FDOT Research Quarterly Summary, June 2020

Completed FDOT Research, March 2020 – June 2020

FDOT Materials Office

Mitigation of Cracking in Florida Structural Concrete
The main objectives of this project were as follows: (1) conduct a laboratory testing program to evaluate the effects of incorporating shrinkage reducing admixture (SRA), polymeric microfibers (PMF), and aggregate compaction optimization (ACO) technique in ICC mixes in order to optimize the benefits of ICC in bridge deck and concrete pavement applications; (2) field-test the application of ICC mixes in bridge deck application with and without the enhancement techniques of incorporating shrinkage reducing admixture (SRA), polymeric microfibers (PMF), and aggregate compaction optimization (ACO); (3) field-test the application of ICC mixes in concrete pavement application with and without the enhancement techniques of incorporating shrinkage reducing admixture (SRA), polymeric microfibers, and aggregate compaction optimization (ACO); and (4) evaluate the cost-effectiveness of using ICC mixes with and without the enhancement techniques in bridge deck and concrete pavement slab applications.

Project number: BDV31-977-47
Principal investigator: Mang Tia, University of Florida
Project manager: Harvey DeFord, FDOT Materials Office

[Read the Project Summary] *[Read the Final Report]*

FDOT Planning Office

Assessment of Planning Risks and Alternative Futures for the Florida Transportation Plan Update
This project aims to help Florida Department of Transportation (FDOT) understand how risk and uncertainty should be addressed in FDOT transportation planning processes from the Florida Transportation Plan (FTP) Vision, Policy and Implementation Elements to more detailed planning efforts, including future corridors, regional transportation plans, and existing corridor studies. UF was one of three universities that conducted independent research. In a later project, independent results will be compared in a collaborative effort.

Project number: BDV31-977-98
Principal investigator: Ruth Steiner, University of Florida
Project manager: Jennifer Carver, FDOT Planning Office

[Read the Final Report]

FDOT Research Quarterly Summary is prepared by the University of Florida's UFTI-T2 Center as a public service. For full details of FDOT research, please visit the FDOT Research Center website.

Assessment of Planning Risks and Alternative Futures for the Florida Transportation Plan Update
This project aims to help FDOT understand how risk and uncertainty should be addressed in FDOT transportation planning processes from the FTP Vision, Policy and Implementation Elements to more detailed planning efforts, including future corridors, regional transportation plans, and existing corridor studies. FSU was one of three universities that conducted independent research. In a later project, independent results will be compared in a collaborative effort.

Project number: BDV30-977-25
Principal investigator: Dennis Smith, Florida State University
Project manager: Jennifer Carver, FDOT Planning Office

[Read the Final Report]

Evaluation of Truck Tonnage Estimation Methodologies
The primary objective of this study was to evaluate the current methodology for estimating truck tonnage for Florida and identify and propose alternatives that can improve the current freight demand model and develop a new truck tonnage model, if required.

Project number: BDV27-977-15
Principal investigator: Evangelos Kaisar, Florida Atlantic University
Project manager: Monica Zhong, FDOT Planning Office

[Read the Project Summary] ***[Read the Final Report]***

Toward a More Efficient Network Structure for Travel Demand Modeling
The purpose of this research was to examine issues related to the network structure of travel demand models and, in particular, of the statewide model, in order to identify a more efficient multiresolution network structure and a consistent process that will (1) enable effective information sharing with district models or local models and (2) optimize model execution while preserving the detailed attribution provided by the finer network segmentation. This will allow modelers to access information from other models at different geographic scopes and be much more efficient and productive when executing travel demand models, without the barriers of the different network data structures and while maintaining their model independence. This research will develop a framework to achieve these goals and explore and test the feasibility of a proposed process for implementation.

Project number: BDV31-977-87
Principal investigator: Ilir Bejleri, University of Florida
Project manager: Vladimir Majano, FDOT Planning Office

[Read the Project Summary] ***[Read the Final Report]***

FDOT Public Transportation Office

Pilot Implementation for Preventing Incorrect Turns at Highway-Rail Grade Crossings
The overall objective of this project is to finalize cost-effective countermeasures for preventing incorrect turns at highway-rail grade crossings via pilot implementation and evaluation.

Project number: BDV25-977-54
Principal investigator: Pei-Sung Lin, University of South Florida, Tampa
Project manager: Catherine Bradley, FDOT Public Transportation Office

[Read the Project Summary] *[Read the Final Report]*

FDOT Roadway Design Office

Quality Assurance Review of Intersection Lighting Retrofits
The objectives of this project were: (1) review lighting analysis design for selected intersections; (2) in the field, measure horizontal and vertical illumination (5 ft above the surface) along centerline of each illuminated crosswalk at three points (left edge of pavement, center of roadway, right edge of pavement), ensuring that ambient lighting will not affect measurements; and (3) compare measured illumination values to theoretical illumination values from lighting analysis design.

Project number: BDV25-977-60
Principal investigator: Pei-Sung Lin, University of South Florida
Project manager: Ed Cashman, FDOT Roadway Design Office

[Read the Project Summary] *[Read the Final Report]*

FDOT Safety Office

Understanding Interactions between Drivers and Pedestrian Features at Signalized Intersections, Phase 3
The objectives of this project were to: (1) select recommended countermeasures from the Phase 2 project and study sites in northern, central, and southern Florida for pilot implementation; (2) implement selected countermeasures at selected sites; (3) conduct before-and-after studies to evaluate the effectiveness of deployed countermeasures; and (4) provide findings from pilot implementation and make recommendations for future statewide implementation.

Project number: BDV25-977-43
Principal investigator: Pei-Sung Lin, University of South Florida
Project manager: Joseph Santos, FDOT Safety Office

[Read the Final Report]

FDOT Structures Office

Evaluation of Techniques to Remove Defective Grout from Post-Tensioning Tendons
The objective of this project was to evaluate defective grout removal techniques for post-tensioning tendons.

Project number: BDV31-977-58
Principal investigator: H. R. (Trey) Hamilton, University of Florida
Project manager: William Potter, FDOT Structures Office

[Read the Project Summary] *[Read the Final Report]*

FDOT Traffic Engineering and Operations Office

Commercial Heavy Vehicle Impacts on Signalized Arterial Corridor Performance
The objective of this research was to identify improvements that can be made to the Highway Capacity Manual (HCM) urban streets analysis method that will better account for the impacts of commercial vehicles on arterial corridor operations.

Project number: BDV25-977-50
Principal investigators: Seckin Ozkul and Scott Washburn, University of South Florida
Project manager: Raj Ponnaluri, FDOT Traffic Engineering and Operations Office

[Read the Project Summary] *[Read the Final Report]*

Connected Vehicle to Vehicle-to-Infrastructure Support of Active Traffic Management
The objectives of this project were to: (1) identify connected vehicle (CV) applications that can be used to meet the objectives of urban street active traffic management (ATM) in Florida; (2) investigate various technical and institutional considerations in the planning, design, and deployment of the identified CV applications; (3) identify methods that can be used to select between CV applications and traditional applications as part of the system engineering process associated with ATM deployment; and (4) identify methods for post-deployment evaluation and performance measurements of CV applications to support urban street ATM.

Project number: BDV29-977-41
Principal investigator: Mohammed Hadi, Florida International University
Project managers: Javier Rodriguez and Raj Ponnaluri, FDOT Traffic Engineering and Operations Office

[Read the Project Summary] *[Read the Final Report]*

Evaluation of Arterial Corridor Improvements and Traffic Management Plans in Florida
The main objectives of this project were to independently evaluate the implementation and management of advanced signal control along two corridors in Florida (US-90 and SR-10). The signals are currently operated and maintained by the City of Jacksonville Traffic Management Center (COJ TMC). The research team will work with the City of Jacksonville and District Two Regional Traffic Management Center (RTMC) staff to obtain information related to existing operations and travel times, design, and demands. The project will also work with the selected contractor to obtain data required in the evaluation of traffic operations after the system installation.

Project number: BDV31-977-44
Principal investigator: Ageliki (Lily) Elefteriadou, University of Florida, Gainesville
Project manager: Pete Vega and Raj Ponnaluri, FDOT Traffic Engineering and Operations Office

[Read the Project Summary] *[Read the Final Report]*

Feasibility of Using Video Image Detectors for Ramp Signal Operations and Performance Monitoring
Florida International University researchers investigated the feasibility of using a video detection system to collect performance data such as queue length and delay; vehicle volume and occupancy are currently being detected using traditional inductive loops and sensors. The researchers surveyed existing video detection systems, and they selected one system for further testing, based on the test results and other considerations including costs, maintenance requirements, and ease of integration.

The researchers developed a Web-based system for calculating and visualizing performance data for monitoring and analysis.

Project number: BDV29-977-30
Principal investigator: Albert Gan, Florida International University
Project managers: Elizabeth Birriel and Javier Rodriguez, FDOT Traffic Engineering and Operations Office

[Read the Project Summary] ***[Read the Final Report]***

Integration of a Robust Automated Pedestrian Detection System for Signalized Intersections
The overall objective of this project was to research and develop an accurate and reliable automated pedestrian detection system at signalized intersections and midblock crosswalks with **H**igh intensity **A**ctivated cross**W**al**K**s (HAWKs), rectangular rapid-flashing beacons (RRFBs), and full pedestrian signals through integration of pedestrian detection technologies or improved available pedestrian detection systems on the market.

Project number: BDV25-977-44
Principal investigator: Pei-Sung Lin, University of South Florida
Project manager: Humberto Castiliero and Humberto El-Urfali, FDOT Traffic Engineering and Operations Office

[Read the Project Summary] ***[Read the Final Report]***

Strategies to Mitigate Wrong-way Driving Incidents on Arterials
The objective of this project was to identify strategies to mitigate wrong-way driving incidents on arterials in Florida.

Project number: BDV29-977-50
Principal investigator: Priyanka Alluri, Florida International University
Project manager: Raj Ponnaluri, FDOT Traffic Engineering and Operations Office

[Read the Project Summary] ***[Read the Final Report]***

FDOT Traffic Engineering and Operations Office & FDOT District 4

Data and Modeling Support of Off-Line and Real-Time Decisions Associated with Integrated Corridor Management
The objective of this research was to assess the applicability, feasibility, and effectiveness of data, analysis, modeling, and simulation approaches to support the decision making process associated with offline and real-time operations of Integrated Corridor Management.

Project number: BDV29-977-38
Principal investigator: Mohammed Hadi, Florida International University
Project manager: Daniel Smith, FDOT District 4

[Read the Project Summary] ***[Read the Final Report]***

Newly Funded FDOT Research, March 2020 – June 2020

FDOT Geotechnical Office

Effects of Downdrag on Pile Performance
University of South Florida researchers will instrument, monitor, and collect data from piles behind embankments that are expected to have measurable amounts of downdrag force and settlement (new construction) with the motivation of determining the circumstances under which downdrag is a critical load and when it is not. A secondary objective focuses on refining the Florida Department of Transportation (FDOT) design criteria for the inclusion of downdrag computations.

Project number: BDV25-977-67
Principal investigator: Gray Mullins, University of South Florida
Project manager: Larry Jones, FDOT Geotechnical Office

TRB Research in Progress entry: https://rip.trb.org/View/1697662

Performance Testing of GRS Test Piers Constructed with Florida Aggregates - Axial Load Deformation Relationships
University of Florida researchers will perform a background review of the literature and reports on geosynthetic reinforced soil (GRS) structures and pier tests. They will design full-scale axial load-deformation tests of GRS piers, construct and test each GRS pier, and compare the performance with current design methods and proposed methods. They will make recommendations to the Florida Department of Transportation (FDOT) for predicting axial load capacity and vertical and horizontal deformation.

Project number: BDV31-977-131
Principal investigator: Scott Wasman, University of Florida
Project manager: Larry Jones, FDOT Geotechnical Office

TRB Research in Progress entry: https://rip.trb.org/View/1690002

FDOT Materials Office

A Review of Florida's FC-5 Raveling Condition Assessment and Measurement Methods
Pavement Analytics, LLC, (Tallahassee, FL) researchers will determine an appropriate method to account for raveling in Florida's pavement condition survey and subsequent pavement performance forecasting. The research should consider survey approaches as well as the rating system.

Project number: BE939
Principal investigator: Bruce Dietrich, Pavement Analytics, LLC
Project manager: James Greene, FDOT Materials Office

TRB Research in Progress entry: https://rip.trb.org/View/1697634

Assessment of Structural Steel Coating Applications
Florida International University researchers will gather, catalog, and assess historical data available at the Florida Department of Transportation (FDOT) district level, with the goal of creating a database capable of identifying and correlating the factors that result in premature coating failures. Furthermore, the research will provide recommendations on data that should be required as input for

an effective electronic database on all new construction and maintenance projects with coating-related activities. The expected benefit of decisions based on the results (such as specification changes) is longer service of coatings and, thus, significant reduction in annual maintenance costs related to coating failures. Coatings on steel bridges will last longer (in line with expected service life), and less money will be spent on repainting work.

Project number: BE935
Principal investigator: Lu Zhang, Florida International University
Project manager: Chase Knight, FDOT Materials Office

TRB Research in Progress entry: https://rip.trb.org/View/1697635

Florida ATMA Pilot Demonstration and Evaluation
University of Florida researchers will evaluate the performance of an autonomous truck-mounted attenuator (ATMA) system based on ongoing or completed projects by other agencies that adopted ATMA and actual testing of the equipment during a demonstration pilot in Gainesville, FL. The goal of this project is to produce a critical analysis report to better understand the feasibility or applicability of the autonomous system to enhance operational or safety benefit on work zones in Florida.

Project number: BDV31-977-133
Principal investigator: Nithin Agarwal, University of Florida
Project manager: Tim Ruelke, FDOT Materials Office

TRB Research in Progress entry: https://rip.trb.org/View/1710225

High Friction Surface Treatment (HFST) Synthesis for Florida Pavements
Texas A&M Transportation Institute (TTI) researchers will conduct a comprehensive literature review and survey of national high friction surface treatment (HFST) practices. Goals include enhancing Florida's HFST program and practice and developing a draft update of Florida's current HFST guidelines and specifications.

Project number: BE923
Principal investigator: Bryan Wilson, Texas A&M Transportation Institute (TTI)
Project manager: Guangming Wang, FDOT Materials Office

TRB Research in Progress entry: https://rip.trb.org/View/1691349

Identification of the Mechanisms That Produce Hydrogen Embrittlement on Post-tensioning Members and the Effects of Galvanic Coupling on Bridge Tendons
University of South Florida researchers will identify the possible consequences of having galvanic coupling between the post-tensioning steel and the galvanized ducts in deviators and bulk heads with regards to the evolution of hydrogen on the high strength steel used for post-tensioning.

Project number: BDV25-977-69
Principal investigator: Christopher Alexander, University of South Florida
Project manager: Matthew Duncan, FDOT Materials Office

TRB Research in Progress entry: https://rip.trb.org/View/1708033

Investigation into the Contributing Factors to the Corrosion of Steel-reinforced Concrete Structures at Elevations Greater than 12 Feet above the Mean High Water Line
Florida Atlantic University researchers will assess if atmospherically deposited chlorides can cause corrosion of reinforcing steel at elevations greater than 12 ft above the mean high water line. If the answer is yes, the researchers will investigate what type of concrete compositions are vulnerable. They will seek a better understanding of atmospherically deposited chlorides that reach a substructure at elevations higher than 12 ft above the mean high water line and what (other than atmospherically deposited chlorides) factors contribute to the corrosion of steel reinforced concrete structures at elevations greater than 12 feet above the mean high water line.

Project number: BDV27-977-18
Principal investigator: Francisco Presuel-Moreno, Florida Atlantic University
Project manager: Ron Simmons, FDOT Materials Office

TRB Research in Progress entry: https://rip.trb.org/View/1688016

FDOT Planning Office

Assessment of Transportation Systems Resilience for Vulnerable Communities and Populations
Florida State University researchers will investigate, model, and develop innovative solutions for risks and vulnerabilities of vulnerable populations pertaining to critical infrastructure. Vulnerable populations in this study will include older adults, ethnic minority groups, and rural populations in Florida. Natural hazards affecting vulnerable populations will include hurricanes and storm surges. The overall goal of this project is to provide tools and resources for Florida Department of Transportation (FDOT) to develop transportation systems resilience policy and guidelines to improve the outcomes for vulnerable communities and populations, especially regarding resilience to natural hazard events (specifically hurricanes and storm surges).

Project number: BDV30-977-31
Principal investigator: Yassir Abdelrazig, Florida State University
Project manager: Jennifer Carver, FDOT Planning Office

TRB Research in Progress entry: https://rip.trb.org/View/1705687

Development of a Resilience Index for the Florida Surface Transportation System
Florida State University researchers will quantitatively evaluate transportation resilience through a multidimensional index (i.e., social, economic, and environmental) that identifies diverse resilience needs for improvement. The identified needs will further help to prioritize local- and state-level transportation projects and programs (including both resilient and non-resilient ones) for investment.

Project number: BDV30-977-30
Principal investigator: Juyeong Choi, Florida State University
Project manager: Jennifer Carver, FDOT Planning Office

TRB Research in Progress entry: https://rip.trb.org/View/1688014

Evaluation of Software Platform Systems for Transit Service Route Planning for Statewide Applications

Florida International University researchers will identify software platform systems for potential statewide applications for transit service route planning platform analysis. Specific project objectives include: (1) identifying existing software platform systems for transit service route planning analysis by conducting a state-of-the-practice survey of Florida's transit agencies and by scanning the literature and the Internet; (2) meeting with transit service planners from transit agencies to learn about their software application experiences and needs; (3) evaluating the general performance of select software platform systems using data from the software vendors; (4) evaluating the output reasonableness of select software platform systems using local data gathered from local sources by the research team; (5) identifying appropriate software platform systems for potential statewide applications; (6) creating a checklist template for use by transit agencies when identifying and evaluating software platform systems; and (7) understanding and refining preparation and processing of local data sources and for evaluating platform systems and performing service change analysis.

Project number: BDV29-977-60
Principal investigator: Albert Gan, Florida International University
Project manager: Gabrielle Matthews, FDOT Planning Office

TRB Research in Progress entry: https://rip.trb.org/View/1714793

Investigation of E-Commerce-enabled Freight Demand and Activities in Residential Areas

Florida International University researchers will incorporate household freight trip attractions into the freight demand analysis framework and address the impacts of e-commerce on travel demand and the highway network. The specific objectives include (1) capture household level consumption and attractions of goods and services; (2) measure the relationships between household and land use attributes and freight trip generation; and (3) estimate the impacts of e-commerce on travel demand and the highway network. Residential deliveries enabled by e-commerce and on-demand delivery services have been increasing rapidly. This shift in how consumers receive goods and services has direct impacts on the state and local roadway network. Yet, existing data and tools are not able to accurately reflect this trend. This research proposes an approach to addressing this missing component in the supply chain by incorporating household generated (attracted) freight trips into the demand analysis framework. This project will provide insights into quantifying last-mile demand to better reflect the actual freight demand and truck trips in the planning process.

Project number: BDV29-977-59
Principal investigator: Xia Jin, Florida International University
Project manager: Brian Watts, FDOT Planning Office

TRB Research in Progress entry: https://rip.trb.org/View/1710226

Microsimulation: Department Assessment and Guidance

Florida International University researchers will provide guidance and directions to improve the Florida Department of Transportation (FDOT) microsimulation modeling practice. The specific objectives of this project are (1) identification of the current and potential FDOT applications of transportation system simulation and associated needs; (2) assessment of existing simulation manuals and guidance in Florida and production of a new, comprehensive simulation guidance document that will serve as a standardized practice for FDOT; (3) assessment of the ability of available microsimulation platforms and applications to meet the simulation needs in Florida; (4) provision of direction for the application of multiresolution as part of the modeling practice in Florida; (5)

exploration of the development of simulation modeling clearinghouse practices; and (6) identification of the department training needs in relation to the use of transportation system simulation.

Project number: BDV29-977-61
Principal investigator: Mohammed Hadi, Florida International University
Project manager: Thomas Hill, FDOT Planning Office

TRB Research in Progress entry: https://rip.trb.org/View/1715102

FDOT Safety Office

Characterizing Curve Crashes in Florida

University of Florida researchers will characterize curve crashes in Florida. This research will provide the State Safety Office with an overview of curve safety performance in Florida statewide. Based on the current curve safety performance in Florida, the research will propose systemic safety analysis to characterize curve crashes for all roads, identifying contributing factors for curve crashes, and developing safety performance functions (SPFs) for curves, which can be used as a guide to prioritize the most high-risk locations for curve improvements. The application of the research will contribute to a better understanding of curve safety issues in Florida and inform transportation engineers and planners to select proper countermeasures and target resources more effectively.

Project number: BDV31-977-135
Principal investigator: Ilir Bejleri, University of Florida
Project manager: Rupert Giroux, FDOT Safety Office

Understanding Florida Motorcycle Crashes and Injury Outcomes Using the Motorcycle Crash Causation Study (MCCS) Dataset

With the Motorcycle Crash Causation Study (MCCS) dataset mapped with the Florida crash database, a complementary understanding and knowledge of characteristics related to locational, temporal, trip, motorcycle, injury, and contributing factors ranked by most harmful event can lead to informed decision-making by the Florida Department of Transportation (FDOT) on strategies, countermeasures, and policy implications (e.g., design standards for motorcycles in the Manual on Uniform Traffic Control Devices [MUTCD]). Given that the MCCS study investigated contributing factors leading to crashes, the knowledge gained from this new research effort will identify and quantify the relationship between crash risks and characteristics of motorcyclists. University of South Florida researchers will review and document motorcycle research literature with the MCCS dataset; review selected police crash reports of fatal and serious injury motorcycle crashes in Florida in the past five years (2014–2018) and identify primary crash types by age group, roadway type, and bike type; analyze the MCCS dataset and document findings; reconstruct Florida motorcycle crash samples by integrating Florida crash data, MCCS information, and external data sources; and identify extensive contributing factors to Florida primary motorcycle crash and serious injury types based on reconstructed Florida motorcycle crash samples and develop recommendations for potential countermeasures.

Project number: BDV25-977-68
Principal investigator: Chanyoung Lee, University of South Florida
Project manager: Edith Peters, FDOT Safety Office

TRB Research in Progress entry: https://rip.trb.org/View/1705686

FDOT Structures Office

Evaluate Effects from Shored Construction on Steel Composite Bridges
Embry-Riddle Aeronautical University researchers will work to better understand the performance of composite steel girder bridges using shored construction (discretely or fully supported). This will involve an extensive review of existing research and current international design codes. Surveys will be used to determine the design policies, construction specifications, and experiences of other states and countries relevant to shored construction of composite steel girder bridges. Furthermore, projects using shored or pre-decked steel girder bridges will be reviewed for design approach, detailing, construction methods, and performance history. Lastly, an analytical study will be performed to determine the effects and economic benefit of using shored construction for composite steel girders.

Project number: BE929
Principal investigator: Dan Su, Embry-Riddle Aeronautical University
Project manager: Zach Behring, FDOT Structures Office

TRB Research in Progress entry: https://rip.trb.org/View/1690009

Improving Safety at Highway-Rail Grade Crossings in Florida while Maintaining Continuity of Passenger and Freight Flows: A Multi-Objective Approach
Considering the importance of rail transportation in Florida, the large number of highway-rail grade crossings, the fairly frequent occurrence of accidents at highway-rail grade crossings, and traffic delays caused by warning devices at highway-rail grade crossings, Florida State University researchers will assist the Florida Department of Transportation (FDOT) through several tasks. They will develop a multi-objective optimization model that can assist FDOT personnel with identification of highway-rail grade crossings that have to be upgraded and selection of the appropriate upgrading type, considering existing budget constraints. They will analyze resource allocation decisions under conflicting objectives (i.e., minimize the overall hazard severity at highway-rail grade crossings vs. maximize passenger and freight flows). They will develop a standalone application which deploys the proposed multi-objective optimization model in order to facilitate decision making. They will conduct a set of case studies to demonstrate some important managerial insights from resource allocation among the highway-rail grade crossings in the State of Florida, given the conflicting nature of the objectives considered. They will improve safety of highway travelers in Florida by reducing the potential hazard of highway-rail grade crossings. Finally, they will ensure continuity of passenger and freight flows, reduce delays at highway-rail grade crossings, support economic development, and ensure prosperity of the state.

Project number: BDV30-977-33
Principal investigator: Maxim Dulebenets, Florida State University
Project manager: Rickey Fitzgerald, FDOT Structures Office

TRB Research in Progress entry: https://rip.trb.org/View/1714670

Inspection of Flexible Filler Tendons
Embry-Riddle Aeronautical University researchers will evaluate existing and new methods and research that has been completed for tendon inspection and determine the applicability and practicality for flexible filled tendons. The methods evaluated will include visual inspections and basic to more complex nondestructive evaluation techniques. Overall, this research will determine implementable tools for the inspection of bridges with flexible filled tendons.

Project number: BE932
Principal investigator: Dan Su, Embry-Riddle Aeronautical University

Project manager: Felix Padilla, FDOT Structures Office

TRB Research in Progress entry: https://rip.trb.org/View/1694844

Strength and Constructability of a Double Composite Steel Box Girder
Florida Institute of Technology researchers will develop design guidelines and analysis procedures for double composite steel box girder bridges. This research will also identify and provide potential solutions for constructability challenges associated with double composite steel box girder bridges.

Project number: BE950
Principal investigator: Nakin Suksawang, Florida Institute of Technology
Project manager: Bruno Vasconcelos, FDOT Structures Office

TRB Research in Progress entry: https://rip.trb.org/View/1697642

Temperature Effects in Match Cast Segmental Bridge Construction
University of Florida researchers will develop best practices that can be used to mitigate transverse distortion (bowing) of match-cast segmental bridge segments during production. Best practice guidance will include recommendations on bridge segment geometries that have a higher risk of bowing and may require mitigation. In addition, practical curing mitigation measures will be studied to determine which are the most effective at preventing this bowing. Ensuring a good fit between match-cast members will help reduce construction delays on bridges, problems with reduced camber during post-tensioning, and post-tensioning losses.

Project number: BDV31-977-132
Principal investigator: Kyle Riding, University of Florida
Project manager: William Potter, FDOT Structures Office

TRB Research in Progress entry: https://rip.trb.org/View/1705695

Update of Commercial Vessel Past Point Data for Designing Bridges across Navigable Florida Waterways
University of Florida researchers will update the past point data for vessel traffic throughout navigable Florida waterways. As an implementation component of the proposed research, the updated past point data will be incorporated into the Florida Department of Transportation (FDOT) vessel collision risk assessment tool. As an additional proposed implementation component, critical analysis of the past point data, will be used to identify the need for updates to collision-related provisions within Sec. 2.11 of the FDOT Structures Design Guidelines.

Project number: BDV31-977-134
Principal investigator: Gary Consolazio, University of Florida
Project manager: Matt Kosar, FDOT Structures Office

TRB Research in Progress entry: https://rip.trb.org/View/1715099

FDOT Traffic Engineering and Operations Office

Assessment of the Infrastructure Readiness for Connected Vehicle-to Infrastructure Applications on Arterial Streets
Florida International University researchers will assist the Florida Department of Transportation in developing functional requirements for the connected vehicle (CV) applications and in testing vendor

implementations of these applications. The researchers will document the state-of-the-practice related to CV vehicle-to-infrastructure (V2I) applications and the associated functionalities, hardware, and software and specify the functional requirements of selected applications as examples of the development of application requirements. They will also develop and demonstrate methods for evaluating the vendor implementations of the CV applications and recommend updates to the related FDOT standards and guidelines.

Project number: BDV29-977-58
Principal investigator: Mohammed Hadi, Florida International University
Project manager: Derek Vollmer, FDOT Traffic Engineering and Operations Office

TRB Research in Progress entry: https://rip.trb.org/View/1697663

Developing Safety Performance Function (SPF) and Crash Modification Factor (CMF) for Managed Lanes Separation Treatments

Florida International University researchers will expand the understanding of the how the choice of separator type affects safety performance. The researchers will collect data from existing managed lane facilities in Florida and develop Safety Performance Functions (SPFs) and Crash Modification Factors (CMFs) for managed lane facilities based on separator type. As SPF will be developed for a managed lane facilities base condition, CMFs will be developed for variations in separator type. If the data collected support the development of CMFs for features other than separator type, they may also be included in the research. Possibilities include access type, access frequency, and number of lanes. All separator types listed below should be included in the study; if adequate data do not exist in Florida, data from facilities in other states may be used. The desired outcome of this research is CMFs and SPFs that can be used to quantitatively compare alternatives during project development and design. This research will focus on four separation types: (1) barrier separation, (2) buffer separation with managed lane markers, (3) buffer separation with pavement marking, and (4) wide buffer separation.

Project number: BE975
Principal investigator: Priyanka Alluri, Florida International University
Project manager: Raj Ponnaluri, FDOT Traffic Engineering and Operations Office

TRB Research in Progress entry: https://rip.trb.org/View/1715100

Developing the Procedures for Welding, Testing, and Fabricating Weathering Stainless Steel to Merge the Scope of the Current AASHTO/AWS D1.5 Bridge Welding Code with the AWS DF1.6 Stainless Steel Welding Code

Researchers at Wood Environment & Infrastructure Solutions, Inc., (Alpharetta, GA) will develop procedures for the safe welding, testing, repairing, and fabrication of weathering stainless steel that remains consistent with the AASHTO/AWS D1.5 Bridge Welding Code. It is anticipated that if this project is successful, the results should provide enough information to be used in the development of a Florida Sampling and Test Method (Florida Method), be considered for inclusion in a future version of the Florida Department of Transportation (FDOT) Steel Fabrication Specifications, identify type of bridge steel components suitable for the available weathering stainless steel, and allow FDOT to specify weathering stainless steel in bridge applications.

Project number: BE958
Principal investigator: Philip Dzikowski, Wood Environment & Infrastructure Solutions, Inc.
Project manager: Tim McCullough, FDOT Traffic Engineering and Operations Office

TRB Research in Progress entry: https://rip.trb.org/View/1704709

FDOT Identification of Prospective Solutions for the Florida Trade Imbalance and Empty Backhauls
University of South Florida researchers will identify Florida locations with empty backhauling using Florida Department of Transportation (FDOT) Weigh-in-Motion (WIM) data and provide recommendations on alternative modes of transportation (i.e., barge, rail, etc.) for specific industries. Florida has high potential for growth to alleviate empty truck backhauling. The specific project objectives include: (1) review/revise the literature on empty backhauling and coordinate with FDOT districts to identify all current and previous research into Florida empty backhauls; (2) conduct WIM data analysis to ensure previous studies are up to date; (3) determine future manufacturing potential through skilled work force data analysis for major industries as highlighted by Enterprise Florida to compare the significance of future change to empty backhauls balance; (4) hold interviews with industry partners to create recommendations on possible industry partnership solutions to improve their shipping practices such as using alternative modes of transportation (i.e., barge, rail, etc.); and (5) provide recommendations on how truck drivers coming into Florida, bringing goods that are destined for Florida, can find work to leave the state with less-than-truckload (LTL) or truck-load (TL) rather than empty backhauling out of the state.

Project number: BDV25-977-72
Principal investigator: Seckin Ozkul, University of South Florida
Project manager: Rickey Fitzgerald, FDOT Traffic Engineering and Operations Office

TRB Research in Progress entry: https://rip.trb.org/View/1715098

FDOT Land Use Analysis to Enhance Successful Logistics Activity Center Development in Florida
University of South Florida researchers will identify the locations with high logistics activity center (LAC) development potential within Florida for future enhancement of successful LAC development. Specific project objectives include (1) review and revise the criteria for identifying successful LAC development determined through the previously performed Florida Department of Transportation (FDOT) D7 study; (2) identify optimal locations with high LAC development potential within Florida; (3) develop Geographic Information System (GIS) databases and maps for identified optimal locations with high LAC development potential; and (4) provide recommendations for enhancing identified optimal locations with high LAC development potential per their current land use. This project will result in a database of GIS maps (approx. 75 optimal sites around the state will be shown in detail) for locations with LAC development potential within Florida. The GIS maps will include information on the following: current land use; acreage; suitability with current land use and LAC development potential; and conflicts between current land use and LAC development potential.

Project number: BDV25-977-71
Principal investigator: Seckin Ozkul, University of South Florida
Project manager: Rickey Fitzgerald, FDOT Traffic Engineering and Operations Office

TRB Research in Progress entry: https://rip.trb.org/View/1715082

Identify Sources and Risks on Cybersecurity for Connected Vehicle Infrastructures
University of South Florida researchers will identify sources and risks to cybersecurity for connected vehicle (CV) infrastructures to improve the cybersecurity of existing and future CV deployments in Florida.

Project number: BDV25-977-70
Principal investigator: Pei-Sung Lin, University of South Florida

Project manager: Daniel Buidens, FDOT Traffic Engineering and Operations Office

TRB Research in Progress entry: https://rip.trb.org/View/1708031

Identifying and Prioritizing Target Regions to Conduct Outreach Activities to Improve Safety and Mobility of Aging Population

Florida International University researchers will develop a Geographic Information Systems (GIS)-based approach, incorporating existing Florida Department of Transportation (FDOT) resources, to strategically identify and prioritize specific regions that benefit the most from outreach activities. The research goal will be achieved through extensive data visualization and spatial analyses in ArcGIS. The macroscopic analysis involves aggregating crashes involving aging road users over some geographic areas (e.g., census block groups or traffic analysis zones) and spatially analyzing these crashes with an intent to identify socioeconomic, demographic, land use, and infrastructure-related factors that may contribute to these crashes. The relation between crashes and the built environment will be determined, and this information will be used to identify and prioritize the regions for conducting outreach activities and the type of education material that need to be distributed at these target regions. This approach can shape long-term planning and policy implications in improving the safety and mobility of aging population.

Project number: BDV29-977-57
Principal investigator: Priyanka Alluri, Florida International University
Project manager: Gail Holley, FDOT Traffic Engineering and Operations Office

TRB Research in Progress entry: https://rip.trb.org/View/1697621

Transportation-related Behaviors and Attitudes: A Survey of Florida's Aging Road Users

Florida State University researchers will conduct a statewide survey of aging road users (50 years and older) aimed at collecting data that can inform the Safe Mobility for Life Coalition's (SMFLC) focus and outreach. The survey, which will include a Web-based and pen-and-paper version, will be a follow-up and extension of a similar survey conducted in 2017 that yielded over 3,000 responses. Summaries of the results of this baseline survey were used to promote the goals of the SMFLC through outreach and education. As examples, results indicated that over three quarters of respondents had not planned for the day they could no longer drive safely and two thirds feared they'd become isolated if they stopped driving. These results were used to create outreach and marketing materials in community events and statewide campaigns (e.g., Older Driver Safety Awareness Week) as well as to create display materials used at educational events around the state.

Project number: BDV30-977-32
Principal investigator: Anne Barrett, Florida State University
Project manager: Gail Holley, FDOT Traffic Engineering and Operations Office

TRB Research in Progress entry: https://rip.trb.org/View/1710227