Mining Floor Design and the Control of Ore Contamination at the CBG Mine in Guinea

This article was submitted by our MineSight Applications LTD. South Africa office, providing service, technical support, and training to MineSight® clients in Africa.

The CBG mine is located in the Republic of Guinea, West Africa and is one of the world's largest bauxite resources. This deposit is particularly unique due to the historically very high grades of bauxite mined. CBG is the largest single producer of bauxite globally. Since it began operations in 1973, the Republic of Guinea has become the leading supplier of bauxite to the Western world.

Bauxite ore bodies typically lie close to the surface, are relatively thin and extend over a very large area. The ore is mined from shallow open pits using loaders and excavators.

Ore contamination and dilution from the underlying footwall lithologies are major concerns and must be carefully controlled. The undulating footwall places restrictions on where mining equipment can operate and this surface needs to be adjusted to ensure safe and efficient operation of equipment and to minimize contamination from the footwall.

MineSight® is used to define the footwall surface, calculate and display the maximum slopes on this surface where mining equipment can operate, adjust the surface to enable equipment operation, and export this surface to GPS monitoring equipment located on loaders and excavators.

The footwall surface is created by generating marker points from the drillhole view at the top intersection of the footwall lithology. These points are triangulated and the resulting surface is gridded to a Gridded Surface File (GSF) (Figure 1).

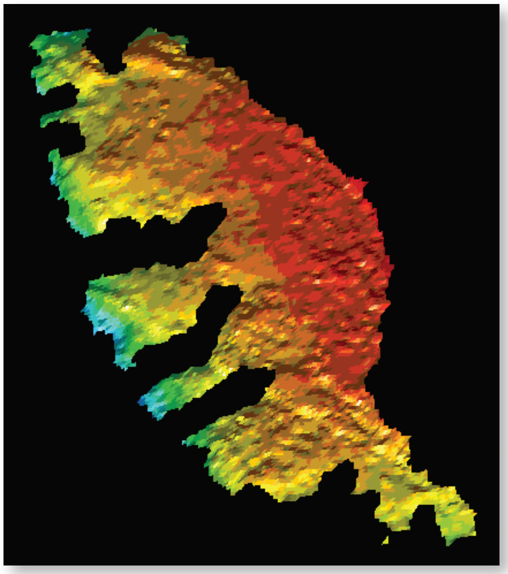

Figure 1. Gridded Surface of the footwall as determined by drillhole data.

Procedure **GRDSLP** is then used to determine the slopes on this gridded surface. The maximum slope for each grid cell relative to their neighbouring grid cells is identified. This calculated maximum slope angle is saved to a previously defined item in the GSF, called SLOPE.

A new view to the GSF is created using SLOPE as the primary display item and color cutoffs are set up for the required maximum slope. For this example, grid cells with slopes of 10% or greater are displayed as red and slopes less than 10% are displayed as blue. Problem areas on the footwall can then be immediately identified (Figure 2).

Figure 2. Slopes on the GSF greater than 10% are displayed in red.

The footwall surface must then be edited and adjusted to less than the maximum allowable slope. To enable easier editing, the footwall surface is displayed as a wireframe and the GSF is displayed as transparent filled polygons. Contouring the surface will also help identify these problem areas. The drillholes are also displayed showing ore and footwall lithologies.

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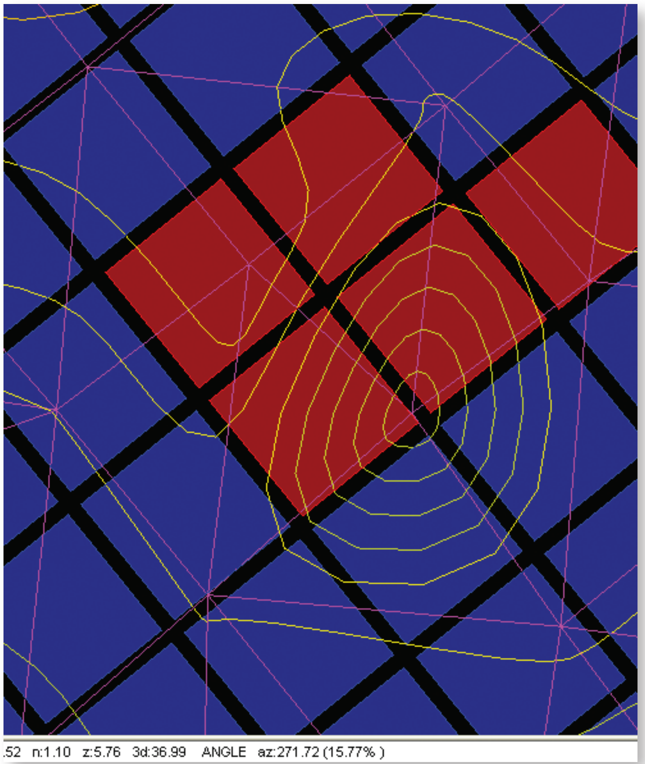

Figure 3. Wireframe, GSF, and contours of the footwall surface are displayed. The slope of a triangle face is displayed in the status bar.

The slopes of all the triangle faces that run through the problem grid cell can be checked by snapping on and dragging the cursor between their vertices and reading off the slope from the Status Bar (Figure 3). The triangle face with the steepest slope should be adjusted to the required 10% slope. This can be done using a reference polyline digitized between these two points and then using the **Polyline | Substring | Adjust Elevations** function to adjust to the required slope. The elevation of the vertex point on the surface is then moved to the same elevation of this adjusted reference polyline (Figure 4).

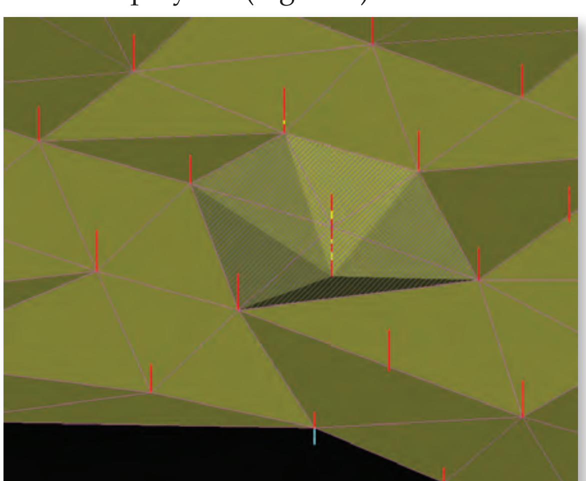

Figure 4. Original surface (yellow) and adjusted surface (purple wireframe).

This process is repeated in all the problem areas where the slope is greater than the defined maximum. The adjusted surface is then saved and re-gridded to the GSF and procedure **GRDSLP** is run again to check the slopes of the new surface. When editing is complete, the adjusted surface will be loaded to the GPS surface monitoring equipment on the excavators and loaders which will help control the vertical depth of mining and ensure minimal contamination and dilution of the ore.

Volume calculations between the original and adjusted surfaces can also be done to calculate the actual resource available to be mined.

The **GRDSLP** procedure can also be used for rehabilitation where maximum slope criteria need to be adhered to. It can also be useful during exploration to identify areas where drill rig set up would be difficult and access preparation necessary.

Photos for Mine Calendar Requested

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The photographs may be digital (minimum of 150 dpi in jpeg, bmp, or tiff format) or print (5”x7” - 8”x10”). Sharp focus is important and visual drama always attracts attention. Submission of photograph(s) implies consent to publish. Bylines, credits, and mine identification should be included with submission. Submit photographs to:

Robert Ashbaugh, Mintec, Inc.
3544 East Ft. Lowell Rd.,Tucson, AZ 85716 USA
or via E-mail: Robert.Ashbaugh@mintec.com

Reminder

Remember to periodically check the Mintec web site at www. mintec.com to make sure you have the latest MineSight® updates.

The update files can be found at:

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