

The implementation of photogrammetry and automated data analysis functions at the Waihi Underground Gold Mine

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ABSTRACT

Emerging technologies are a constant challenge to integrate into production geology work flows. The large volumes of data generated, and the requirement for data to be analysed immediately becomes an impediment for the implementation of many new technological advances. This is even though decisions with significant financial implications are constantly made at an underground face where the usefulness of data acquired is measured in minutes as opposed to days.

Ore control processes at Waihi are now being positioned to leverage off new developments in the field of photogrammetry, machine learning and timely data analysis.

A structured workflow has been developed that involves three dimensional (3D) photogrammetry scans (hereafter referred to as scans) of ore drive development captured by underground mine technicians. Survey points are allocated, and the data processed and spatially registered on the day of capture in Agisoft MetaShape software. This is carried out by mine technicians in conjunction with the survey department, thus freeing up valuable time for geologists. A high resolution 3D image is available to the geologist for ore drive decisions within hours of capture. Python scripting is utilised to streamline the process. Scans are imported into CloudCompare, with geological and structural information automatically extracted. All data is imported into Leapfrog and detailed geological and structural models generated, updated with the latest data and shared for use by all personnel in the technical services department.

The immediate advantage of the implementation of this technology is higher quality and improved geological interpretations with the ability to modify those interpretations immediately after data capture. This in turn leads to better geological models, with direct positive production benefits.

The utilisation of machine learning is being investigated to further categorise veins, alteration, and lithology.

In the future it may be possible to have data processed in real time at the development face enabling the ore control geologist to make immediate decisions on ore drive direction.

Keywords: photogrammetry, machine learning, ore control optimisation