Tailings Dam Deformation Monitoring (Case Study: Shambva Mine, Zimbabwe)

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SUMMARY
Tailings dams frequently represent the most significant environmental liability associated with mining projects, both during the operational and decommissioning phases of a project. A spate of recent and well-publicized tailings dam failure incidents has placed the mining industry in general and those responsible for tailings dam design and safety in particular, under intense scrutiny. Some of these failures are caused by the engineering (or lack of it) that goes into the design of these tailings dams. Owners, designers and operators of tailings dams should aim to have a zero level of failure, whether physical or environmental. Tailings dam failure can be a very devastating event to the environment and for any mining company. It is therefore important to ensure that suitable steps are taken to monitor the deformation of a tailings dam and prevent failure. At the time this research was undertaken, Shambva Mine (Zimbabwe) had no method of monitoring the stability of its tailings dam. If the dam was to become unstable and consequently collapse, it would not have been possible for the mine staff to know beforehand and take steps to prevent this from happening. The monitoring of this tailings dam would become even more critical during the rainy season and once the dam has reached its life span. The main purpose of this study therefore was to develop a method for monitoring the stability of the Shambva Mine Tailings Dam. A traverse survey was undertaken to establish control points around the Shambva Mine tailings dam and then using this control, slope pegs to be used for monitoring were installed on the tailings dam. During the research period, the monitoring exercise was performed thrice and the results obtained indicated that the tailings dam is still stable. The scope of this study is limited to monitoring the deformation of tailings dam slopes to prevent environmental harm. However contamination of nearby or surrounding fresh water sources by seepage from the tailings dams can also pose harm to the environment. For further study therefore, the researcher recommends that relevant methods be designed and implemented to ensure that seepage from tailings dams pose no harm to the environment.