

## CE 890 Graduate Seminar

**SPEAKER:** Shahin Nayyeriamiri (Dr. Esmaily's M.S. student)

**TOPIC:** "A Realistic Theory of Soils Consolidation"

**DATE:** November 18, 2009

**TIME:** 4:00 p.m. (refreshments at 3:45 p.m.)

**PLACE:** 2144 Fiedler Hall

### ABSTRACT

Consolidation is a process by which soils decrease in volume. It occurs when stress is applied to a soil that causes the soil particles to pack together more tightly, therefore reducing its bulk volume. When this occurs in a soil that is saturated with water, water will be squeezed out of the soil. In the Classical Method, the magnitude of consolidation usually is predicted by a theory developed by Karl von Terzaghi but Laboratory observations of the consolidation behavior exhibit discrepancies between the theory and the results. These discrepancies are usually attributed to the secondary effects that occur during primary consolidation. On the other hand, Terzaghi's theory presupposes the constancy of permeability and compressibility of the soil. In this study, the effect of variable permeability and compressibility on the consolidation behavior is investigated. For this objective, a mathematical treatment of the behavior is presented. Subsequently, laboratory consolidations tests with mid plane pore pressure measurements are conducted on soft, remolded, preconsolidated and undistributed samples of Tabriz clay. The test results, when compared with the theoretical findings, indicate that most of inherent discrepancies may be explained via the use of the theory developed in this study. Fig. 1 shows consolidation test with an oedometer test to determine their compression index.



**Fig. 1 Consolidation test procedures**