

MARCH 2023



## ABOUT THIS PROJECT

**PROJECT NAME:** Investigation of Unbraced Pile Height in Fully-Encased Pile Bents of Bridge Structures

**PROJECT NUMBER:** RE-23008

**PROJECT FUNDING PROGRAM:** State Planning and Research

**PROJECTED END DATE:** April 2024

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# RESEARCH IN PROGRESS

## Better understanding the performance of bridge pile bent piers may offer construction efficiencies

Bridge pile bents—the foundational legs of a bridge that extend through soft soils or waterways—are typically made of steel piles encased in concrete to protect them from corrosion and other environmental stressors. Recent Iowa DOT research revealed that the concrete encasement also gives the piles additional structural strength, allowing them to provide significantly more support than previously thought.

The findings offer Iowa's bridge engineers the potential to design and build more bridges with pile bent piers, which cost less and are easier to construct than other types of bridge piers.

"If we can take advantage of the increased structural capacity of the encased-steel piles in design, we

can use them for bridges that have traditionally been built on costlier types of piers," explained Michael Nop, Iowa DOT's bridge project development engineer. "That means more bridges can be built with pile bents, which are much faster and more economical to construct."

To determine just how strong and durable bridge piles are when they're fully encased, or surrounded in concrete to form a wall of support beneath the bridge, Iowa DOT has initiated a new research project that will investigate the capacity of the fully encased piles. The project will aim to revise the calculations engineers use to build bridges on these types of foundations across the state.

With a greater understanding of not just the strength but also the

durability of fully encased piles, Nop said their use could be expanded to more waterways.

"Rivers and streams cause scour, or wash away sediment around the bridge's foundations," he said. "But if the research shows that this type of pile design can better withstand scour, we expect that we'll be able to use them more often in Iowa."

The research is expected to conclude in April 2024.

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