

## **GEOTECHNICAL GROUP LOS ANGELES SECTION - ASCE**

### **MEETING NOTICE**

**Wednesday, September 19, 2012**

#### **Earth Pressure Balance Tunneling Machines – The New Tunneling Paradigm**

**Robert A. Robinson, C.E.G.**

Director of Underground Services

Shannon & Wilson, Inc.

#### **ABSTRACT**

Over 100 earth pressure balance tunnel boring machines (EPBMs) have been used in the U.S. since the 1980s, with the first EPBM application on a wastewater tunnel in the San Francisco Bay Muds. EPBMs have proven to be effective for the safe construction of tunnels through difficult ground conditions ranging from flowing sand and silt, to fractured rock, with groundwater heads in excess of 200 feet (6 bars), and without resorting to major dewatering or other ground improvements along the alignments. With the appropriate application of EPBM methods it is possible to limit settlements to fractions of an inch. However, EPBM tunneling is not risk free. The Beacon Hill Transit Project, completed in 2011 in Seattle, Washington, provides a useful example of the challenges that may occur in wet mixed sand and clay soil conditions. Although surface settlements never exceeded about 0.4 inch along the 4,300 ft long twin bore alignment, localized over-excavation resulted in 9 large cavities that were successfully located and backfilled with 2,952 cy of controlled density fill.

The generally successful application of EPBMs on hundreds of tunnels world-wide, includes several tunnels in the 30 to 45 ft diameter range. Successful completion of these large tunnels led to the recent design and award of the Alaska Way Viaduct replacement tunnel, in Seattle, Washington, that will be constructed with a 57.5 ft diameter EPBM fabricated by the Hitachi Zosen Corporation in Japan. Construction of this world record machine-driven tunnel is scheduled to start in the summer of 2013.

#### **SHORT BIO**

Robert Red Robinson graduated from UCLA in geology in 1969 and has nearly 40 years of experience on over 300 tunnels throughout the U.S., Canada, and Central America. He has participated in a wide range of exploration, design, and construction tasks for water/wastewater and electrical utilities, rapid transit, railroad, and highway tunnels ranging from 2-ft diameter directionally drilled utility lines up to 65 ft diameter transportation tunnels. He is currently working on tunnel projects in L.A., Seattle, St. Louis and Vancouver, B.C. Selected major projects that he has worked on include the 65 ft Mt. Baker Ridge Tunnel in Seattle, and transit systems in Los Angeles, Portland, Seattle, St. Louis, Baltimore, Washington D.C., and Vancouver B.C. He is currently working on the 57 ft diameter Alaskan Way Viaduct Replacement Tunnel in Seattle.

SOCIAL HOUR: 5:30 p.m.  
DINNER: 6:30 p.m.  
PROGRAM: 7:30 p.m.  
PLACE: Stevens Steak House  
5332 Stevens Place, City of Commerce  
Southwest Corner of I-5 & Atlantic Boulevard  
PRICE: \$35 with reservation (Free with valid Student ID); \$40 at the door  
RESERVATIONS: Andrew Liu  
By e-mail to ahl\_77@yahoo.com

**Please make reservations by e-mail prior to 12 noon, Friday, September 14, 2012**