

IURI LIRA SANTOS, MATHEW MINNIS, JOHN QUARANTA and LESLIE HOPKINSON, Department of Civil and Environmental Engineering, West Virginia University, Morgantown, WV, 26506. Slope stability and landform design in a coarse coal refuse reclamation.

Restoration of abandoned mine lands is on-going in Appalachia and across the United States. One potential technique to reclaim these areas is through the use of geomorphic landforming combined with paper mill residuals used as a soil amendment. The geomorphic approach attempts to approximate the long-term, steady state landform condition, leading to reduced erosional adjustment as compared to standard engineered fill designs. This study analyzed regraded mine refuse slopes for safety and erosion sustainability under a 100-year storm event for the Royal Scot refuse pile located near Anjean, WV.

The project involved the design and evaluation of a cap and cover system composed of two layers. The first layer is a 60 cm. compacted barrier layer (hydraulic barrier) and second is a 30cm vegetative growth layer. The focus of the analysis was the effectiveness of the hydraulic barrier layer and the final slope stability of the system.

A reclamation design was prepared and 3D finite element modeling was performed to assess ground surface terrain profiles considering weather and material strength. Results from the modeling indicate that for a 100-year storm event, the slope remains stable with a factor of safety ranging from 1.3 to 1.9 for different slope profiles. After the 100-year storm event, the hydraulic barrier reached a 20% degree of saturation proving its effectiveness with minimizing infiltration into the reclamation fill.