

# Developing a Comprehensive Highway Accident Data Analysis System with GIS

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## Problem

Traffic accidents continue to be a leading public health problem. Although significant strides have been made in improving highway safety during the past several decades, motor vehicle crashes remain the leading cause of death for people ages 6 to 27 years. Motor vehicle crashes in the United States impose an economic penalty on the public of \$150 billion each year. According to the Louisiana Department of Public Safety, the cost of fatal traffic crashes in Louisiana for

year 1999 alone was well over \$2 billion.

In December 1997, the AASHTO Board of Directors endorsed a Strategic Highway Safety Plan. This plan, updated in 1998 as "Promoting Safe Passage into the 21st Century," envisions a concerted effort across all aspects of highway safety to achieve the goal of reducing highway fatalities and injuries by 20 percent by year 2008. This goal may be considered ambitious because, for more than a decade, there have been only slight



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fluctuations from the level of about 42,000 deaths per year. In addition to its efforts to improve the design, operation, and maintenance of the highway system, the plan requires increased focus on other aspects of safety problems, such as developing "better tools to analyze safety data."

## Objectives

The primary goal of this project is the development of a GIS-based system of highway accident analysis for DOTD that can provide an insight into the general state of highway safety as well as contributing causes of accidents at any location.

The objectives of this project include:

- (a) A review and summary of current highway-accident-analysis programs adopted by state transportation departments across the country.
- (b) Development of an accident-analysis system.
- (c) Investigation of the effectiveness of past safety improvement strategies with the newly developed system.

## Description

Analyzing highway accident data is crucial to understanding safety

trends, designing strategies to combat safety problems, and evaluating impact on safety measurement. Improving highway safety requires a good data-analysis system with easy data extraction processes and analytic capabilities. For this purpose, Louisiana DOTD has developed an accident-data program with which highway safety engineers can compute the annual accident rate based on highway classification and location. With this program, safety engineers can also identify locations with accident rates that are two or more times higher than the state average. These locations are then classified as abnormal sites warranting further studies.

Using highway accident data collected by law enforcement agencies and annually compiled by the Louisiana Department of Public Safety, DOTD has developed a GIS map showing locations of all accidents on state highways. Since GIS has not been linked to accident analysis, the current data program does not provide the graphical interface required to search for accident frequencies by data ranges on state highways with varying spatial units, such as intersections and highway segments. Although statistics developed by the Louisiana Highway Safety Commission do establish accident frequencies by several contributing and causative factors, these calculations are made at the

parish level, rather than by individual highway segments. To reduce highway accident frequencies, it is imperative to investigate the contributing factors at a disaggregated level.

## Implementation Potential

When developed, the system will allow highway engineers to better evaluate highway safety performance at any location on the state highway network.