"The true mystery of the world is the visible, not the invisible."
Oscar Wilde

BasRock Software for Geotechs Newsletter
2015 Quarter 1
BasRock
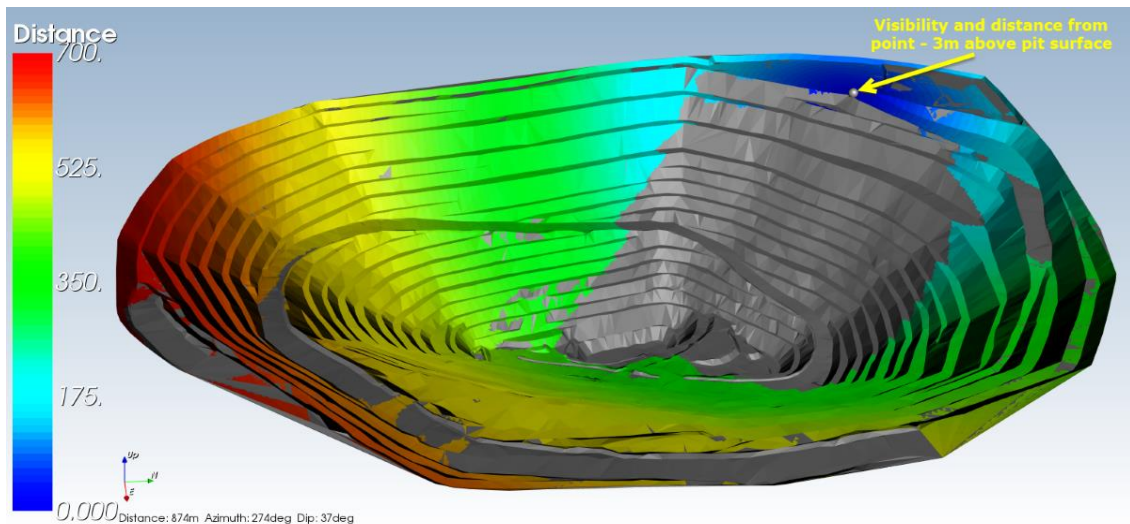
Use the Facebook page to stay up-to-date with developments, and use My blog to get the detail on version additions, changes and instructions.

The latest available software packages (currently free of charge):

GEM4D: A 3D "drag-and-drop" DXF-visualiser that also provides the specific functionality required by Geotechnical Engineers - see a video here.

Trajec3D: A 3D rigid body dynamics rock fall analysis program that accommodates fall bodies of any shape and size with movement in real time - see a video here.

PhotoCoreLog: Image preparation and automatic recording of the core logging

Trajec3D Manual and GEM4D Training

A Trajec3D Manual is now available from here. The manual is a working document and covers the basics of rockfall simulation, rock fall variables, and instructions on using the program.

If you are interested in attending a GEM4D GoToMeeting on-line training session, please send an e-mail to mail@basrock.com, and I will invite you to join your selected session (free of course) - please be very specific on the session that you would like to attend. Both sessions will cover the same material, and I hope to reach all time zones with the selected time slots.

Screen sharing will be done with GoToMeeting, and a separate telephone conference line for voice. The reason I prefer to keep them separate, is to ensure that the full bandwidth is available for the video. **All GEM4D sessions are on Saturday 18 April and will run for around 40 minutes.**

- *Session 1:* 18 April 08h00 *(GMT+8 - Perth time)*

measurements from photographs into a data grid.

The sessions will be an introduction to GEM4D, and will discuss the program logic, layout, and the best way to use the software for maximum benefit. These sessions will cover the basics, and only touch on more advanced topics. Training sessions with a focus on the advanced applications will be arranged later in the year.

Visibility from a point

The areal coverage from a point can be deceptively difficult to judge in open pits. GEM4D now has an option that colour code the pit according to visibility from a mouse picked point (thanks GS). This can be combined with other colouring options as demonstrated in the large top image, and image to the bottom right. The grey areas in both images are invisible from the respective points, and the visible area in the top image coloured on distance, and the image to the bottom right on impact angle.

This is useful when evaluating set-ups for survey total stations, radar effectiveness from specific locations, and to determine the overall visibility from a location. Use the right toolbar bottom button and select "Colour visibility from pick". As collision detection testing is required between the selected point and every polygon centre, and this process can take a few of minutes to complete for detail triangulations.
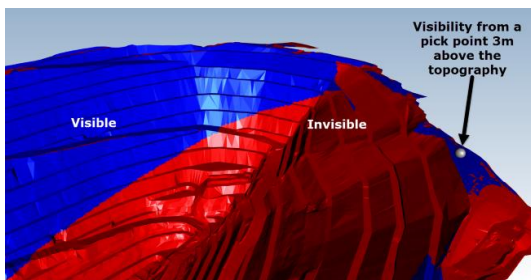
Radar visibility and accuracy

The large image at the top and the image below combines a few GEM4D functions to generate the illustrated effects:

1. Use the right toolbar bottom button (paint colour canvas icon) and select "Colour visibility from pick". Select the appropriate parameters in the pop-up box and pick a point in the scene.
2. Save the file with the top toolbar "Save => Save scalar colours as DXF-file". This breaks the polygons into separate objects for the different colours. Load this file and use for Step 3.
3. Colour the pit with the vector impact angle from the selected point with the right toolbar bottom button and select "Colour accuracy loss from pick".
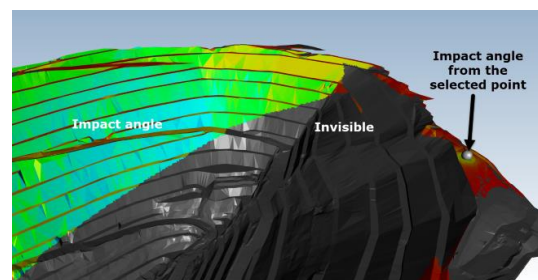

GEM4D + Trajec3D = Simulating rock falls Down Under

GEM4D and Trajec3D can be combined to achieve results that would otherwise be difficult to accomplish. Although Trajec3D is largely used for rock falls in open pit mines, the physics engine is equally applicable to rock flow in passes and into underground voids.

An interesting question came from a site (thanks AF and ND). When co-disposing waste rock with paste or hydraulic fill into primary open stopes, the accumulation areas of the waste is important. If the waste rock accumulate against a wall that will be exposed, the waste material will rill into the void and cause dilution. The waste pass design can be effectively used to divert the waste material, but a simulation tool is required to understand outcomes and trajectory paths. The images below show simulations from Trajec3D. The triangulation preparation and waste pass design was done in GEM4D.
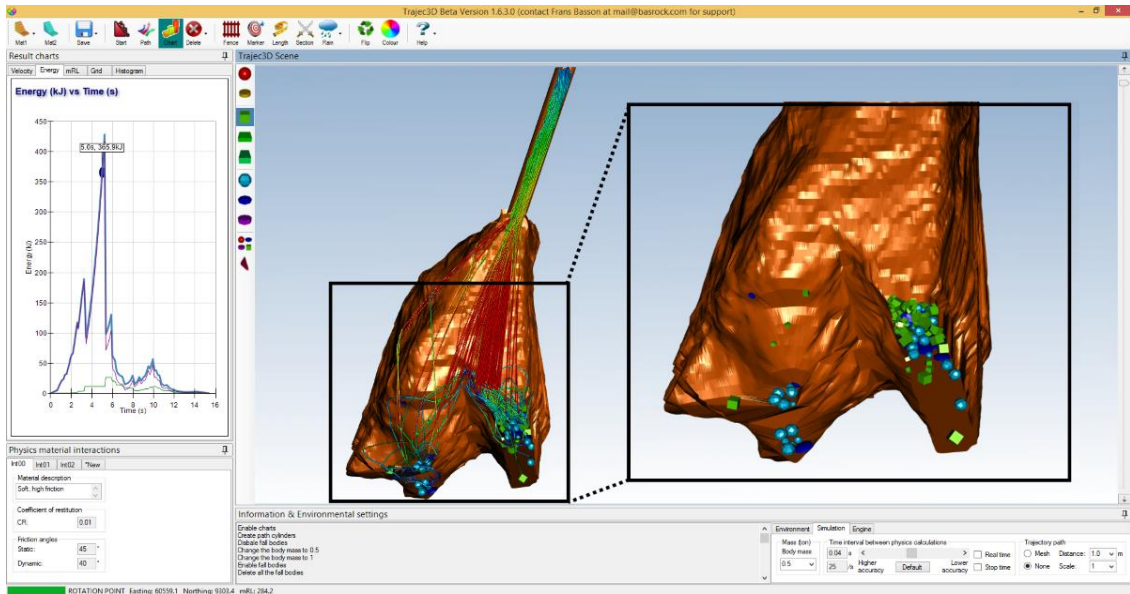
Opened DXF-file with saved colours
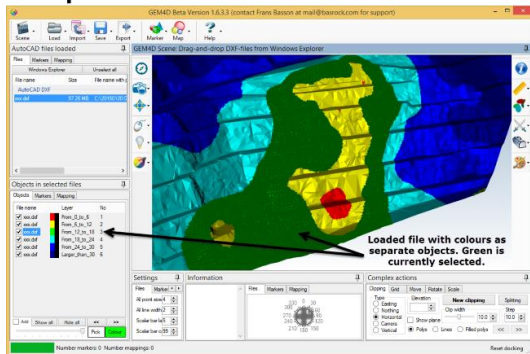
Different marker shapes
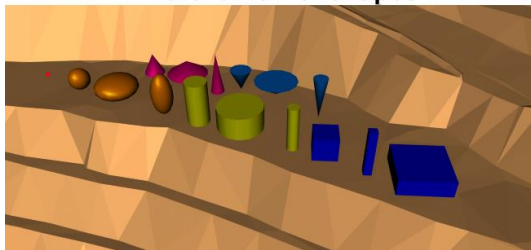
GEM4D Shortcuts

Some of the shortcuts in previous versions of GEM4D were automatically added by the graphics library, but I decided to disable those and only support custom shortcuts from Version 1.6.5.0.

- "*b*" cycle through background colours "*White*", "*Black*", and "*Gradient*" (default).
- "*c*" quick key to copy the screenshot to the clipboard.
- "*i*" initialise the scene - place in "*Plan*" view.
- "*o*" quick key to open a DXF-file.
- "*v*" cycle through the views "*North*", "*East*", "*South*", "*West*", and "*Plan*".
- "*Space*" starts the scene auto-rotation.
- "*Escape*" stop the scene auto-rotation.
- "*Shift*" multiple selections when selecting objects in the scene, lists items, or the data grids ("*Marker*" and "*Mapping*"). Selection of objects in the scene only works when you are in "*Information*"-mode (when the top "*i*"-toggle button on the right toolbar is "*ON*").
- "*Control*" temporarily disable the selected action - enable rotation, zooming and panning of the scene after a action is selected (without exercising the action as long as "*Control*" is pressed).

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