and the solutions they are implementing to address those challenges ([https://safety.fhwa.dot.gov/rsdp/safety\\_casestudies.aspx#hsm](https://safety.fhwa.dot.gov/rsdp/safety_casestudies.aspx#hsm)).

## Projects that used IHSDM to apply Highway Safety Manual Part C predictive methods:

State/ Agency	Year	Case Study Title, Link and Description
MI	2021	<b>Michigan’s US 31 at I-94 Interchange Alternatives Analysis (FHWA-SA-21-020):</b> <a href="https://safety.fhwa.dot.gov/rsdp/downloads/MDOT%20I94%20US31_Case%20Study_Final.pdf">https://safety.fhwa.dot.gov/rsdp/downloads/MDOT%20I94%20US31_Case%20Study_Final.pdf</a> Michigan Department of Transportation (MDOT) used an iterative approach to project development that used IHSDM to identify a preferred design alternative based on a broad suite of traffic, safety, and cost considerations. The strategic application of IHSDM enabled MDOT to assess different design alternatives and project assumptions to make data-driven decisions for the proposed I-94 and US 31 interchange and surrounding network.
WI	2021	<b>WIS 75 Intersection Screening &amp; Project Development Process (FHWA-SA-21-074):</b> <a href="https://safety.fhwa.dot.gov/rsdp/downloads/WisDOT%20Intersection%20Analysis_Case%20Study_Final.pdf">https://safety.fhwa.dot.gov/rsdp/downloads/WisDOT%20Intersection%20Analysis_Case%20Study_Final.pdf</a> Wisconsin DOT (WisDOT) applied IHSDM to evaluate potential alternatives and assess predicted crashes. With predicted outcomes based on several alternatives, WisDOT used IHSDM’s Economic Analyses Tool to identify the most cost-effective alternative to improve safety at the candidate intersection.
FHWA-WFLHD	2021	<b>FHWA Western Federal Lands Highway Division: Yale-Kilgore Road Safety and Traffic Assessment (FHWA-SA-21-073):</b> <a href="https://safety.fhwa.dot.gov/rsdp/downloads/FHWA-SA-21-073_WFLHD_yale_kilgore_rd_case_study.pdf">https://safety.fhwa.dot.gov/rsdp/downloads/FHWA-SA-21-073_WFLHD_yale_kilgore_rd_case_study.pdf</a> Western Federal Lands Highway Division (WFLHD) used IHSDM as part of the design process for the rehabilitation of the Yale-Kilgore Road. The WFLHD team used IHSDM to conduct the analysis tradeoffs necessary to make informed design and safety countermeasure decisions.
IN	2021	<b>Indiana’s State Road 37 Improvement Project (FHWA-SA-21-019):</b> <a href="https://safety.fhwa.dot.gov/rsdp/downloads/FHWA-SA-21-019_INDOTSR37_Case_Study.pdf">https://safety.fhwa.dot.gov/rsdp/downloads/FHWA-SA-21-019_INDOTSR37_Case_Study.pdf</a> Indiana DOT separately analyzed individual facility types for the no-build and proposed designs using IHSDM, including mainline segments, intersections, entrance and exit ramps, ramp terminals, and crossing street segments.
LA	2014	<b>Roadway Safety Data and Analysis Case Study: Safety Analysis in Project Development in Louisiana:</b> <a href="https://safety.fhwa.dot.gov/rsdp/case_studies_lacs.aspx">https://safety.fhwa.dot.gov/rsdp/case_studies_lacs.aspx</a> The Louisiana DOT and Development used safety data and safety analysis techniques (including IHSDM) in a broad range of project development practices.
ID	2010	<b>Highway Safety Manual Case Study 1: Using Predictive Methods for a Corridor Study in Idaho:</b> <a href="https://safety.fhwa.dot.gov/hsm/casestudies/id_cstd.cfm">https://safety.fhwa.dot.gov/hsm/casestudies/id_cstd.cfm</a> The researchers used IHSDM to identify existing geometric deficiencies, specific locations requiring further evaluation or locations requiring possible design improvements, and potential safety issues on existing Idaho SH-8 corridor conditions.



## IHSDM 2021 (Ver.17.0.0) Capabilities

Facility Type		Number of Lanes	Traffic Control Type	Policy Review Module (PRM)	Crash Prediction Module (CPM)	Design Consistency Module (DCM)	Traffic Analysis Module (TAM)	Driver Vehicle Module (DVM)	Calibration Tool	Economic Analysis (EA) Tool	Notes
Rural Two-lane Highways	Segments	2	N/A	X	X	X	X	X	X	X	
	3-leg Intersections	N/A	Stop (minor road), Stop (major road turns), Signal, Roundabout		X				X	X	
	4-leg Intersections		Stop (minor road), Stop (All-way), Signal, Roundabout		X				X	X	
Rural Multi-lane Highways	Segments	4	N/A	X	X				X	X	
	3-leg Intersections	N/A	Stop (minor road), Signal, Roundabout		X				X	X	
	4-leg Intersections		Stop (minor road), Signal, Roundabout		X				X	X	
Urban/Suburban Arterials	Segments	2-8	N/A		X				X	X	Including one-way arterials (2-4 lanes).
	3-leg Intersections	N/A	Stop (minor road), Stop (major road turns), Stop (All-way), Signal, Roundabout		X				X	X	Including "high-speed" (i.e., posted speed >= 50 mph) stop (minor road) and signalized intersections.
	4-leg Intersections		Stop (minor road), Stop (All-way), Signal, Roundabout		X				X	X	
	5-leg Intersections		Signal		X				X	X	
Freeways	Segments	4 - 8 (Rural), 4 - 10 (Urban & Suburban)	N/A		X				X	X	
	Speed-Change Lanes				X				X	X	
Ramps	Ramps & C-D Roads	1 (Rural), 1-2 (Urban & Suburban)			X				X	X	
Ramp Terminals	3-leg Ramp Terminals	N/A	Stop (minor road), Stop (All-way), Signal		X				X	X	Ramp terminal types: A2, B2, D3en, D3eX.
	4-leg Ramp Terminals		Stop (minor road), Stop (All-way), Signal		X				X	X	Ramp terminal types: A4, B4, D4.
	SPDI		Signal			X				X	X
	TDI				X				X	X	