Geotechnology Applied to Quality Control in Bauxite Mining in Brazil

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# ABSTRACT

The Hydro Bauxite Mine in Paragominas, Pará, Brazil, faces the daily challenge of monitoring the quality of mining operations. This task is undertaken by trained technicians who assess the boundary between waste and ore throughout the day across various shifts. However, the current process does not include a qualitative evaluation of monitored activities, which hampers the efficiency and reporting of these operations. To address this limitation, the solution involves the adoption of geotechnology. The ArcGIS system was introduced to innovate the quality control methodology through the use of the Field Maps and Survey123 applications. Field Maps provides technicians with access to geological model data and mining plans on an offline map, while all field controls were digitized using Survey123 forms. These forms include fields for identification, geographic coordinates, qualitative evaluations, photographs, and comments. The implementation of this new process has demonstrated significant efficiency gains, reducing the time required for data entry to approximately 3 minutes, compared to an estimated 30 minutes with the previous method. This represents a 90% reduction in time, resulting in increased productivity and enhanced control over mining activities. Additionally, the recorded data is stored in ArcGIS Online’s cloud platform, enabling the creation of a standardized, secure, and traceable database. The integration of geological model data accessible in the field, qualitative assessments, photographs, and georeferenced information enhances the efficiency and accuracy of technicians’ decision-making processes, contributing to improved management of quality control activities within the mine.