

Request for Research Funding for FY 2023-2024

Project Number (Research Center Use Only): SMO-24-03

Requesting Office	State Materials	Priority	3 of 12
Proposed Title	Material and Design Analysis of Bridge Mounted Light Poles For Hurricane Readiness		
Justification	<p>In October 2022, after Hurricane Ian, twenty-four light pole assemblies with cast aluminum bases, were found to have failed while in service, near Winter Springs, Florida. The light poles were located on the Lake Jessup Bridge. The conditions of Winter Springs were reported at up to 50 mph for sixteen hours and up to 70 miles per hour for two hours. One pole assembly fell into the roadway and/or adjacent right of way. Twenty other pole assemblies were removed due to crack formation in the cast aluminum bases. It is not known if the failure mode is load, stress, or fatigue induced however, the poles were not subject to design-level wind speeds based on the reported conditions in the area. This research attempts to assess the cause of failure in these light poles and to examine the current materials and design used in aluminum light poles and propose an optimization for a more resilient structure. This research could generate a wide range of implementable outcomes including: a recommended change to material selection, an adoption of a fatigue test to accurately screen for hurricane events, advancement in the vibration damper design, or the production of a new standard design.</p>		
Impact	Validating the design and materials of the light poles used by the Department are sufficient to withstand hurricane wind events, through appropriate testing and scale modeling. Assessing if the AASHTO model used for assessing wind loads is robust enough for Florida.		
Affected Offices	Materials, Structures		
Existing Work	ASCE 7-16 Minimum design Loads and Associated Criteria for Buildings and Other Structures		
Keywords Used In Existing Work Search (Cannot leave blank)	Hurricane Ian, aluminum poles, light poles, fatigue testing, alloy, vibration dampener, wind load testing		
Related Contracts (Give contract numbers)	N/A		
Funding Request	\$250,000	Anticipated Duration	30 months
Project Manager	Tim McCullough	Contracting Method	RFP to all registered voters
Equipment	N/A	N/A	
Urgency	2	This project may provide FDOT with an immediate need to update Structures Manual review.	
Implementability	2	Include language in Structures Manual	

Project Benefits (Succinct, complete explanation)

The outcome of the research project can generate a safer material- and design-combined solution for aluminum light poles mounted on bridges for hurricane readiness. The Department will gain confidence that its allowable designs and material selection are appropriate for Florida’s environment.

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
○ Materials Enhancement	N/A	The current aluminum alloy or dampener used in light poles can be replaced with a more resilient alternate to better resist to loads, stresses, and fatigue without overdesigning.
○ Materials Savings	N/A	Specifying a more resilient alloy can minimize the need for replacement after storms.
○ Time Savings	N/A	Evaluating the forensic reports and developing laboratory- and field-scale testing can optimize the materials and design for future installations and minimize failures, therefore saving time and resources.
○ Lives Saved/Injuries Prevented	N/A	Ensuring a resilient design for light poles can save the lives of civilians and first responders during and after storms.
○ Other (Explain)	N/A	

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