

Evaluating waste concrete for the treatment of acid sulphate soil groundwater from coastal floodplains

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ABSTRACT

The treatment of acidic groundwater generated from acid sulphate soil (ASS) terrain is a challenging environmental issue in coastal floodplains of Australia. In this study, a laboratory column experiment was conducted to assess the performance of waste concrete for treating the acidic groundwater leachate from ASS terrain of the Shoalhaven region of NSW. The groundwater was highly acidic (pH of 2.5–3.5) and contained elevated concentrations of iron (10–90 mg/L) and aluminium (30–45 mg/L). Passage of the acidic groundwater through the column filled with waste concrete resulted in a significant improvement in water quality. Reduction in the concentration of iron and aluminium to below detection limits and improvement of the pH from acidic to near-neutral (pH 6–8) were observed, along with a significant release of alkalinity over a six month period under controlled laboratory conditions. The results show that the working lifetime of waste concrete as the reactive media was governed primarily by the precipitation of secondary minerals despite the high acid neutralisation capacity of the waste concrete material.

Keywords: Acid sulphate soil; Contaminated groundwater; Column test; Groundwater remediation; Waste concrete

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