

Lecturer: John Peter Oleson

Lecture Title: “Building for Eternity: Investigating the Secrets of Roman Hydraulic Concrete.”

The speaker's main current research is summarized in this lecture

The lecture will be delivered in English

All long-distance trade in the Roman world went by sea, and harbour installations built of hydraulic concrete were a crucial part of the imperial infrastructure. The fact that many of these concrete structures have been able to withstand the force of the sea for 2000 years has long excited comment and speculation. Although the modern world produces five billion cubic metres of sophisticated concrete every year, the material most commonly used by humans after air and water, the secrets of Roman concrete have remained shrouded in mystery. The speaker has 30 years of experience with harbor excavation, and with research on Roman harbor design, analysis of the components of the hydraulic concrete, and the design of the wooden forms in which the concrete was placed. Since 2001 he has been part of a project that has collected large cores of concrete from Roman maritime structures above and below water by a revolutionary new method. These cores have for the first time allowed accurate laboratory analysis of the engineering characteristics of Roman hydraulic concrete, with very surprising results. In addition, the samples have for the first time allowed proper analysis of the materials used and the method of placement. The results have documented a Mediterranean wide trade in the volcanic ash from [Baiae, on the Bay of Naples](#), which was the crucial component of Roman hydraulic concrete. In 2004, the team also replicated full-scale, Roman style [formwork](#) in the harbour of [Brindisi](#), and constructed a harbour pier with carefully reproduced Roman style hydraulic concrete. The resulting data have provided striking new information on the process by which the Roman engineers planned and executed their harbor installations and other structures. Discussion of the project results is set in the context of a historical introduction to the procedures and accomplishments of Roman concrete technology in general.

Bibliography:

Hohlfelder, R.L., C. Brandon and J.P. Oleson 2005. “Building a Roman *Pila* in the Sea—Experimental Archaeology at Brindisi, Italy, September 2004,” *International Journal of Nautical Archaeology* 34: 123-27.

Oleson, J.P. 1988. “The technology of Roman Harbours,” *International Journal of Nautical Archaeology* 17, 147-58.

Oleson, J. P., C. Brandon, S. Cramer, R. Cucitore, E. Gotti and R.L. Hohlfelder 2004b. “The ROMACONS Project: A contribution to the historical and engineering analysis of hydraulic concrete in Roman maritime structures.” *International Journal of Nautical Archaeology* 33: 199-229.

Oleson, J. P., L. Bottalico, C. Brandon, R. Cucitore, E. Gotti, and R.L. Hohlfelder 2006. “Reproducing a Roman maritime structure with Vitruvian pozzolanic concrete,” *Journal of Roman Archaeology* 19: 29-52.