

## CEE 595F – Geotechnical Engineering Seminar

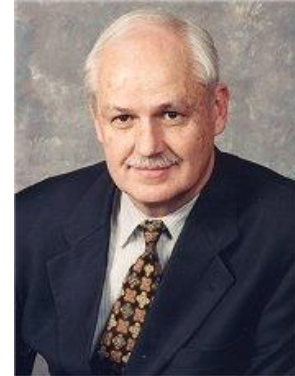
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Friday, September 21, 2018 | 10:00 AM, Newmark Lab 2311

### Observation and Monitoring of Ground Behavior – from the Source to the Structure

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#### Abstract

Monitoring of ground behavior at the source is at the heart of the observational method on geotechnical projects. On slopes and in large underground rock caverns, inclinometers and borehole extensometers have been used for over 60 years to locate the source of ground movement and geologic features affecting stability.

For urban tunnels and excavations, ground movements are monitored and correlated with construction events to confirm or adjust construction procedures to prevent damage to structures.

Around advancing pressurized tunnel boring machines (TBMs), ground movements and porewater pressures have been continuously monitored and correlated with key operating parameters. Control of face pressures and complete filling and pressurization of the radial gaps around the TBM shield and tunnel lining have resulted in the capability to tunnel at shallow depth and with large diameter tunnel boring machines, such as on the Alaskan Way Viaduct replacement tunnel, without ground loss and damaging settlement.

With controlled tunneling, adjacent structures are monitored in order to confirm that damaging settlements are not occurring.

Examples are also provided of structures where construction conditions – or natural events --- are not as controlled, and monitoring of structures has been limited or absent. In such cases, the distorting structure serves as the instrument. Observations not only show the extent of distortion and damage but provide insights on the ground behavior causing the damage.