Tips for successful triangulation

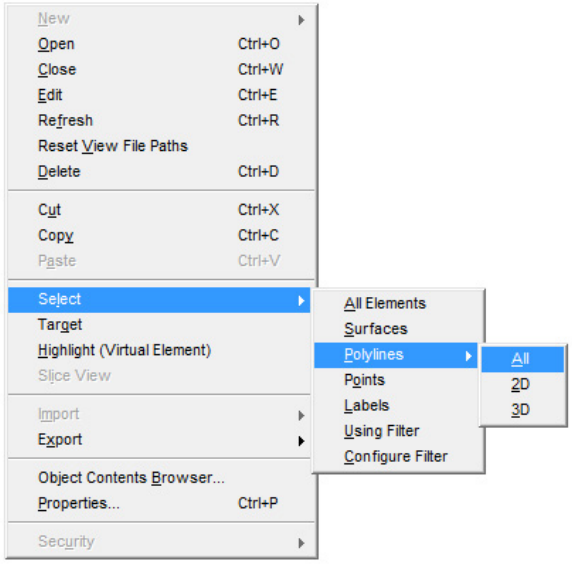
Triangulations at Large

Triangulation of large amounts of data in MineSight can present some challenges. Here are some tips to help you triangulate successfully and ensure good results even when using a lot of data.

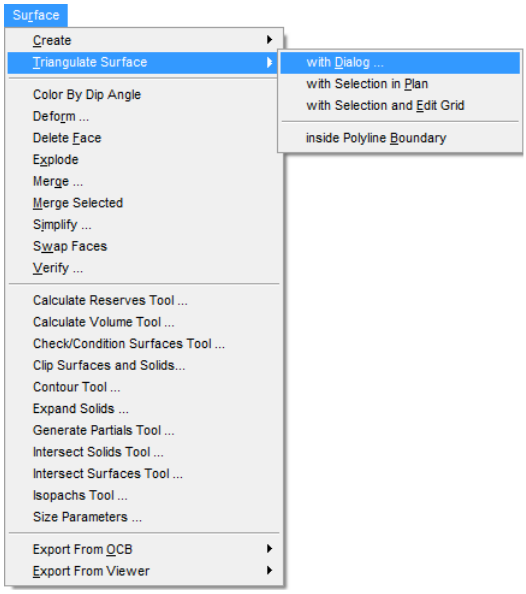
Triangulating Large Surfaces with MS3D

Before starting it is important to make sure that your project limits (File → Project Settings in MineSight 3D) match the extents of your data. If the project limits are very different from your data extents, there may be some precision loss in the triangulated result. Correct project limits are very important in MineSight 3D as all data is displayed and managed relative to the project minimum. If you do open a geometry object and make changes to it, you can lose precision on the geometry when the project limits are significantly different than the data limits.

How to pick the data you are going to use - When triangulating with a large amount of polylines or points it is always better to select the data from the Data Manager (Right click → Select → Polylines or Points). Not only do these elements quickly get added to the select mode, but you can select several objects at once and even filter by plane, element type, or attributes.

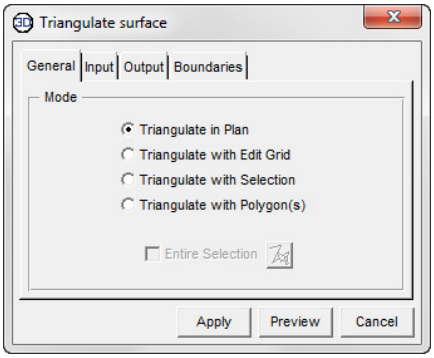


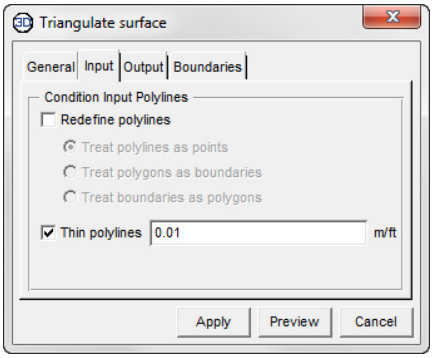
Triangulate with Dialog is the way to go – This function is the preferred way to triangulate data, especially when dealing with large amounts of data. It has all the options that the other triangulation functions do, with the added convenience of a preview.

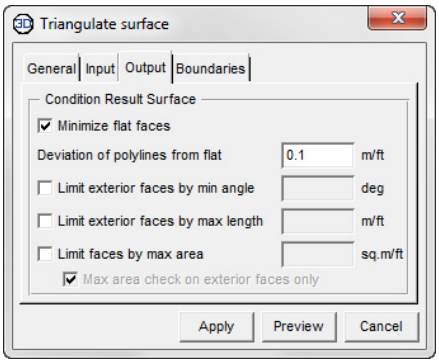


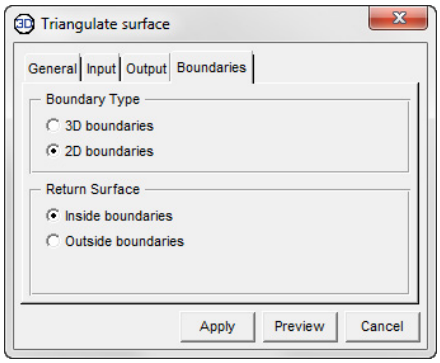
Options in the Triangulate with Dialog include “Thin polyline”. This reduces the number of triangles created when the polylines being used have too many points, without having to permanently alter the original data. It acts as a virtual polyline thin just for the triangulation function being used.

When using polyline type data to triangulate, avoid using the “Redefine polylines - Treat polylines as points” as it could compromise the accuracy of surfaces by ignoring the polyline structure and just treating the data as point data.

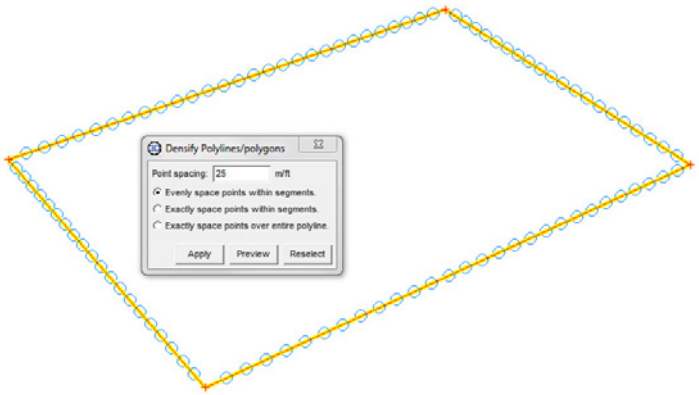




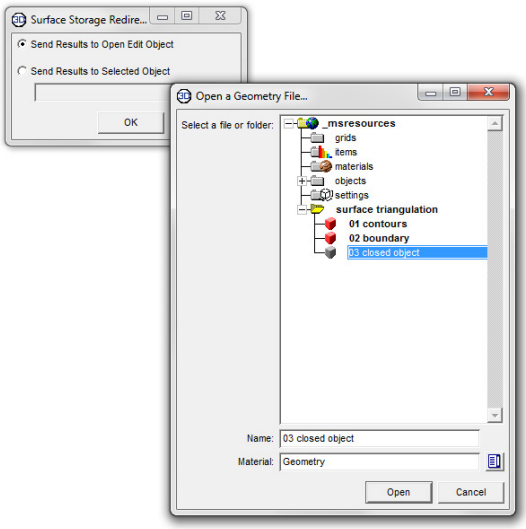




You can also take advantage of options such as “Minimize Flat faces” for more realistic results when triangulating contour lines. This option looks for triangles between different lines instead of creating flat triangles on the same line. Other options include limiting exterior faces by minimum angle, or maximum length or area - ideal for controlling boundary data that need not be triangulated. And finally, if polylines have been assigned a boundary type of Material, they can be used as limits in the Boundaries tab. The triangulation can use the points in the boundary as part of the elevation (3D) or not use them (2D – Cookie cutter effect). When making a boundary to be used on large data, it is a great idea to densify this boundary polygon. This helps the boundary function subdivide the number of intersections per segment into smaller, more digestible pieces.



Case Closed – Here's another tip when triangulating with a large amount of data. Store the results into a closed object. This will minimize the amount of memory that MineSight needs when it displays a triangulation.

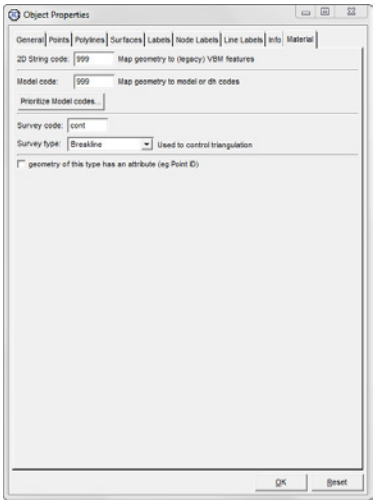


Triangulating Surfaces Using DTB standalone engine.

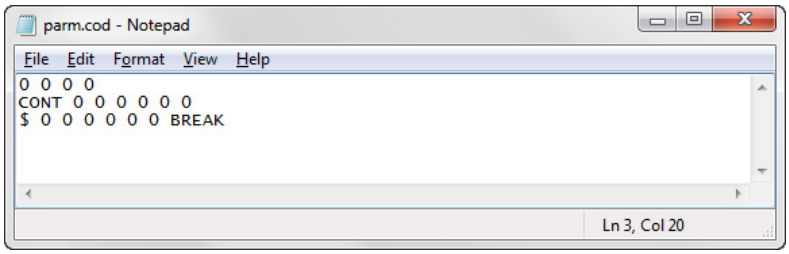
Delaunay Triangulation is the engine this executable uses to triangulate survey data, and it is the same engine that is used inside MineSight 3D. Survey data can consist of points and strings, which are used to create a mesh of triangles. There are four different setup options for this program: interactive mode, piping, command line, and run file.

In interactive mode, enter all information in a response to questions provided by the program. You can prepare a file with answers to these questions and, using the piping technique, forward answers to all questions from that file. You can export the survey data from MS3D geometries which have been prepared. The following figures show an example of a DTB run.

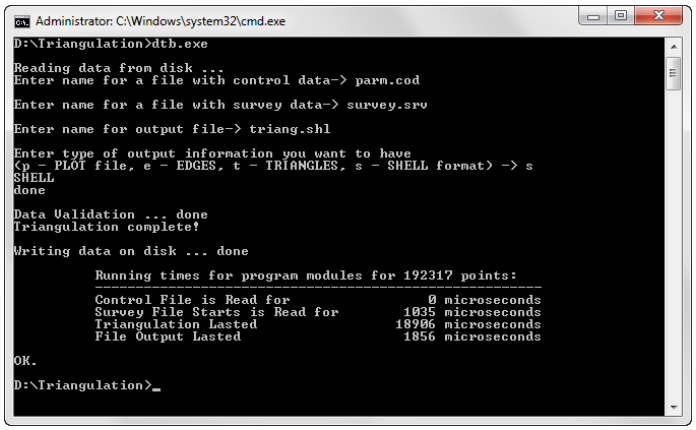
If using contours for example, a Material must be set up with a survey code specified:



You can prepare a parameter file, as shown below. The important portions of this text file for triangulations are that the survey codes are the same as the material survey code, and that the final line is as in the example below. The other parts of this file can be used as in the example. They are placeholders that do not need values for this procedure; they do not have any affect as far as the triangulation is concerned.



Finally in a command prompt (example shown) or from a script, you can run DTB.exe:



Making sure your results are good – An important part of the triangulation of large data sets is to verify your results. Visually inspecting the results as well as performing checks through the Verify tool are essential ways of getting a sense of how well the triangulation came out. Once it is triangulated the surface can be repaired, clipped, decimated all with the goal of ending up with a manageable and reliable surface.