

Chapter 7

Safety Management in Transportation Planning

Overview - the Safety Management System

Introduction

Transportation planning activities involve numerous components of traffic data and analyses. Incorporating safety as a component of planning requires detailed information to be effective in the process. The primary element in safety management is the identification of problem areas or types. To be successful in this objective accurate data is required. With this information it is possible to identify problem areas and work toward finding solutions to mitigate or eliminate crashes. The Northeastern Indiana Regional Coordinating Council (NIRCC) has established a safety management system structured around accurate data. The system has been designed to provide a variety of informational data sets to various users from planners, engineers, law enforcement agencies and even social advocacy groups.

Source of Data

NIRCC obtains all crashes that occur in Allen County on an annual basis from the Automatic Record Information Exchange System (ARIES). This database contains all crashes that occur in the state of Indiana. Crash reports from all law enforcement agencies are required to be provided and included to the Indiana State Police through this system. In February of each year NIRCC retrieves all the data reported in Allen County and saves the data in a database for analysis.

Quality of Data

The Indiana State Police continue to improve crash reporting in Indiana. The process for crash location information updated in a new version of software in 2021. Crash locations are reported by latitude and longitude format. Officers can also improve the written location description for each crash. Staff can extract all reported crashes and geocode them into our GIS software. Once the geocoding is complete the mapped data is reviewed to identify crashes that do not appear to be mapped properly. All private property crashes are also removed from the reported location and placed in a specific location to ensure they are not included in public roadway analyses.

NIRCC works directly with the law enforcement agencies in Allen County to address any reporting issues and provide suggestions on how to improve the reporting process. Information is shared with patrol officers and special investigation units such as the Fatal Alcohol Crash Team to improve the data before it is submitted in final form.

Analysis of Data

A complete data set for one calendar year is saved into a database and information related to the “unique”

location for each crash is geo-coded into a geographic information system (GIS) for analysis. The GIS software gives planners the ability to evaluate crash data in an infinite number of ways. NIRCC provides each jurisdiction within Allen County an annual “Crash Summary Report” which is provided to the respective law enforcement agencies, engineering departments, elected officials and used for statistical purposes by planners. The report summarizes crashes by location, types, contributing circumstances, individual information, environmental impacts and a variety of other data items.

High crash locations are often defined as locations that are “hazardous”. NIRCC worked with law enforcement agencies and engineers to define “hazardous” locations. Safety in transportation planning often defines high crash locations by frequency of crashes because of the impacts on the transportation network resulting in congestion and excessive delay. For other users high crash locations are those where more crashes occur per million vehicles. NIRCC developed a process to identify high crash locations or, hazardous locations, which considers and balances both of these definitions. NIRCC’s process was developed through a cooperative effort with FHWA, INDOT and the Transportation Technical Committee (TTC).

The process incorporates both frequency and crash rates to identify and rank hazardous locations in a fair and responsive manner. A listing of crash locations is review that includes the crash frequency of the locations. Locations from this listing that meet or exceed seven crashes in a single year are then given a crash rate. A second listing is then created that includes only the locations identified from the frequency standards. This procedure is the most cost efficient and accurate method at this time. The principle of using a minimum frequency threshold and a RMV is a simple method to determine the safety of a location.

The next evaluation step is to incorporate crashes resulting in injuries or fatalities (I/F). The percentage of I/F is used to identify locations where severity is greater than expected. There are two processes that are followed to evaluate two strata of data. Crash locations with an annual frequency equal to or greater than 7 will be reviewed in one stratum and crash locations with an annual frequency greater than two and less than 6 follow a second process.

Process for locations with frequency >2 ; < 6 crashes per year

1. A density analysis will be completed using a 250’ radius to identify crash locations.
2. Crash locations with a frequency of 6, 5, 4 or 3 must have a minimum of one I/F crash to be included in the listing.
3. Locations then must meet one of the following two criteria;

A. Frequency	Percentage of I/F
6	100% to 33 %
5	100% to 40%
4	100% to 50%
3	100 % to 66%

B. Locations with a RMV equal or greater than 1.00 will be included in the analysis.

Process for locations with FREQUENCY > 7 crashes per Year

1. A density analysis will be completed using a 250' radius to identify crash locations.
2. All crash locations with a RMV > 2.00 will be selected.
3. All locations with a RMV between 1.00 and 1.99 and have a percent of I/F between 100% and 66%.

The final step is to calculate a severity index for each location. Planners utilize specialized software developed by Purdue University in conjunction with the Indiana Department of Transportation called Hazard Analysis Tool, HAT. Severity index values (ICC) aid planners in determining how many standard deviations from a 'typical' or 'similar' intersections the location being evaluated is performing. A value of 1.00 standard deviation or higher indicates the location is experiencing a higher level of injury or fatal crashes that other similar locations throughout the State of Indiana.

Uses of Data

NIRCC uses the data for various planning activities in addition to providing crucial information to other agencies and users. The use of the data supports the Indiana Strategic Highway Safety Plan. The data is used in conjunction with data from previous years. Analysis of crash data for planning purposes relies on data from three or more years to support most decisions. The primary use of the data is the identification of high crash locations or hazardous crash locations. It provides planners the necessary resource to aid local officials in addressing citizen comments for education of drivers. As the program continues to grow the various uses of the data also increases.

The Indiana Strategic Highway Safety Plan identifies emphasis areas listed below.

Safe Road Users

At Risk Users

Older Drivers

Younger Drivers

Motorcyclists

Vulnerable Road Users

- Other Non-Motorized (i.e. buggies)

- Pedestrians

- Bicyclists

- Micromobility Users

Impaired Users

- Alcohol

- Drug

- Distracted

- Drowsy

Safe Vehicles

- Large Vehicles/Commercial Vehicles

Safe Roads

- Intersections

- Rail Grad Crossings

- Roadway Departures

Safe Speeds

- Speeding

- Speed Management

- Work Zones

Post-Crash Care

- Emergency Response

- Golden Hour Treatment and In-time Response

Project Selection and Prioritization

The process of selecting projects encompasses a variety of contributing factors. Locations identified through NIRCC's evaluation process and deemed "hazardous", are carefully reviewed to determine what solution or action to implement. The annual data is reviewed by planners by using the new data in combination with the previous two years resulting in a listing of locations identified from three years of data. This listing of locations is provided to a committee of local engineers called the Transportation Technical Committee (TTC). TTC reviews the listing to inform planners of issues regarding specific locations they have already addressed or have plans to address. Potential causes for problems at the identified locations are also discussed and documented. This information is then forwarded to the local Transportation Safety

Forum for further review.

The Transportation Safety Forum is comprised of representatives from each local law enforcement agency and engineering agency. Attendees include representatives from the following agencies; Indiana Department of Transportation, Indiana State Police, Allen County Highway Department, Allen County Sheriff's Department, Fort Wayne Engineering Department, Fort Wayne Police Department, New Haven Engineering Department, and New Haven Police Department. The safety forum provides a unique opportunity for law enforcement representatives and engineers to share with one another important issues regarding the locations identified. NIRCC facilitates the meetings, providing the data and documenting the issues shared by each of the representatives. Law enforcement representatives see the crashes first hand and can provide invaluable information that cannot always be documented in individual reports. Local engineering department representatives can share potential improvement ideas with law enforcement representative to get feedback on the potential effectiveness. The forum has benefited the safety process in Allen County by improving communication between various stakeholders and provided each of the participating agency's insight to what one another is doing to improve the safety of the roadways in Allen County.

The listing of projects identified by NIRCC is updated again with the comments from the Transportation Safety Forum. Planners review the locations where specific improvements were suggested. The projects identified from the listing are then forwarded to the local public agency responsible for the location for further consideration. Locally approved projects are then pursued by the local engineering departments for implementation of the construction process or forwarded to NIRCC for consideration of federal funding. NIRCC provides the listing of identified hazardous locations and the specific projects selected by local agencies for improvements to the Urban Transportation Advisory Board. This board approves projects for federal funding based on the benefit of each project and available funding. Larger projects may be approved for future funding if current conditions do not permit programming of the project. Smaller projects are often funded locally.

Existing Project Analysis

The ability to easily obtain crash records has allowed planners a new opportunity to review existing roadway projects being developed for construction. Projects that are in their infancy of preliminary design are reviewed to identify all safety deficiencies. This information serves to provide the designers of the project necessary information to ensure the deficiencies are addressed. Planners also provide this review to elected officials to support the needs of the project. The analysis may also warrant safety funding that can assist in the cost of the project.

Bicycle & Pedestrian Safety

A process to evaluate bicycle and pedestrian safety has been established by the Northeastern Indiana Regional Coordinating Council. The process involves an annual summary of all related crashes throughout Allen County. Each crash is evaluated to determine where the crashes are occurring and why. Planners determine what contributing circumstances are involved with each collision and search for patterns that can aid in future improvements to address identified deficiencies.

Transit Safety

Safety of residents that utilize the local transit system is very important to the success of the service. Safety improvements to the highway system have corresponding safety benefits to the transit system. The safety management system is structured in a manner that provides planners the ability to track elements of safety other than locations. Crash types involving pedestrians and buses can be identified and reviewed to address existing issues. The data can also support bus stop safety to assist the transit provider in route selections.

In addition to the efforts NIRCC provides, Citilink addresses safety issues concerning the transit system and is aware of the importance safety plays in overall passenger comfort. Several projects to improve security on buses and customer safety at the transfer facility have been made. Drivers are also provided training to address safety, terrorism, and security. The perception of a safe transit system is a great marketing tool. Citilink strives to maintain a safe transit system.

Conclusion

NIRCC has progressed in the development of a useful safety management program and continues to look for ways to improve data and expand the use of the information. The process of evaluating crash locations continues to evolve with the introduction of new unique situations and challenges. The information serves in meeting the goal of safer and more efficient roadways in our area.