



Using tools to analyze crash and roadway data to predict the safety impacts of highway projects allows agencies to target investments with more confidence and reduce severe crashes on the roadways.

Traditional crash and roadway analysis methods mostly rely on subjective or limited quantitative measures of safety performance. This makes it difficult to calculate safety impacts alongside other criteria when planning projects. Data-driven safety analysis (DDSA) employs newer, evidence-based models that provide state and local agencies with the means to quantify safety impacts similar to the way they do other impacts such as environmental effects, traffic operations and pavement life.

The analyses provide scientifically sound, data-driven approaches to identifying high-risk roadway features and executing the most beneficial projects with limited resources to achieve fewer fatal and serious injury crashes.



Through round four of Every Day Counts (EDC-4), this effort focuses on both predictive and systemic analyses—two types of data-driven approaches that state and local agencies can implement individually or in combination.

Predictive analysis helps identify roadway sites with the greatest potential for improvement and quantify the expected safety performance of different project alternatives.

Predictive approaches combine crash, roadway inventory and traffic volume data to provide more reliable estimates of an existing or proposed roadway's expected safety performance. The results inform roadway safety management and project development decision-making. The data not only help agencies make better decisions, but also inform the public as to what safety benefits they can expect from their investment.

Systemic analysis uses crash and roadway data in combination to identify high-risk roadway features that correlate with particular crash types.

Agencies have traditionally relied on crash history data to identify "hot spots," or sites with high crash frequency. However, severe crashes are widely dispersed over road networks, and their location and frequency fluctuate over time. Systemic analysis identifies locations that are at risk for



DDSA provides more reliable analysis than previous methods through the application of predictive and systemic tools for analyzing crash and roadway data.



severe crashes, even if there is not a high crash frequency. Practitioners can then apply low-cost countermeasures to those locations. The benefit is wider, but more targeted, safety investment.

STATE OF THE PRACTICE

To date, 75 percent of states are applying DDSA in one or more of their project development processes.

This effort is a result of collaborative work by AASHTO, FHWA, the Transportation Research Board and industry over the past two decades. DDSA was originally promoted under the third round of EDC (EDC-3), and it continues under the fourth round (EDC-4) with an additional focus on broadening use among local agencies.

BENEFITS

- ▶ **Informed Decision-Making.** Predictive and systemic analyses improve on traditional decision-making approaches that rely on subjective and limited quantitative measures of safety performance.
- ▶ **Targeted Investment.** Agencies use the analyses to optimize funding by selecting the most appropriate roadway features and project sites.
- ▶ **Improved Safety.** DDSA offers a scientifically sound, data-driven approach to allocating resources that results in fewer fatal and serious injury crashes on the Nation's roadways.

DDSA TOOLBOX*

Supporting information, informational videos and more can be found at the DDSA webpage:

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/ddsa.cfm

Predictive Analysis

AASHTO Highway Safety Manual

<http://www.highwaysafetymanual.org>

AASHTOWare Safety Analyst software

<http://www.safetyanalyst.org>

Agile Assets Safety Analyst software

<https://www.agileassets.com/products/safety-analyst/>

Crash Modification Factors Clearinghouse

<http://www.cmfclearinghouse.org>

FHWA Interactive Highway Safety Design Model

<http://www.fhwa.dot.gov/research/tfhrc/projects/safety/comprehensive/ihsdm/index.cfm>

SPF Tool <http://spftool.com/>

Spreadsheet tools, including the Enhanced Interchange Safety Analysis Tool (ISATe)

<http://www.highwaysafetymanual.org/Pages/Tools.aspx>

Systemic Analysis

FHWA Systemic Safety Project Selection Tool

<http://safety.fhwa.dot.gov/systemic/fhwasa13019>

Roadway Safety Foundation United States Road Assessment Program (usRAP) software

<http://www.usrap.org/>

*FHWA cites specific tools as examples, not as an endorsement of these tools over others.

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Every Day Counts (EDC), a State-based initiative of FHWA's Center for Accelerating Innovation, works with State, local and private sector partners to encourage the adoption of proven technologies and innovations aimed at shortening and enhancing project delivery.

