MAPTEK™ Vulcan™

CUSTOM SCRIPTING & OBJECT ATTRIBUTES

Sumitomo Metal Mining uses Vulcan object attributes and custom Lava scripting to help model the geology of the Pogo Gold mine in Alaska.

Pogo Gold Mine is located near Delta Junction, Alaska. Exploration began in 1990, gold deposits were discovered in 1994 and production was launched in 2006. The Pogo mine exhibits a large scale quartz vein system, often with well-defined hanging walls and footwalls on the ore zone.

The size and age of the deposit present many complications. The original shape was far from perfect with local pinch and swell common. This structure was later intruded, sheared, and faulted. The original grade was often very locally stratified.

Mining this deposit economically sometimes results in missing footwall data where nearby drilling anticipates good grade on the footwall up-dip, but the drilling is too distal to rely on for local vein thickness. This information should be considered for the next up-dip stope design. Where data is missing, the objective is to infer reasonable data points for applying to stope design.

Geological modelling

The geological model requires a footwall. Data often only dictates that it is 'at least' this far down; it does not always show exactly where the footwall is located.

Point attributes, specifically the display attributes, are used to portray source data and confidence level for individual points.

The geology department stores drilling data in a third party SQL backend database. Maptek™ Vulcan™ simplifies connection to the database which is available to engineering staff through an ODBC connection. This allows them to access the most current data and eliminates export time.

Drilling data is not the only information used by geologists for modelling the deposit. In-stope data points recorded using a total station carry the highest priority, and take precedence whenever there is a conflict.

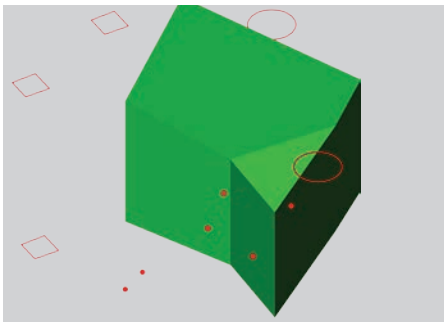
These points, along with the drillhole data points, are supplemented by inferred data points when the geological model requires further definition.

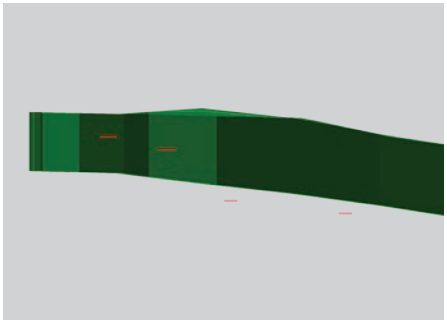
Issues

A common problem is a locally missing footwall. The original physical dimensions of the vein system vary locally and are further complicated by subsequent faulting. For production reasons, a stope may be mined following only the hanging wall.

A geological model update, based on this in-stope data, lacks a local footwall location. In the absence of local drilling, the conservative approach is to model the footwall to the lowest elevation represented in production face mapping.

The result is a physical geological model that represents a vein that is 'at least this thick'. The problem is that the stope design engineer does not know, by just looking at the physical or grade models, what areas are questionable.



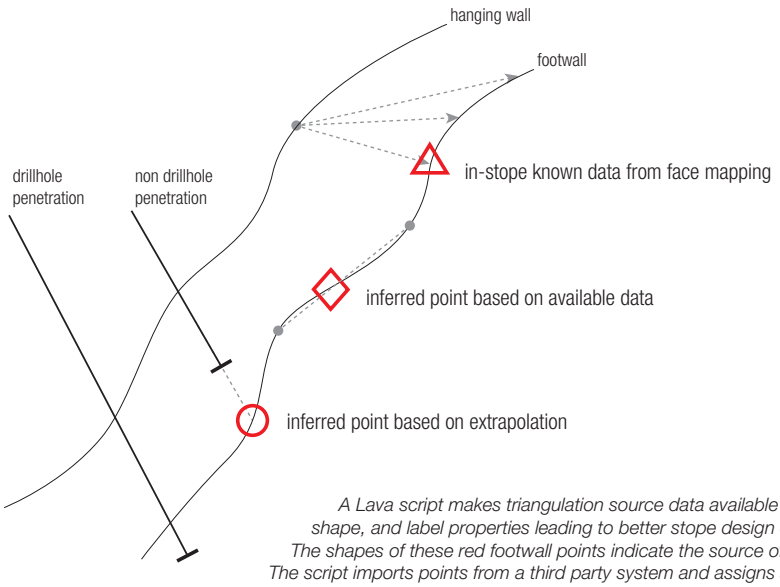


Differentiating source data

When modelling, a common practice is to use different display styles for points to portray different types of source data.

At Pogo mine blue is used for hanging wall and red for footwall. Further, the shapes of points are important, especially in the inferred data set.

- Triangle: A 'regular' inferred point, interpreted from a face map.
- Diamond: An inferred point that extrapolates the model as far as possible based on the available data.
- Circle: An inferred point that extends the model based on extrapolation from drilling intercepts. This most often happens when adjusting position and elevation data from older surface holes with deep intercepts.



A Lava script makes triangulation source data available as colour, shape, and label properties leading to better stope design decisions. The shapes of these red footwall points indicate the source of the data. The script imports points from a third party system and assigns attributes.

Another point attribute provides a description of the source for the point location. Inferred and extrapolated points can be labelled with the stope that generated the data. If the point data source was a drillhole, the drillhole ID goes into that same attribute. Setting the 'label' to that attribute shows the data source for each point.

EVEN WITHOUT LABELS, THE SHAPES OF THE POINTS IN VARIOUS AREAS YIELD IMPORTANT INFORMATION WHEN DESIGNING A STOPE BASED ON THE PROVIDED MODEL.

An area where the footwall data is defined by all diamonds indicates that the geological model extends at least down to that elevation, but the real footwall may be significantly lower.

The data is made available to the stope design engineers via an ODBC connection and Lava script. This makes the most current data available without requiring constant requests for exports from the geological database. The script assigns the correct symbol name based on the type of point; it also assigns the label data.

Running the script is simple and fast, making the script-created layers disposable, with no need to maintain them.

Lava script

A Lava script based on the Pogo mine example is available in the Maptek Users Area at users.maptek.com. Navigate to Solution Articles and search for 'Script: Reading a CSV through ODBC, creating points, and assigning attributes using Lava'.

Thanks to Steve Polkowski
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