Joint Transportation Research Program

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Cost-Effective Data Collection to Support INDOT's Mission

Introduction

The Indiana Department of Transportation (INDOT) collects a large amount of data for a variety of reasons and uses. Much of the data are required by federal legislation. Other data elements are collected because they will help INDOT fulfill its mission, which is to "plan, build, maintain and operate a superior transportation system enhancing safety, mobility, and economic growth."

The majority of the data is addressing mobility and congestion. Other data concern physical assets, including infrastructure inventory such as roadway geometry, pavement condition, and bridge condition, and nonphysical assets such as safety-related measures.

The challenges involved in transportation data collection and management are faced by all state departments of transportation. INDOT operates in a changing environment. Funding is decreasing, and traffic volumes decline when economic conditions falter. At a time when traffic data cannot just be extrapolated to fill gaps in the data base, the resources needed to track the changes in traffic patterns must be applied with as much efficiency as possible. Infrastructure inventory data also must be maintained as efficiently as possible to allocate maintenance funds. To meet these challenges, the following items are addressed in this report:

- What data are currently collected by INDOT?
- What are INDOT's data needs?
- How effectively do collected data meet those data needs?
- How can data collection be improved to more effectively meet those data needs?

Additional needs were expressed to identify data owners for each set of data. The recommendations presented herein are offered to demonstrate how day-to-day data operations can be improved with respect to quality, efficiency, and effectiveness.

Findings

An inventory and description of the data types were formulated. A set of technical memos were created, based on interviews and online surveys of experts and INDOT business leaders for each data type. The memos in Appendix B provide a snapshot of INDOT's data collection activities in each business unit.

Chapter 3 summarizes in tabular format information about the data collection programs carried out by INDOT. The information includes the data items collected, the data collector and/or owner entity, frequency of collection, the tools used for data collection and storage, and the purpose of collection.

In order to represent the connections between databases, different offices, and data owners at INDOT, a series of flow diagrams are demonstrated in Chapter 4. The flow diagrams are structured as a series of nodes connected by arrows indicating the direction of the flow of information.

To gauge how well the data collected by INDOT are meeting the needs of its users, an online survey of data users at INDOT was undertaken. The survey focused on three types of data inadequacies: data that were unavailable, data that were inaccurate, and data that were outdated. The results are summarized and presented employing bar charts and tables in Chapter 5. This project found that the overwhelming majority of the data collection efforts at INDOT are done well. This is especially impressive, given how much data INDOT collects and the opportunities given to data users during this study to point out any shortcomings in INDOT's data collection program.

Implementation

The following is a list of recommendations to improve data collection based on the surveys, interviews, and literature reviews conducted during this study. The suggestions below are described in more detail in Chapter 6 and offer either cost savings or a better basis for programming projects.

1. Investigate the accuracy of vehicle weight data collected by WIM stations and methods of weight calibration and verification, because those data items are crucial inputs for many INDOT functions, including pavement and bridge design and maintenance and capacity planning.
2. Resume collection of pavement surface distress and calculation of Pavement Condition Rating annually at the network level for all roads under State jurisdiction and consider employing new technologies of collecting surface distress data at the project level.
3. Collect and employ Falling Weight Deflectometer data to assess the structural strength at the network-level. A complete coverage of roads under State jurisdiction in five years is achievable. Ground Penetrating Radar tests should be conducted as a supplementary measure to ascertain pavement thickness information when needed.
4. Identify bridges that can be inspected every 48 months instead of 24 months according to the FHWA criteria and Consider inspection at a 48-month interval for those bridges. This study found that an estimated eighteen percent of INDOT bridges meet the FHWA criteria for having their routine inspection intervals changed from 24 to 48 months.
5. Develop intersection and ramp databases to improve network-level safety analyses and contribute to safer intersections and ramps.
6. Develop a geospatially enabled database that displays the land parcels under INDOT ownership.
7. Make the vehicle classification information collected at sites equipped with ITS more accessible to data users.
8. Three major data systems—the Work Management System, the Scheduling and Project Management System and the Automated Reporting Information Exchange System—should be interfaced with other systems.

The interrelationships between databases at INDOT are being evaluated and modified on a continuous basis. The ongoing development, expansion, and refinement of the data warehouse and Management Information Portal can take into account the aforementioned recommendations.

There are also five recommendations to improve data governance and management. These recommendations are made because of issues regarding the difficulty cited by INDOT personnel in fulfilling their data requests and the seeming lack of cost information regarding INDOT's data collection activities. These recommendations are described in more detail in Chapter 6.

1. Periodically update the Data Collection Inventory tables developed in Chapter 3 and publish them online.
2. Institutionalize a system in such a way that data needs can be satisfied through online or an owner who can respond promptly to the requestor.
3. Monitor the total annual costs of itemized activities within each data collection program.
4. Adopt data governance procedures to evaluate existing and proposed data collection programs to justify the need for their execution, to ensure they operate in a cost-effective manner, to improve the quality of the collected data, and to ensure that data are labeled properly for the intended users.
5. Improve the format and content of agency information provided to the Indiana Transparency Portal as a potential avenue to inform the public of INDOT's performance in project delivery and in maintenance of infrastructure in good condition.

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