A constitutive model for soils and interfaces involved in creeping natural slope is proposed. It is based on the hierarchical single-surface plasticity and viscoplasticity approaches and allows for factors such as elastic, plastic and creep strains, normal stress, and stress-path effects. The model is calibrated from a series of laboratory triaxial tests for soils obtained from the field site at Villarbeney Landslide, Switzerland, simple shear tests for interfaces, and simple shear creep tests for both. The model is implemented in a two-dimensional finite-element procedure, which is then used to back-predict observed field behavior at two locations at the Villarbeney Landslide. (from Authors)

958348
Slope stabilization using old rubber tires and geotextiles
P. S. H. Poh & B. B. Broms, *Journal of Performance of Constructed Facilities - ASCE*, 9(1), 1995, pp 76-79.

An innovative and inexpensive slope-stabilization scheme is presented that uses old rubber tires and woven geotextile to arrest the deterioration of a hill slope adjacent to a 100 m (328 ft) high microwave-transmission tower on the Indonesian island of Batam. The total cost was less than 40% of the estimated cost of a conventional retaining wall. The paper discusses the design and the construction of the wall, as well as the costs. (Authors)

958349
Engineering geomorphological mapping and opencast mining in unstable mountains - a case study
G. J. Hearn, *Transactions - Institution of Mining & Metallurgy, Section A*, 104(Jan-April), 1995, pp A1-A18.

The application and value of rapid geomorphological mapping techniques in the assessment of slope instability and erosion hazards in the remote and mountainous area of Ok Tedi mine, Papua New Guinea, are reviewed. It is believed that this mapping is the first to have been systematically applied to any mining operation in remote mountainous terrain. Rock avalanches and landslides are features of the area around the mine and represent potential hazards to mine operations. In 1989 an avalanche with an estimated volume of 70 000 000 m^3 occurred in close proximity to the mine and prompted a multidsciplinary geotechnical study of the entire mine operational area. The assessment of landslide hazard and geomorphological mapping formed integral parts of the study and were carried out at rates of 0.6-0.75 km^2 per week. They yielded various documentation for geotechnical management. This documentation, together with the conclusions reached and recommendations made, played an important role in the geotechnical assessment of slopes in the mine operational area. (from Author)

958350
Landslide and erosion hazard mapping of Ok Tedi copper mine, Papua New Guinea
G. J. Hearn, *Quarterly Journal of Engineering Geology*, 28(1), 1995, pp 47-60.

Landslides and erosion pose significant hazards to mining and engineering activity in the remote mountainous terrain of Western Province, Papua New Guinea. Terrain hazard mapping has identified numerous landslides and rock avalanche deposits in the Ok Tedi catchment and in the immediate vicinity of the mine. This mapping comprised detailed slope inventory, geomorphological mapping combined with air photography interpretation and a review of pre-existing structural geological and geotechnical data. The study area was sub-divided into 245 zones and assigned hazard and risk categories or levels derived from the field data. These classifications were presented in map form at 1:10 000 scale along with prioritized recommendations for further investigation, monitoring and remedial action, where appropriate. (from Author)

958351
Pit wall design implementation at Mt Whaleback open pit mine, Newman, Western Australia
U. K. Gunasekera, H. Guo & D. G. Wagland, in: *Adding value to our resources - our future. Proc. conference, Newcastle, NSW, 1995*, (AusIMM), 1995, pp 85-89.

The Mt Whaleback orebody is in a complex geological regime. A good understanding of geological structure is essential during the design and implementation stages. It is essential to validate the rock-mass properties used in the design during implementation. It is important to achieve integrity of the final pit wall during development and to maintain the integrity during ore extraction. The original geological model is updated by way of on-going detailed geological face mapping. Information gathered during design implementation provide tools for effective management of the pit walls. Controlled blasting techniques are employed in the final limits blasting. Presplit helps to maintain the integrity of the wall by venting excessive gases from the limts blasts. This helps to reduce bedding dilation by gas penetration. Also, it helps to define the design batter for the operators for final batter trimming. Cablebolting is applied in selective areas to secure small-scale potential instabilities. During the development phase, pit wall monitoring instruments are installed. These instruments are used to monitor the performance of the wall during and after excavation of the slope. (from Authors)

958352
Erosional stability of rehabilitated uranium mine structures incorporating natural landform characteristics, northern tropical Australia
T. J. East, C. J. Uren, B. N. Noller, R. F. Cull, P. M. Curley & C. J. Unger, *Zeitschrift fur Geomorphologie*, 38(3), 1994, pp 283-298.

Australian Government guidelines specify that tailings containment structures at rehabilitated uranium mines in the Alligator Rivers Region of tropical northern Australia should have an engineered structural life of 1000 years. As part of the containment structure design process, erosion plots incorporating both regional geomorphological characteristics (concave hillslope profiles and a weathering-resistant rock cover of schist) and more conventional engineering design parameters (straight slopes and mine waste rock) were constructed at the Ranger Uranium Mine. The plots were monitored for storm runoff, and concentrations of solutes, suspended solids and selected ions over successive wet seasons. The initial results suggest that rehabilitated uranium mine structures which utilise selected features of stable natural landforms in their design may have greater erosional stability than more conventionally engineered structures. (from Author)

Earth retaining structures

958353
Behaviour of geosynthetic reinforced soil retaining walls using the finite element method
R. Karpurapu & R. J. Bathurst, *Computers & Geotechnics*, 17(3), 1995, pp 279-299.

Describes finite element models that are used to simulate the behaviour of two carefully constructed and monitored large-scale geosynthetic reinforced soil retaining walls. The walls were constructed using a dense sand fill and layers of extensible polymeric (geosynthetic) reinforcement attached to two very different facing treatments. The model walls were taken to collapse using a series of uniform surcharge loads applied at the sand fill surface. The results of analyses show that the finite element model, constitutive models and implementation reported in this study can accurately predict all important features of wall performance. (from Authors)