Request for Research Funding for FY 2025-2026			
Project Number (Research Center Use Only): GEO-26-04			
Requesting Office	Design (Geotechnical)	**Priority**	4 of 5
Proposed Title	Relaxation of Driven Piles in Florida Soils: Phase II		
Justification	Relaxation refers to the loss of pile capacity sometime after driving of the pile. If relaxation goes undetected during construction it can lead to the acceptance of a pile without reaching the required bearing capacity and issues with the foundation. The proposed research is a follow up to the recently completed research contract, BED24-977-05, *Relaxation of Driven Piles in Florida Soils*, which showed a method of predicting relaxation potential is possible. The Phase I study looked at approximately 6,000 driven pile set-check cases from which 1,111 were found to be complete data sets worthy of scrutiny for the Phase I study. From these 1,111 only 3% of the database demonstrated relaxation based on final as-built conditions compared to the initial pile installation state. However, it is estimated that up to 50% of the 1,111 restrike data sets contain relaxation information which will bolster the new relaxation potential/detection method. The primary objective of this study is to delve more deeply into the driving records of the present 1,111 set-check data sets to increase the identified occurrences of relaxation and increase the reliability of relaxation predictability.		
Impact	If relaxation goes undetected during construction it can ultimately result in a foundation unable to withstand the structural weight, construction delays, extra testing, and extra costs to address the issue during construction. Therefore, the ability to predict relaxation is an important step to preventing this from occurring. This research would give the Department a methodology to assist designers to estimate relaxation and a process to establish a pile driving criteria to accept piles during construction when relaxation occurs. Additionally, the Department would benefit from being able to predict relaxation during design since recent changes to how the Department pays for items such as pile redrives – which is typically how relaxation is determined and addressed in construction – would save the Department from paying for pile re-drives as unforeseen work as well reduce claims by the contractor due to delays and extra costs associated with addressing relaxation issues.		
Affected Offices/ Districts	Geotechnical Design, Office of Construction, District Geotechnical Engineers.		
Existing Work	A Method For Accounting For Pile Setup and Relaxation in Pile Design and Quality Assurance - Purdue University (https://doi.org/10.5703/1288284314282) Relaxation of Piles in Sand and Inorganic Silt - Yang, N C BED25-977-05, *Relaxation of Driven Piles in Florida Soils – Gray Mullins*		
Keywords Used In Existing Work Search **(Cannot leave blank)**	Pile relaxation, pile relaxation in sand, relaxation of piles.		
Related Contracts (Give contract numbers)	BED25-977-05, *Relaxation of Driven Piles in Florida Soils*		
Funding Request	$250,000	**Anticipated Duration**	24 months
Project Manager	Rodrigo Herrera	**Contracting Method**	Direct contract with University of South Florida, Dr. Gray Mullins.
Equipment	N/A	N/A	
Urgency	2	The urgency to complete this research is relatively high due to the Department currently lacking a method to predict and address relaxation during design and construction with reported cases in which over 25% of the original measured capacity has been lost after initial pile driving leading to increased costs during construction due to delays and the need to pile re-drives. Furthermore, the recent changes to how the Department pays for items such as pile re-drives makes it necessary to better predict relaxation and better address the	

		issue during construction to avoid increasing construction costs due to unforeseen pile re-drives.
Implementability	3	The research can be directly implemented by updating current design guides (Soils and Foundation Handbook) to include a check for relaxation as well as update to the specifications on steps to take during construction and testing recommendations to handle relaxation issues.

Project Benefits (Succinct, complete explanation)

(1) Engineers will be able to predict relaxation during design and ensure it is properly addressed in the contract documents
(2) Save costs by reducing the amount of claims by the contractor for delays and additional costs associated with addressing unforeseen relaxation issues
(3) Save costs by reducing the amount of pile re-drives to be paid as unforeseen work
(4) Increase safety by preventing piles from being accepted without the required bearing capacity
(5) Save costs on possible repairs if structural failure occurs due to undetected relaxation during construction
(6) Establish a pile driving criteria to accept piles during construction when relaxation occurs

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	N/A	N/A
o Financial Impact	Cost Savings	The research can potentially reduce the amount of claims by the contractor due to delays associated with unforeseen relaxation issues, save on repairs costs due to inadequate foundations caused by relaxation, and save costs on pile re-drives by including them in the Plans instead of paying them as unforeseen work.
o Time Savings	Avoid delays during construction	Time will be saved by avoiding delays to address unforeseen relaxation issues and avoiding extra testing.
o Lives Saved/Injuries Prevented	Increase in Safety	The results of the research will prevent the acceptance of piles that do not meet the bearing capacity which will avoid foundation issues and increase the safety of the traveling public.
o Other (Explain)	N/A	N/A

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