



## Best Practices for Bridges with Pipe Piles

### **Problem Description**

Pipe piles (PP) and concrete-filled steel tubes (CFST) have been used on bridge projects in Tennessee for decades. Parameters defining PP/CFST installations include piling material, fill material, connection details, field capacity prediction, design criteria, and corrosion protection measures. These six parameters have varied greatly from project to project and there is no standardized process whereby the most suitable parameters may be established for a particular project. Seismic design parameters need to be standardized within Division of Structures design policy for both consultant and in-house design. Additionally, local buckling of pipe piles is not properly addressed in current design specifications.

### **PROJECT NUMBER:**

RES2023-04

### **PRINCIPAL INVESTIGATOR:**

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### **TDOT LEAD STAFF:**

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### **PROJECT SCHEDULE:**

August 2022 to July 2024

### **Research Objectives**

Objectives include each of the following:

- Develop a systematic method of selecting the most appropriate pipe pile and design method. Currently the piling systems vary between design groups or the design consultant's preference. A unified policy to determine the use of pipe piles in both abutments and bents is desirable.
- Derive recommended structural analysis and design techniques to satisfy AASHTO requirements in the LRFD (Load and Resistance Factor Design) Bridge Design Specification and the Guide Specification for LRFD Seismic Bridge Design.
- Assessment of, and possible recommended modifications to, field pile capacity prediction methods, corrosion-protection measures, and stiffness properties.

### **Potential Implementation and Expected Benefits**

TDOT anticipates the research findings to benefit the Department and our partners by the following points: This research will incorporate state-of-the-art design methods for local buckling in steel pipe piles as well as provide improved efficiency and uniformity in the use and subsequent design of steel pipe pile foundation support systems. TDOT can implement the findings of this research with updated bridge design procedures and may use the results update published design policy. Consultants and other state DOT's will benefit from this research as a pipe pile design reference.