

Request for Research Funding for FY 2021-2022

Requesting Office	Geotechnical	Priority	4 of 5
Proposed Title	Relaxation of Driven Piles in Florida Soils - Phase I		
Justification	Relaxation is the reduction in pile capacity with time. It is a phenomenon that has been observed in several projects, especially Design Build projects as a result of verification testing. There have been reported cases in which over 25% of the original measured capacity has been lost after initial pile driving. Currently the Department does not have a methodology to assist designers estimate relaxation (protocols for In-Situ testing or laboratory testing), nor a process to establish a pile driving criteria to accept piles during construction when relaxation occurs. This creates delays, extra testing and extra costs during construction, especially because the problem is typically found after pile driving begins. <u>In most cases the issue has been resolved by additional driving until the piles reach a stable bearing layer.</u>		
Impact	The results may create the need for changes on the design guidelines, Soils and Foundations Handbook, and in construction practices. The consequences of not doing this research may be the potential for not recognizing relaxation has occurred.		
Affected Offices	This project will affect the Structures Design Office and the Office of Construction.		
Existing Work	There are several papers and studies about relaxation, but mostly for conditions outside Florida and the US. In Florida the topic has been only marginally explored, with publications by Herrera et al. (2018), Rancman et al. (2018), and Champion (2014). However, none of those publications presented a formalized protocol for laboratory testing, in-Situ testing and construction management (driving criteria, production pile length, set check requirements, etc.) that could be implemented fully into our documents. We are not aware of a formal research on this subject in the US and particularly for the Florida soils.		
Keywords Used In Existing Work Search (Cannot leave blank)	Pile relaxation		
Related Contracts (Give contract numbers)	None		
Funding Request	\$150,000	Anticipated Duration	18 months
Project Manager	Proposed technical manager to oversee research: Juan Castellanos and Rodrigo Herrera	Contracting Method	Direct contract with USF, Dr. Mullins
Urgency	4	We would like to have results on this relatively soon as we are seeing more relaxation issues. Project results should be implemented soon after the completion of the project.	
Implementability	1	The project could be implemented within a 1.5 year after completion. The only obstacles is that changes to the design manuals are on yearly basis and changes to the specs are on 6 month basis but they take effect at least 6 month after the specs changes are accepted.	
Project Benefits (Succinct, complete explanation)			
<ol style="list-style-type: none"> 1. This project will collect information of existing experience and practices and determine what works. This will be beneficial to establish a database to develop a second phase in which we will establish methodologies to deal with this phenomenon during construction. 2. One of the objectives would be to determine whether a second phase is necessary. This would prevent us to incur unnecessary research costs. 			

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		The foundation of our bridges will be safer.
○ Materials Savings		
○ Time Savings	NA	Will reduce time of action during construction that typically arises when the construction personnel do not know what to do and end up improvising or doing unnecessary work.
○ Lives Saved/Injuries Prevented		
○ Other (Explain)	NA	Will prevent settlements or damage to the structures that may arise if we have serious relaxation issues in a project. Having a design methodology and a construction testing process in our documents and specifications, will help reduce claims for delays and extra cost that could happen if the contractor were not expecting the additional steps we need to do to deal with relaxation, or the plans did not anticipate them.

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