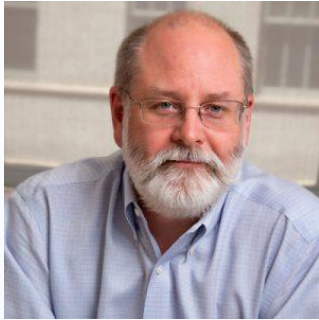


## CEE 595F – Geotechnical Engineering Seminar

Friday, March 15<sup>th</sup>, 2019 | 11:00 AM, Newmark Lab 3310



### Microtunneling with Water Only Can Cause Over Excavation and Settlement

**Glenn M. Boyce, PhD, PE, P.Eng**  
McMillen Jacobs Associates

**Abstract:** Microtunneling is a specialized form of remote controlled tunneling that allows small and medium-size diameter gravity sewers to be installed below the groundwater table at a precise line and grade. When the slurry microtunneling method was developed, the concept was the MTBM would provide a constant face pressure to counterbalance the earth and groundwater pressures. The concept was and is to introduce bentonite into the drilling fluid to be pumped to the MTBM face. This drilling fluid consisting of bentonite and water forming a thick slurry. With the pressure of the drilling fluid greater than the earth and groundwater pressures, the drilling fluid is forced into the ground, forming a filter cake. That filter cake helps to stabilize the ground, keeping the ground in front of the MTBM stable so it can be excavated in a controlled manner. Depending whether the ground can stand freely and is permeable enough to receive the drilling fluid, the percentage of the bentonite can be reduced. Over time, some contractors have decided to delete the bentonite completely and use only water. The use of water does not create a filter cake, and the ground at the face can be unstable and can move freely into the MTBM cutter chamber. When too much materials moves into the machine, over excavation can occur. Over excavation leads to surface settlements. This presentation describe the microtunneling construction process (pipe jacking) and how bentonite is used to stabilize the ground, reduce ground settlement, reduce jacking forces, and ensure completion of a successful project.

**Speaker Bio:** Glenn Boyce is Principal with McMillen Jacobs Associates with 36 plus years of experience designing tunnels – large and small. Glenn is an industry leader in the field trenchless technologies having authored the ASCE Standard for the Design and Construction of Microtunneling and other trenchless Manuals of Practice (MOPs). He serviced as the Chair of the North American Society for Trenchless Technology (NASTT). He is licensed in six states, Canada, and Hong Kong. In 2009, Glenn was named the “Trenchless Person of Year.” And in 2017, he was awarded ASCE’s Stephen D. Bechtel Pipeline Engineering Award for his numerous contributions to the engineering profession.