ACADEMY

GEOMAX

TUTORIAL
SURFACES & VOLUMES

Surfaces & Volumes

DESCRIPTION

- Build Surfaces
- Calculated Volumes from Surfaces

GOAL

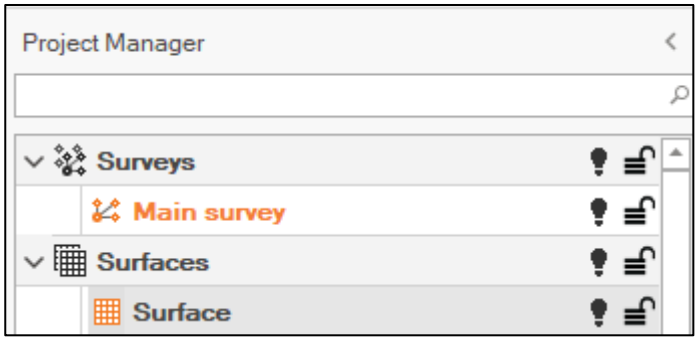
- How to import and create surfaces
- How to calculate and export a volume calculation

DATA

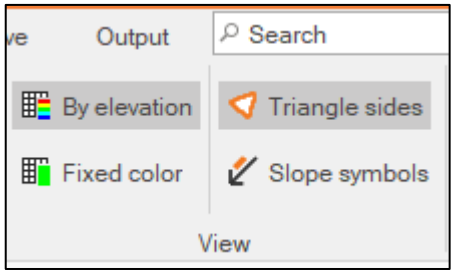
- DTM.gfdoff

Import a surface

- A surface can directly be imported from different formats
- The surface is included in the project manager, separated from the survey data
- Each new imported surface is added to the project manager

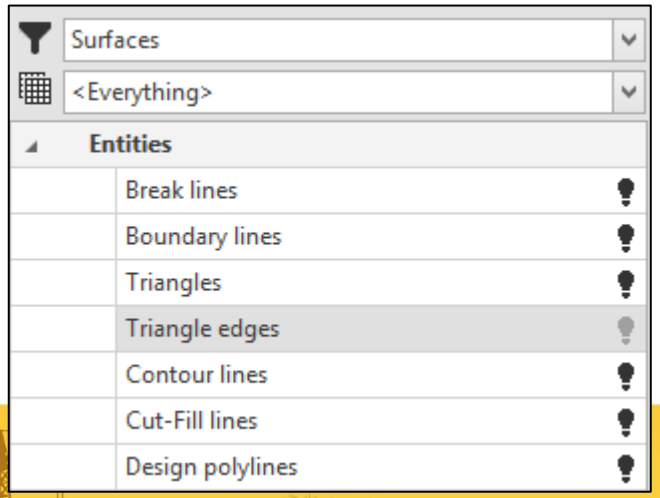


Surface visualization



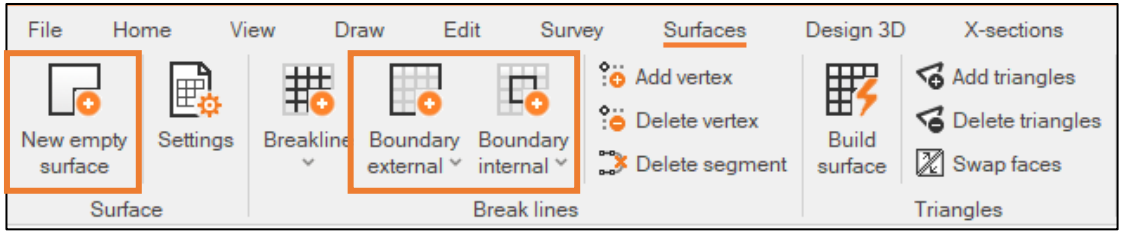
A surface can be displayed in different modes:

- BY ELEVATION: the color changes depending on elevation
- FIXED COLOR: surface color is homogeneous
- TRUE COLOR: using true color from point cloud
- TRIANGLES SIDES is used to display the sides of the triangles componing the surface



- The filters allows to show/hide different information related to the surface visualization

Surface creation



- **NEW EMPTY SURFACE**: to create a new empty surface; the surface is added to the project manager

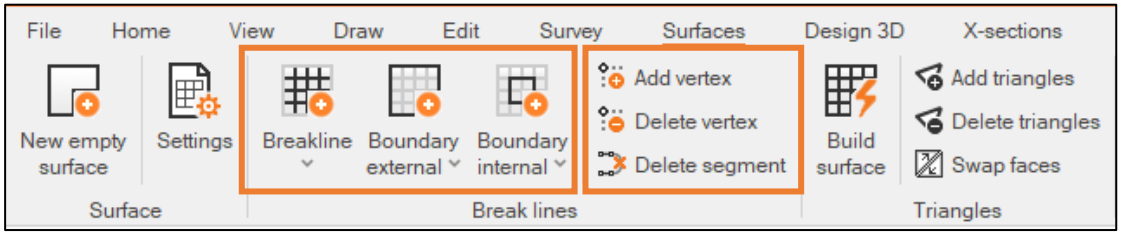
- **BREAKLINE**: breakline defines where surfaces have an interruption in the slope

- **BOUNDARY EXTERNAL**: defines the external perimeter of the surface; triangles will be created in the internal side of the perimeter

- **BOUNDARY INTERNAL**: defines the internal perimeter of the surface; triangles will be created in the external side of the perimeter

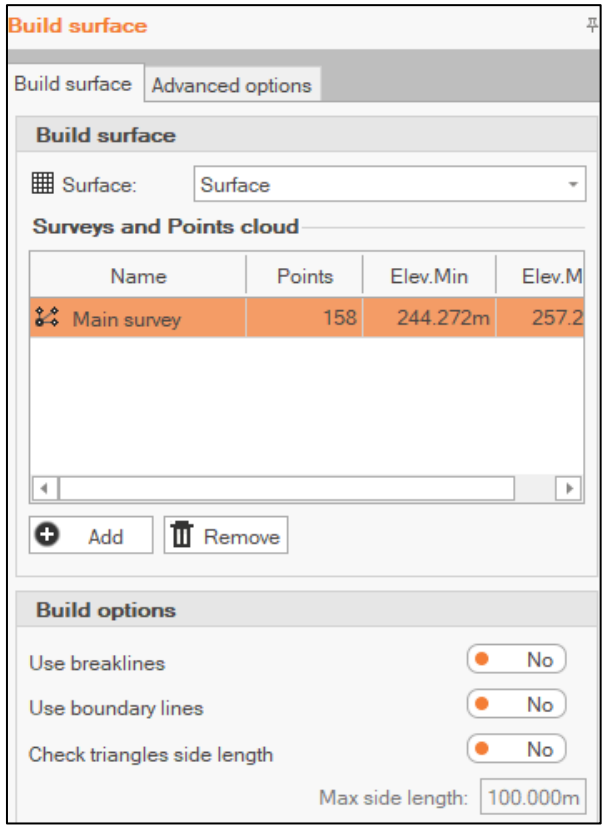
Surface creation

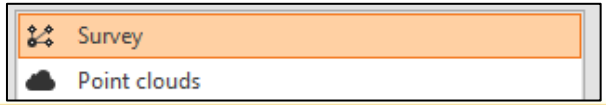
- Breaklines and boundaries can be selected from the drawing elements or defined by polyline before the surface creation



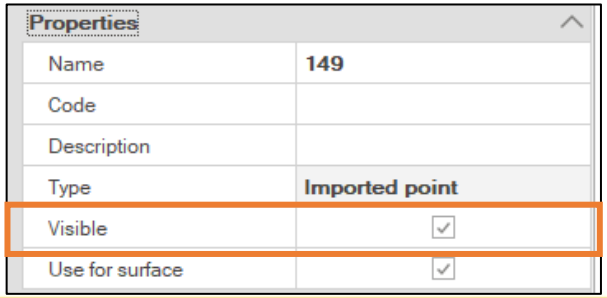
- Add vertex, Delete vertex and Delete segment functions can be used to edit the created breaklines and boundaries

Surface creation

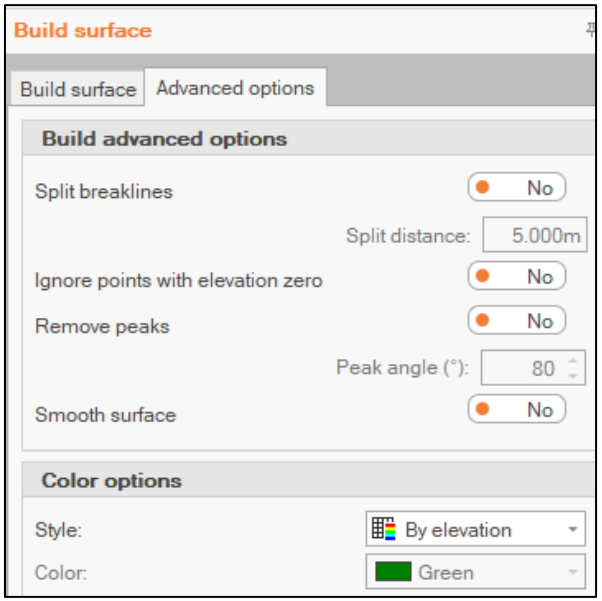




- Using the Build Surface function is possible to create the surface from job elements
- Add to the tab the elements used for surface creation
- Survey points and point cloud can be selected
- To not use a point, deselect the option from point property page



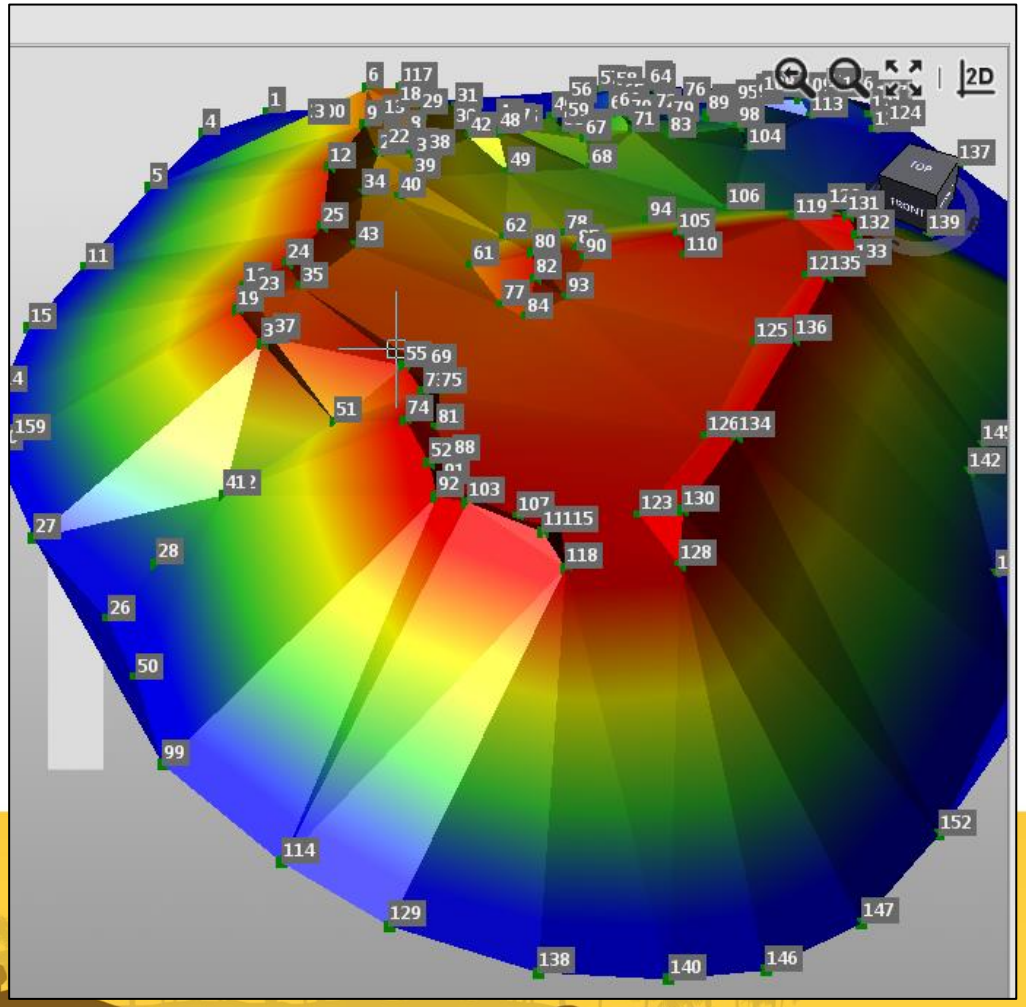
Surface creation



- In the surface creation options select if breaklines and boundary lines are used
- *Ignore points with elevation zero*, *check triangle side lengh* and *remove peaks* are used to remove triangles that could be wrong

Surface creation

- Surface with its properties are displayed in the property menu



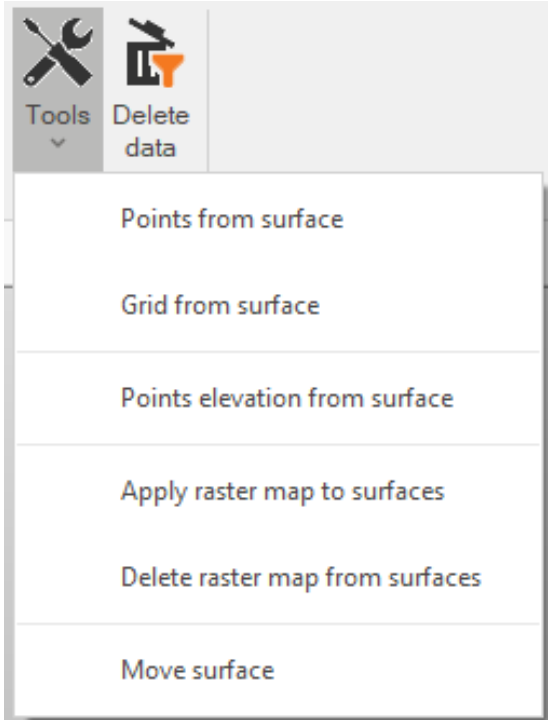
Properties

Surface	
Name	Surface
Visible	☑
Locked	☐
Color	Green
Transparency (%)	
Use unique color	☐
Render mode	By Elevation

Filters	
Break lines	☑
Boundary lines (internal)	☑
Triangles	☑
Triangle edges	☐
Contour lines	☑
Slope direction symbols	☑
Cut-Fill lines	☑
Design polylines	☑
Calculation zones	☑

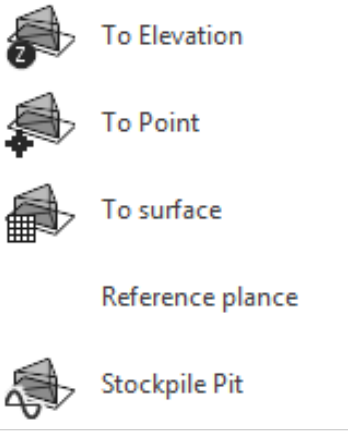
Info	
Break lines	0
Boundary lines (internal)	0
Boundary lines (external)	0
Triangles	283
Vertices	155
Calculation zones	0
Min elevation	244.272m
Max elevation	257.217m
Area 2D	4284.90m²
Area 3D	4924.13m²

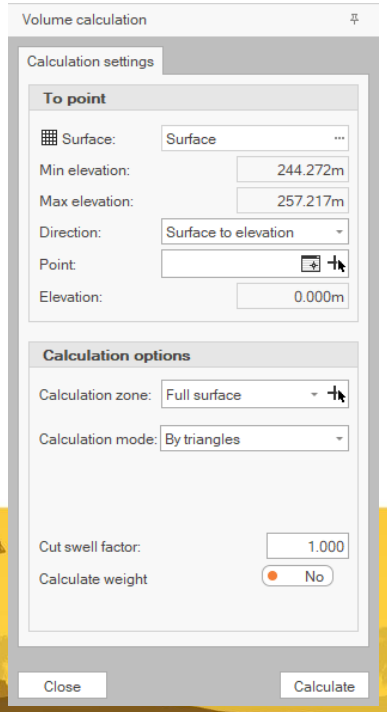
Surface tools



- **Points from surface**: creates points from a surfce
- **Grid from surface**: creates a new grid surface from a reference surface
- **Points elevation from surface**: calculate the point elevation from a reference surface
- **Apply raster map to surface:** used to color a surface using a raster map laying over the surface. Maps extracted from Web Map tool can be used for this purpose

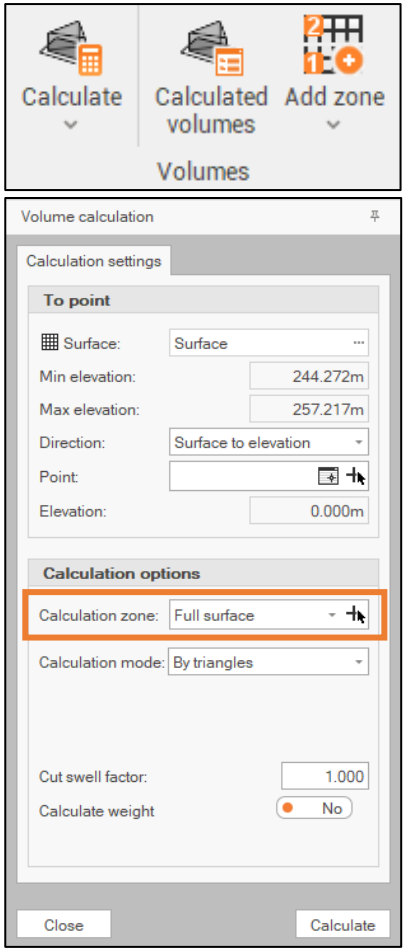
Volume calculation





- **To Elevation:** calculate the surface volume according to an elevation
- **To Point**: calculate the surface volume according to the elevation of a topographic point
- **To Surface**: calculate the surface volume between two different surface
- **Reference plane**: calculate the surface volume according to a reference plane
- **Stockpile Pit**: calculate the volume between the surface and the perimeter surface

Volume calculation – Add Zone

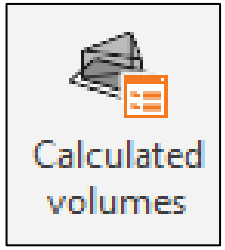


In the surface it is possible to define calculation zones in order to calculate the partial volumes for each zone. It is not necessary to divide the surface in multiple parts to have sub-volumes; just define the zones and run the volume calculation:
the volume will be calculated exactly on the selected zone.

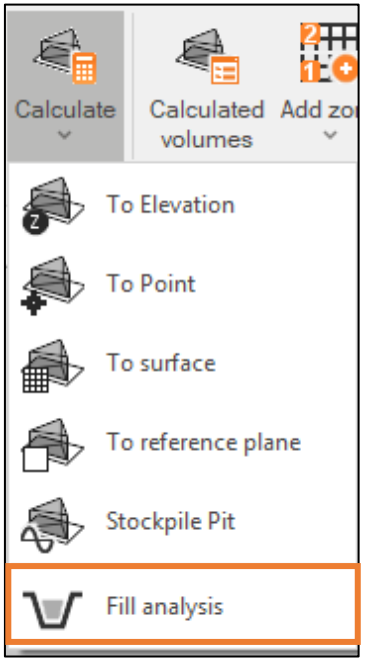
This feature can be very useful in multiple cases, whenever it necessary to have sub volumes: multiple owners, different material with different costs, multiple excavations or piles of materials

Volume calculation

- Volume can be calculated with different methods (triangles, REB VB22.013, by grid)
- After a volume calculation, the result can be saved and exported in a report
- Saved calculations are stored in a dedicated database



Fill analysis



- Fill analysis perform the fill analysis on a surface by different methods
- By elevation calculate the fill at given elevation
- By fill, calculate the elevation to obtain the given fill value
- Step by Step calculate how changes the fill while changing the elevation, and plot the results