

Field performance evaluation of tailings cover system using a solidified layer

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An engineered cover system for mine tailings with a solidified layer was applied on a pilot scale to evaluate the field performance. The objective of a solidified layer was to reduce water infiltration, acid generation and sulfide oxidation. Hydrated lime and waterglass were used to produce calcium silicates which can serve as a binder for the solidification and stabilization of the layer. In the field, a solidified layer was installed at the top of tailings with a size of 3m x 3m x 10cm by the solidification method and then covered with soil by additional 50cm. Volumetric water content and electric conductivity were monitored by depths in tailings and cover layers for ca. 15 months. From the field data, leachate with high salt contents was generated in the tailings layer at the early stage of the monitoring, however, about 6 months later the objective could be accomplished as the solidified layer was stabilized. Especially, during the heavy rainfall season of the later stage, the water infiltration was continuously prevented in the system. Although pore waters in the soil cover layer showed alkaline pH and high contents of Na and Si, the solidified layer seemed to become gradually stabilized. It is reasonable to apply the system to the tailings with high risk (strong acid and high sulfide contents) considering strong alkaline properties of binders and site-specific field conditions.