

Integrating Spatial Safety Data into Transportation Planning Processes

Transportation planning is a collaborative process that incorporates the input of many stakeholders to define future policies, goals, and investments that prepare for future needs. Transportation planners analyze a range of alternatives and impacts when selecting designs, but too often safety evaluations are neglected or assessed as a separate post-process. Integrating safety into the planning process, and explicitly building tools and models for alternative scenario evaluation to account for safety outcomes is critical. Despite previous attempts to integrate road safety to planning models, one area needing further attention is the safety of road users (rather than road entities) and an examination of how changes in demographics, housing choices, and travel patterns affect safety.

The objectives of this research effort were to:

1. Introduce a new index for measuring road safety, accounting for road user's home location and develop a safety performance function to account for travel demand; and
2. Estimate and compare the safety outcomes of existing long-term planning models in relation to the new safety index.

This study created a Home-Based Approach (HBA) method to generate a Safety Performance Function. Unlike the majority of road safety studies, which attribute crashes to specific intersections or roadway types, in this study the research team

attributed traffic crashes to the home address of the road users involved, measuring crash frequency at the traffic analysis zone (TAZ) level. The HBA accounts for both travel demand characteristics and safety at the TAZ corresponding to the residential address of the road users, allowing for the exploration of the relationship between travel demand and the safety outcomes of several modes of travel.

Four case studies were presented to illustrate how the HBA can be integrated into travel demand models as well as other relevant sources of data. Each case study illustrates different applications of the HBA to explore factors affecting road safety. These methods can be used by safety planners to evaluate the safety impacts of transportation network design alternatives, changes in the transportation system management, as well as zoning and land use patterns impact on exposure to a crash.

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