

Quarterly Journal of Engineering Geology and Hydrogeology

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CONTENTS – Volume 52, Part 4, November 2019

Thematic set: Keeping lessons alive in engineering geology	
Introduction to keeping lessons alive in engineering geology P. Renforth, A. Flynn, T. Hall, D. P. Giles & J. Perry	399
Advances in engineering geology in the UK 1950–2018 James S. Griffiths	401
Geochemical lessons from Carsington Dam failure of 1984 and reconstruction J. M. Reid & J. C. Cripps	414
The role of risk and assumption in the engineering geology of Crossrail U. Lawrence & M. Black	425
The 2017 Regent Landslide, Freetown Peninsula, Sierra Leone Peter Redshaw, David Boon, Grace Campbell, Matthew Willis, Julius Mattai, Matthew Free, Colm Jordan, Simon J. Kemp, Anna Morley & Michael Thomas	435
Geology, Engineering and Humanities: three sciences behind the Malpas dam failure (France, 2 December 1959) P. Duffaut & J. Larouzée	445
Wind turbine construction in and around Carsington Pasture in Derbyshire; overcoming the challenges posed by difficult ground conditions M. A. Czerewko, A. Bastekin, J. Tunnicliffe & R. O'Rourke	459
Tackling problems in civil engineering caused by the presence of pyrite John C. Cripps, J. Murray Reid, Mourice A. Czerewko & Ian Longworth	481
The application of geology to the design, construction and continuing maintenance of the Mullardoch Tunnel Christopher D. Jack & Robert J. W. Lyall	501
Research article	
Laboratory investigation of nonlinear flow characteristics through natural rock fractures Mohammad Javad Nasri Fakherdavood, Ahmad Ramezanzadeh & Human Jenabi	519
How many samples are needed to prove the absence of contamination? An example using arsenic John Heathcote	529
Assessing longwall shield–strata interaction using a physical model Gaofeng Song, Kuo Ding & Dezhong Kong	536
Photographic feature	
Loess landslides on the South Jingyang Platform in Shaanxi Province, China Penghui Ma, Jianbing Peng, Qiyao Wang, Zhao Duan, Zhenjiang Meng & Zhuang Jianqi	547
Technical note	
Thermal groundwaters of the UK: geochemical indications of flow, vulnerability and possible threat to the shallow hydrosphere W. George Darling	557
Discussion	
Discussion on 'Advances in engineering geology in the UK 1950–2018', Quarterly Journal of Engineering Geology and Hydrogeology, Vol. 52, 2019, https://doi.org/10.1144/qjgeh2018-171 G. J. Hearn	563
Discussion Reply	
Reply to Discussion on 'Advances in engineering geology in the UK 1950–2018' Quarterly Journal of Engineering Geology and Hydrogeology, Vol. 51, 2019, https://doi.org/10.1144/qjgeh2018-171 James S. Griffiths	569
Book review Jonathan W. N. Smith	571

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Cover Photograph. The journey-time between Gundewein and Mekane Selam, two towns located at approximately 2660 m a.s.l. in the Ethiopian Highlands, has been cut by more than 75% by the construction of 129 km of mountain road and a 300 m long bridge. The bridge is across the Blue Nile and 58 km of this new road descends and ascends the steep sides of the 1300 m deep Blue Nile gorge on an alignment with a cumulative rise and fall of over 2500 m over a straight-line distance of 21 km. The terrain is one of the most challenging of any for new road construction. Its underlying geology comprises Oligocene–Miocene basalt and pyroclastic rocks (pictured) overlying Cretaceous sandstone and siltstone which, in turn, overlie Late Jurassic limestone mudstone and shale. Its geomorphology comprises lithologically-controlled benches separated by sheer cliffs, with extensive deposits of colluvium, talusium and rafted rock debris. Geohazards include large-scale rock toppling, rock falls, deep-seated and shallow landslides, flash flooding, shifting stream channels, slope erosion, stream erosion, debris flows, debris fans, seepage erosion and cavity collapse. The Total Geology Approach to design and construction involved landscape modelling, geotechnical reference condition mapping, engineering geological mapping and targeted ground investigation, implemented by a team of national and international specialists between 2006 and 2015. The dynamism of the terrain, and in particular the adjustment of its geomorphology to earthworks and road drainage systems, meant that slope stability and erosion problems required careful attention during construction, as they will during the operational lifetime of the road. The Gundewein – Mekane Selam road was designed initially by Renardet SA/SABA Engineering. This design was reviewed and revised by Scott Wilson (now AECOM). Construction was undertaken by CGC Overseas Construction Group, Beijing under the supervision of Scott Wilson/Dana & Associates and on behalf of the Ethiopian Roads Authority. Further details can be found at <https://doi.org/10.1007/s10064-015-0724-y> and <https://doi.org/10.1144/qjgeh2018-058>

Photograph by: G J Hearn