



UC Berkeley Geosystems Engineering Wednesday Lecture Series

Wednesday, 12 March 2025
1:10-2:00 PM
Lecture Room: 406 Davis

Cast-In-Steel-Shell (CISS) Pile: Key Insights from Construction Projects

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A Cast-In-Steel-Shell (CISS) pile is a deep foundation system composed of a steel shell driven into the ground and subsequently filled with a rebar cage and concrete. While this pile type is uncommon in the building industry, it is frequently used in transportation and bridge projects where lateral foundation stiffness (EI) is crucial, particularly when crossing weak, soft, scourable, or liquefiable soils. The California Department of Transportation (Caltrans) specifies that the CISS shell must be driven using a diesel hammer. Steel shells with diameters ranging from 6 to 8 feet are commonly used in our experience, specially manufactured to meet structural design requirements of projects.

The shell is driven open-ended to the design tip, after which the soil inside is removed to a specified depth. Finally, a rebar cage is installed, and concrete is placed.

We will examine several case histories that highlight notable experiences with CISS pile construction, focusing on key aspects such as drivability, the use of PDA, soil plug length within the shell, groundwater control, and the construction of seal courses inside the shell. These case studies, spanning various geologic conditions and construction challenges, offer valuable lessons to inform future design and construction practices.

