Geophysical blast hole sampling

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Manual sampling is a long-standing traditional method of assaying blast holes. However, this method has several drawbacks, including the safety issues around having personnel performing manual samples in a harsh environment and the human variability involved in getting a representative "shovel full of dirt". A typical manual sample (a 4 Kg calico bag) is less than 1% representative of the volume of a typical blast cone.

Downhole Assaying has been introduced, which uses an elemental spectroscopy tool to log the holes (much as standard geophysical logs like gamma ray, density, and televiewers are acquired in RC holes). This tool, together with a semi-autonomous logging platform not only gives a much better representation of the rock, but also minimises manual handling risks and the human variability.

This paper outlines a project that has been in trail at the Fortescue mine sites over the last few years and is now being implemented at all operational hematite mine sites.

Fundamentally, the combination of a geophysical tool and semi-autonomous truck are the way forward for a safer and more productive blast hole sampling method. The method utilises a neutron-generating geophysical tool and sensor, which measures the response of the material surrounding a blast hole, and then delivers a proxy-assay at sub-metre intervals. This is then utilised similar to a blast-cone sample results (but with much better vertical assay resolution) to map out areas within the blast pattern that are 'ore', 'waste', or 'other suitable grade'.

The paper will present on the journey of testing and calibrating these tools on RC and Diamond drill holes, and then integrating the processes into the operational environment.