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Author(s): Bouazza A (Bouazza, A.), Vangpaisal T (Vangpaisal, T.)

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Abstract: Manufacturing defects in a needle-punched geosynthetic clay liner (GCL) may include variation of mass per unit area of the bentonite, uneven thickness of the GCL, poor bonding of the composite components (geotextile/bentonite/geotextile) and, in some cases, a poor distribution of needle-punched fibres. This last case can result in unreinforced patches in the GCL, which can be detrimental to its hydraulic or gas barrier performance and also its internal strength. This paper presents the results of an experimental investigation into the effect of the distribution of needle-punched fibres on the gas permeability of a GCL. It is shown that, at high gravimetric moisture content, a poor distribution of needle-punched fibres can result in gas permeability up to three orders of magnitude higher than in a sample with uniform distribution, whereas the difference was found to be small at low gravimetric moisture content.

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Reprint Address: Bouazza, A (reprint author), Monash Univ, Dept Civil Engn, Bldg 60, Melbourne, Vic 3800 Australia

Addresses:

1. Monash Univ, Dept Civil Engn, Melbourne, Vic 3800 Australia
2. Ubon Ratchathani Univ, Ubon Ratchathani 34190, Thailand

E-mail Addresses: malek.bouazza@eng.monash.edu.au, thaveesak.v@ubu.ac.th

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 A [Numerical Characterization of Advective Gas Flow through GM/GCL Composite Liners Having a Circular Defect in the Geomembrane](#) JOURNAL OF GEOTECHNICAL AND GEOENVIRONMENTAL ENGINEERING 135 11 1661-1671 NOV 2009

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