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# Determination of rock material properties to design robust support at Unki Mine

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## ABSTRACT

Since mining platinum started at Unki Mine in 2005, large and small geologically controlled falls of ground (FOG) have been problematic especially in 2011 where a FOG caused a fatality. This study is about determining the rock properties at Unki Mine and then using the results to design and recommend robust support to reduce the FOG problems that are continuously happening.

The study analysed all the FOG data from the mine database from 2010 to 2015 using statistical methods. Rock properties of the hangingwall, ore zone and footwall were determined from the laboratory tests. The geological structures were also mapped carefully. The results were then used as input data to the numerical modelling softwares Phase$^2$ and J-Block.

The J-Block program was used to determine the number of keyblocks that were stable, unstable and failed with support in designated and specified bords. A probabilistic approach was used to evaluate the stable span with special reference from small to large hangingwall instabilities for different mining scenarios. It was found out using Phase$^2$ that large spans at Unki Mine are possible provided appropriate and robust support system is adopted. To fully address the issue of FOG problem at Unki Mine, a probabilistic approach is recommended as this is considered to be more appropriate than a deterministic approach that has been the traditional design approach so far.