



BRITISH TUNNELLING SOCIETY

ANNUAL GENERAL MEETING

Followed by

INFORMAL DISCUSSION

Thursday 15th May 2008 at 6.00pm

at

The Institution of Civil Engineers

One Great George Street, Westminster, London SW1P 3AA

The Arrowhead Tunnels Project

**Overcoming Difficult Ground Conditions and
Water Pressures with Two Hybrid Hard Rock TBMs**

Presented by:

Brian Fulcher	Project Director, Shea-Kenny Joint Venture
Mike Bell	Resident Engineer, Hatch Mott MacDonald

The Arrowhead tunnels are designed to connect the California Aqueduct system to the recently completed Diamond Valley reservoir. Construction of 13 km of 5.8m bore tunnels near the base of the San Bernardino Mountains passes within a kilometre of the San Andreas Fault and crosses numerous other significant faults.

Ground conditions range from highly fractured to massive, moderately jointed igneous and metamorphic rocks. Faults and shear zones containing clay gouge, crushed rock, brecciated and highly fractured rock have been encountered. Water pressures in the tunnel have been recorded as high as 20 bar. Inflow was controlled by a programme of grouting prior to excavation.

This presentation will describe some of the problems and challenges encountered and the solutions implemented to improve performance of the project.

Tea and biscuits will be available at 5:30pm

In case of any query please

contact The Secretary, BTS tel: 020 7665 2233 or e-mail: bts@ice.org.uk

or visit <http://www.britishtunnelling.org>