

Elsewhere in *ICE Proceedings*

S. K. Fullalove, *Editor*

The following are summaries of papers published in other parts of *ICE Proceedings* during 2008 that readers of *Water Management* may find of interest. Summaries of all papers in ICE journals are freely available and fully searchable at the 'journals on-line' section of the ICE website. See www.ice.org.uk/journals for details.

Gibraltar runoff: a steep challenge for decommissioning

M. Cooper, P. Stubbs, T. Carter, S. Dunn

Proceedings of the Institution of Civil Engineers, Civil Engineering, **161**, No. 1, February, 35–41, doi: 10.1680/cien.2008.161.1.35

Much of the British government's water supply in Gibraltar over the last century was achieved by fixing corrugated iron sheeting on steep sand slopes flanking the rocky peninsula to catch rainfall. However, introduction of desalination plant has rendered the massive catchments redundant. Over the past 30 years they had also started to become a liability, with large sheets becoming detached in high winds and two major landslides resulting from concentrated wetting of underlying sand. This paper describes the challenging design and construction of a decommissioning scheme for the east-side Ministry of Defense catchments, involving removing 13 ha of sheeting, installing 78 km of stabilising ground anchors, placing a temporary coir matting and seeding with indigenous plants and all on a 250 m high, 34 slope.

Wendover arm canal – an early hydraulic use of asphalt

T. Peters and S. Brown

Proceedings of the Institution of Civil Engineers, Civil Engineering, **161**, No. 4, November, 184–191, doi: 10.1680/cien.2008.161.4.184

Recent restoration of the 1797 Wendover arm of the Grand Union Canal in England has revealed one of the earliest uses of asphalt as a waterproofing liner. Following excessive leakage, a length of 4.4 km of the arm was lined in 1857 with coal tar asphalt as an economic alternative to repuddling with clay. However, within 13 years the canal was leaking as before and eventually closed in 1904. As this paper reports, the failure appears to have resulted from use of an excessively rich lining mixture and poor construction practice plus damage from boats, ice breaking and earth movements. It was nevertheless a novel, if ultimately unsuccessful, approach to repairing a seriously leaking canal economically

and constituted a significant step in the use of asphalt for hydraulic engineering.

Seepage control for Satpara dam, Pakistan

Z. M. Malik, A. Tariq and J. Anwer

Proceedings of the Institution of Civil Engineers, Geotechnical Engineering, **161**, No. 5, October, 235–246, doi: 10.1680/geng.2008.161.5.235

The Satpara dam project is an earth core rockfill embankment proposed over moraines in northern Pakistan. This paper presents a perspective of the proposed under-seepage control measures improvised in the dam design through landscape development and foundation conditions, highlighting the field observations and in situ tests. Details are presented of optimisation studies involved in the decision on a solution for the foundation treatment of the dam, comprising a combination of an impervious upstream blanket with a partial cut-off for effective under-seepage control. The dataset of recorded permeabilities from the field tests ranges from 0.001 to 0.000 000 1 m/s. Estimates of uncertainties in the recorded permeability values have been explored, based on both statistics and judgement. A foundation model has been developed in RockWorks, using the closest point algorithm. Multivariate sensitivity analyses with combinations of blanket thickness, cut-off depth and position were carried out in SEEP/W to establish a composite under-seepage control design for the permeable foundations. Due importance was given to the computed hydraulic gradients throughout the analyses, but the final, optimal solution also had to involve other practical considerations: the practical modes of failure and their consequences, remedial possibilities and the practical construction potential associated with the measures adopted for under-seepage control.

Effect of core composition on seismic stability of earth dams

A. Shafiee

Proceedings of the Institution of Civil Engineers, Geotechnical Engineering, **161**, No. 6, December, 283–290, doi: 10.1680/geng.2008.161.6.283

It is current practice to employ composite clay – a mixture of clay and aggregates that floats within the clayey matrix – as the core of embankment dams, which were previously constructed from pure clays. Experience has shown that significant pore

pressure can build up during cyclic loading in composite clays. In this paper, the results of dynamic analyses performed on the Karkheh dam in Iran, incorporating different core materials, are presented. Pure clay and composite clay are used as the core materials and the results of the analyses are compared. It is

shown that significant seismic pore pressure build-up in composite clays can significantly reduce the factor of safety against sliding for the fragment of the slip surface passing through the core, even though the overall factor of safety falls within a reasonable level.