Request for Research Funding for FY 2025-2026

Project Number (Research Center Use Only): TEO-26-08

Requesting Office	Traffic Engineering and Operations	**Priority:** High	8 of 12

Proposed Title	Customizing Pedestrian and Bicycle Crash Prediction Models for Florida

Justification	Florida continues to experience a high rate of crashes and fatalities for active transportation road users. Over the six-year period from 2018 to 2023, bicycle and pedestrian fatalities rose by 48.75% and 9.86%, respectively [1]. The recent NCHRP project 17-84 [2] has developed crash prediction models for pedestrian and bicycle crashes. This methodology is likely to be reflected in the next edition of the Highway Safety Manual (HSM2). However, there are some important aspects that need to be addressed to implement these crash prediction models for Florida's roadways. • First, the proposed models in the NCHRP project 17-84 are developed using available exposure data for pedestrians and bicyclists or variables compatible with the U.S. Road Assessment Program (usRAP). Separate models are developed to predict pedestrian crashes along each side of the road, at a midblock location, and at each intersection leg. This requires collecting pedestrian volume, crash, and roadway characteristics data at a disaggregate level along roadway elements. However, agencies may not collect these data by direction or in the manner suggested. Thus, FDOT needs to assess the data requirement for the developed models. If required data are not available, FDOT needs to modify the data requirement and customize the models. • Second, agencies need to calibrate pedestrian and bicycle crash prediction models developed in NCHRP Project 17-84 to account for Florida's context classification [3], covering for both scenarios when pedestrian and bicyclist exposure data are available and when such data are not available. A sensitivity analysis should be done to see the effect of not using pedestrian and bicyclist exposure data on crash prediction. • Third, the models developed in the NCHRP project 17-84 are for conventional intersections only. FDOT's Intersection Control Evaluation (ICE) procedure covers many other innovative intersection and ramp terminal forms. Thus, there is a need to identify suitable data sources, explore available data, and recommend if any modifications are needed to apply the models (calibrated for conventional intersections) to innovative intersections. At the same time, FDOT uses traditional Safety Performance Functions (SPFs) and Crash Modification Factors (CMFs) for various innovative intersections such as RCUT, MUT, DLT, and DDI [4]. These applications apply to all crashes, not treating pedestrian and bicycle crashes separately from vehicular-only crashes. There is a need to understand what type of adjustments are required if FDOT wants to predict pedestrian and bicycle crashes separately for these intersections such as RCUT, MUT, DLT, and DDI. Hence, there is a need to streamline and customize the methodology appropriate for Florida incorporating Florida specific roadway/intersection design and data availability. To address this need, the proposed project will have the following objectives: • Assess the available data in Florida to implement pedestrian and bicycle crash prediction models, proposed by NCHRP project 17-84. • Modify the data requirement and customize the SPFs to be consistent with the available data in Florida. • Customize pedestrian and bicycle crash prediction models to Florida's roadway context classification to improve prediction accuracy for Florida's intersections. • Investigate the potential for adjusting SPFs and CMFs to exclusively account for pedestrian and bicycle crashes at innovative intersections including RCUT, MUT, DLT, and DDI. The project will address Florida's increasing number of pedestrian and bicycle crashes. It will generate data, models, and insights that will improve FDOT's procedures to evaluate roadway elements by incorporating pedestrian and bicycle crash predictions and enable FDOT identify critical sites for pedestrian and bicyclists' safety improvement. As such, this project will significantly advance the safety element of FDOT Compass. **References:** 1. Florida Department of Highway Safety and Motor Vehicles (FLHSMV), 2024. Traffic Crash Report [https://www.flhsmv.gov/traffic-crash-reports/crash-dashboard/ (Accessed 11.17.24). 2. National Academies of Sciences, Engineering, and Medicine. 2023. *Pedestrian and Bicycle Safety Performance Functions*. Washington, DC: The National Academies Press. https://doi.org/10.17226/27294.

	3. Florida Department of Transportation (FDOT), 2024. Context Classification Guide. URL: https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/roadway/completestreets/files/fdot-context-classification.pdf?sfvrsn=12be90da_6, (Accessed 11/15/2024). 4. Florida Department of Transportation (FDOT), 2024. Manual on Intersection Control Evaluation. URL: https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/traffic/trafficservices/studies/ice-materials-2025/fdot-ice-manual-2025_11-15-2024.pdf?sfvrsn=37b4c4a4_5 (Accessed 11/16/2024).
Impact	The research will enhance the existing practice by allowing FDOT to easily incorporate the pedestrian and bicycle crash prediction models from NCHRP 17-84 in its ICE procedure and other safety-related programs. The methodology developed under NCHRP 17-84 is likely to be reflected in HSM2. Without this research effort, FDOT will not be prepared enough to implement the pedestrian and bicycle safety performance functions suggested by HSM2 into FDOT's practice.
Affected Offices/ Districts	State Traffic Engineering and Operations Office, State Safety Office
Existing Work	A search in the RIP database resulted in several active projects related to pedestrian safety such as: 1. Assessing the Multi-Modal Safety Performance of Turn Lanes [NCHRP 07-28(02)]- this research will develop SPFs and CMFs for turn lanes at intersections. 2. Speed Management Strategies to Improve Pedestrian and Bicyclist Safety on Arterials and Higher-Speed Roadways [NCHRP 17-111] 3. Enhancing Crash Modification Factors and Safety Performance Functions for Pedestrian and Bicyclist Countermeasures [NCHRP 17-112]-this project will enhance NCHRP Project 17-84 focusing on the benefits of countermeasures. 4. Evaluation of Promising Countermeasures and Innovative Techniques on speed Management to Improve Pedestrian and Bicycle Safety [FDOT]—this project aims to develop the best practices, guidance, and recommendations on speed management using speed safety cameras and traffic signal progression to deter speeding. However, none of these projects is focusing on streamlining the data requirement of NCHRP project 17-84 or customizing its models for Florida. Similarly, a search query was made in the TRID database with the keyword "pedestrian safety performance", but no overlapping publication was found.
Keywords Used In Existing Work Search **(Cannot leave blank)**	Pedestrian Safety, Pedestrian Safety Performance
Related Contracts (Give contract numbers)	N/A

Funding Request	$200,000	**Anticipated Duration**	24 months
Project Manager	Dibakar Saha	**Contracting Method**	UCF (Samiul Hasan & Naveen Eluru)
Equipment	N/A		
Urgency	1		The project is urgently needed to address the increasing pedestrian and bicyclist fatalities in Florida by incorporating pedestrian and bicycle safety performance functions in FDOT's ICE procedure.
Implementability	1		The findings from the project can be directly implemented in FDOT's ICE procedure.

Project Benefits (Succinct, complete explanation)

A successful completion of the project will enable FDOT:

1. Address pedestrian and bicycle crashes through appropriate data and models
2. Improve the ICE procedure by including new pedestrian and bicycle crash prediction models and adding innovative intersections
3. Identify critical sites for pedestrian and bicyclists' safety improvement

Project Benefits (Select all that apply and explain)	Quantifiable Benefits (units, dollars, etc…if applicable)	Methodology or Data Sources Used to Determine Quantifiable Benefits. If not applicable, please give justification of project benefits
o Materials Enhancement		
o Financial Impact		
o Time Savings		
o Lives Saved/Injuries Prevented	N/A	The research will inform FDOT through updated data, models and evaluation procedure to save lives or prevent injuries of pedestrians and bicyclists.
o Other (Explain)		

*Comments should explain and support urgency, financial benefit, and implementability scores