



Data-Driven Safety Analysis

PROJECT CASE STUDY

Louisiana Integrates Quantified Safety Performance into Design Decision on New Highway

The Louisiana Department of Transportation and Development (LADOTD) is constructing a high-speed, four-lane, rural arterial highway between Interstate 12 and State Route 21 in Bush, Louisiana, to address regional transportation mobility needs and potentially stimulate economic growth and activity in Washington and St. Tammany Parishes. This project will replace an existing two-lane, undivided highway with numerous access points in order to alleviate congestion, shorten travel time and improve safety.

LADOTD applied predictive safety analysis to quantify safety performance when comparing proposed alternatives (including the No Build alternative) during the project's engineering and design phase.

Safety Tools and Best Practices Used

LADOTD applied the Federal Highway Administration (FHWA) Interactive Highway Safety Design Model (IHSDM) crash prediction module. They used the module, which implements the American Association of State Highway and Transportation Officials (AASHTO) Highway Safety Manual (HSM) predictive methods, to predict the number of crashes for each alternative in the design year of 2035. The analysis quantified the safety performance of each alternative in terms of the predicted number of crashes by severity and their associated societal costs over the life of the project.

Using the No Build alternative as a benchmark, the project team used the number of crashes predicted by IHSDM to compare the alternatives. The team disaggregated the predicted crashes into severity levels and converted them into a dollar value using cost data from the National Highway Traffic Safety Administration's technical report, The Economic Impact of Motor Vehicle Crashes (2000), and updated the data with the Consumer Price Index. This allowed them to evaluate the monetary differences realized by the potential crash reductions.

PREDICTIVE SAFETY ANALYSIS BENEFITS

Improved Safety

Predictive analysis considers the safety implications of each design configuration, providing differentiation between alternatives.

Informed Decision-Making

Predictive analysis helps quantify the safety impacts of transportation decisions, allowing safety to be purposely considered along with other project goals.

Optimized Investment

Safety performance can be quantified in terms of the number and severity of crashes, which can then be translated into societal costs over the life of the project.

Alternatives Safety Analysis Summary: 2035

Rank	Alternative	Total Crashes	Crashes Reduced	Total Cost of Crashes	Potential Reduction
1	P	820.8	87.3	\$22,060,778	\$2,345,187
2	J	828.2	79.9	\$22,257,509	\$2,148,456
3	Q	851.6	56.5	\$22,887,479	\$1,518,486
4	B/O	902.9	5.2	\$24,278,285	\$138,680
5	No Build	908.1	0.0	\$24,405,965	0

(Source: LADOTD)

All four alignments were designed to the same criteria, but their unique characteristics had meaningful differences in their predicted safety performance. The highest ranked alternative in terms of safety performance predicted roughly 10 percent fewer crashes than the No Build alternative, resulting in a projected \$2.3 million cost savings to society.

Key Takeaway

- ▶ Predictive safety analysis allows safety to be measured similarly to other criteria in a preferred alternative. The goal is to have safety considered, not to trump or dictate the decision.

Preferred Alternative

The U.S. Army Corps of Engineers issued the Record of Decision in June 2012 for the alternative they determined to be the most environmentally acceptable while achieving project purpose and need. In making the selection, the Corps assessed costs and benefits and considered public and agency comments developed as part of the Environmental Impact Statement process. They considered safety as part of the traffic and transportation impacts when assessing each alternative's potential physical, natural and social environmental consequences. While the selected alternative did not have the highest predicted safety performance, it is still expected to experience fewer crashes and result in less societal cost expended than the No Build alternative.

Selecting an alternative with a substantial reduction in crashes, but not the greatest reduction, is an exercise in sound engineering judgment. The more important aspect is that the decision-makers selected an alternative based on consideration of all impacts, including safety.

Conclusions

Agencies responsible for executing National Environmental Policy Act requirements and selecting the preferred alternative make such decisions by balancing many impacts and trade-offs. An agency is not compelled to select the alternative believed to be the safest, just as it is not compelled to select the lowest-cost alternative or the alternative that has the least impact on a particular environmental asset, such as wetlands.

On this project, the team applied substantive safety data to the environmental process and alternative analysis. This marked a transition from the nominal safety approach to using quantified safety performance to make project decisions. All of the alternatives included a raised median with limited access points, thereby improving safety. However, applying substantive safety analysis by alternative allowed the team to use safety as a differentiating feature in the evaluation and selection process.

ADDITIONAL RESOURCES

- ▶ This document contains information presented in "Safety in the Project Development Process: A Context Sensitive Approach," a case study provided courtesy of the Institute of Transportation Engineers: www.ite.org
- ▶ Additional information on LADOTD highway safety methods and tools can be found at http://www.dotd.la.gov/planning/highway_safety/
- ▶ More information on Data-Driven Safety Analysis is available on the Every Day Counts website at <http://www.fhwa.dot.gov/everydaycounts/edc-3/analysis.cfm>

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