

GM3D

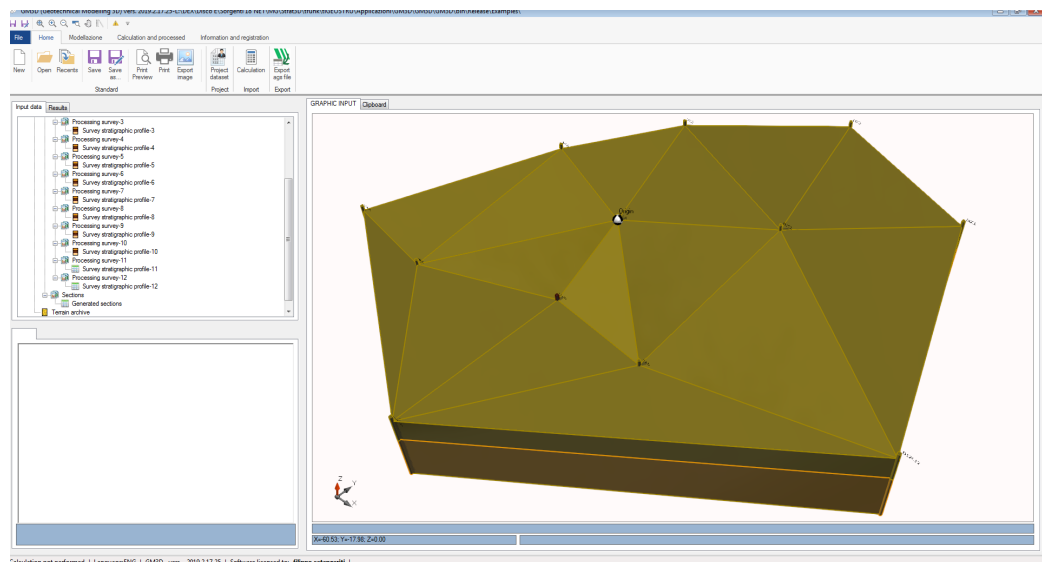
Part I	
Introduction	1
Part II Application structure	1
1 Home	2
2 Modeling	3
3 Calculation and processing	4
Part III How to assign the surface texture	5
Part IV Structure of the input model	6
1 Topographic surface	6
2 Survey processing	9
3 Sections	14
4 Terrain Archive	15
Part V Processing	16
Part VI Geoapp	17
1 Geoapp Section	18
Part VII Contact	18
Index	0

1

Introduction

GM3D is dedicated to the interpretation of geological and geotechnical surveys with a three-dimensional approach.

In particular, the software is a tool used to interpret the stratigraphic model in 3 dimensions and not, as usually happens, in 2 dimensions. An example of application of the software can be to establish the trend of the stratigraphic profile starting from a set of punctual stratigraphic surveys (which therefore define the stratigraphy in a given point).



2 Application structure

The basic commands are grouped in the following tabs:

1. Home;
2. Modeling;
3. Calculation and processing;
4. Information and registration.

2.1 Home

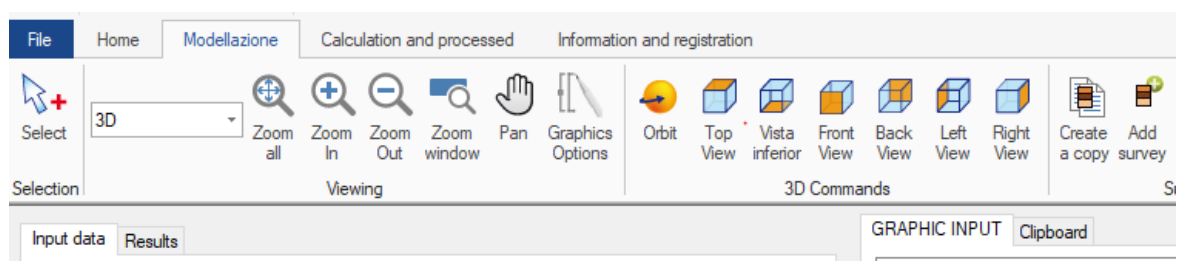
The Home tab allows you to activate all the features that are classically available for a file. The available functions are as follows:

1. New: Allows you to create a new file (possibly saving the current one);
2. Open: Opens an existing file;
3. Open Recent: Opens an existing recent file;
4. Save: Save the file. If the same has not already been saved then it will be necessary to select the path of the folder in which to save the file;
5. Save as: Save the file. Unlike the "Save" function, the save as function will always require selecting the path of the folder in which to save the file;
6. Print Preview: Will display the print preview;
7. Print: It will start the dialog box for printing what is displayed on the screen;
8. Export Image: Allows you to export the contents of the graphic window into an image. It will be possible to export images in the following formats: .bmp, .png, .wmf, .emf
9. Project data: It will be possible to manage the general data of the project:

10. Import ags file: Import an ags file. The format is the standard format for the exchange of information in the geotechnical field;

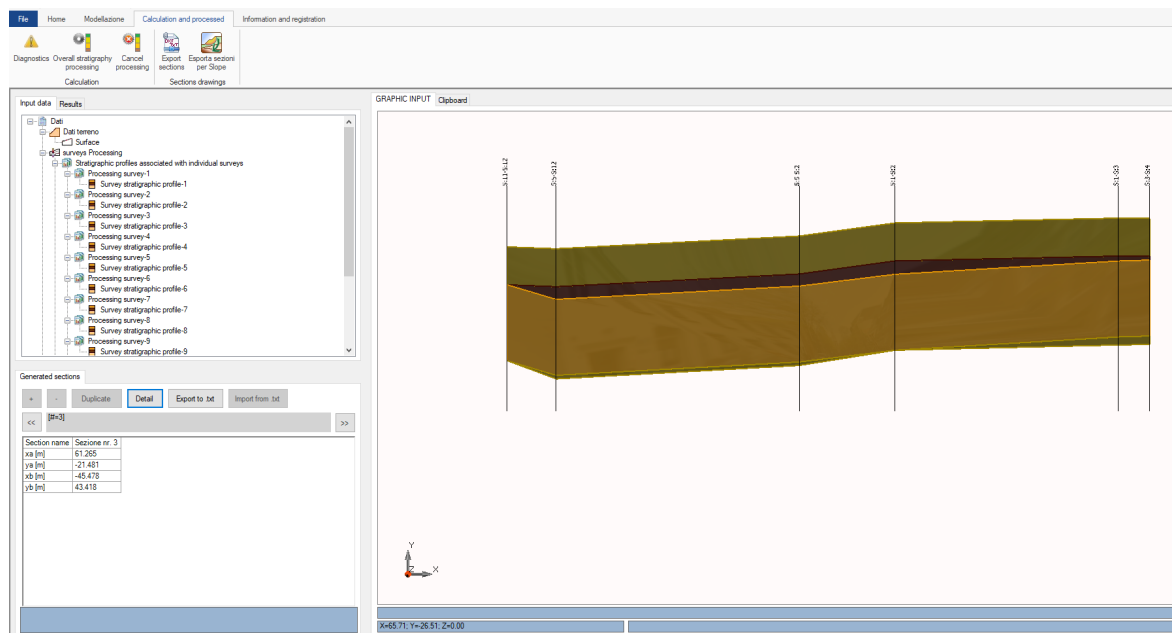
11. Export ags file: Import an ags file. The ags format is the standard format used for the exchange of information in the geotechnical field;

2.2 Modeling



The Modeling tab shows all the useful functions for creating and manipulating the stratigraphic model (Input and Output). All available functions are described in the following paragraphs.

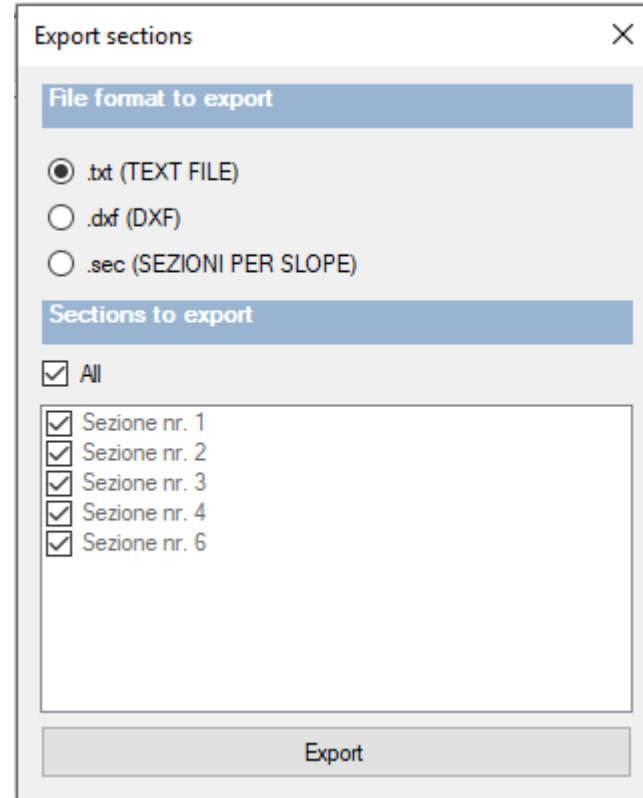
2.3 Calculation and processing



The calculation and elaboration tab exposes the useful functions for the interaction with the model from a processing point of view. The tab shows the following functions:

1. **Diagnostics:** The diagnostic function allows you to check the correctness of the input data before starting a processing. Overcoming data control is a necessary condition for the execution of 3D stratigraphy processing;
2. **Process overall stratigraphy:** The function processed the inserted surveys. The elaboration consists in the creation of the three-dimensional stratigraphic model according to an internal algorithm based on the selection of a master survey;
3. **Cancel processing:** Cancel the processing eliminating all the results produced by the processing;
4. **Export sections:** Allows the export of any sections generated after processing. The formats in which a section can be exported are dxf and txt.

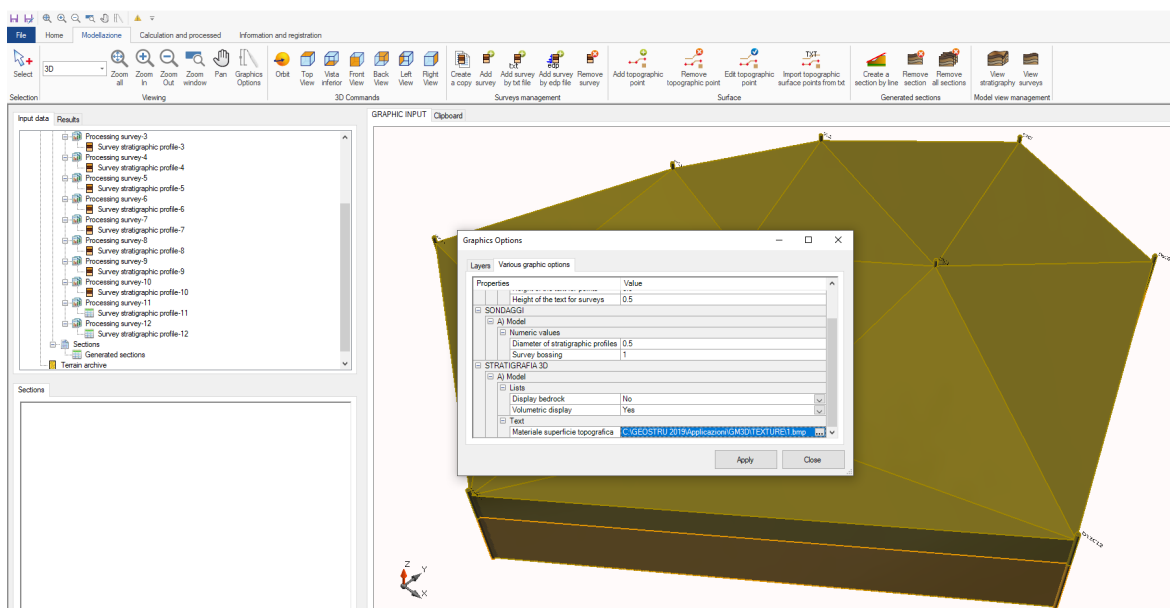
The graphical interface for managing the export of the sections is as follows:



Graphical interface for exporting sections

As you can see, you can export sections in txt and dxf format. It is possible to export all the generated sections or just one group (checking the ones you want to export).

3 How to assign the surface texture



4 Structure of the input model

The input model is defined by:

1. The topographic surface: The above-mentioned surface is defined by a data structure that defines a quoted plane (set of points of coordinates x , y and z);
2. Punctual stratigraphic profiles: Set of profiles associate to a point of x and y coordinates a stratigraphic profile (perhaps deriving from a drilling or interpretation of other tests);
3. Sections: In the input phase it is necessary to define the parameters that identify the traces of the stratigraphic sections to be processed;
4. Terrain archive: A collection of soils to which reference can be made during the assignment of point stratigraphic profiles.

4.1 Topographic surface

The topographic surface is described by a set of points characterized by the x , y and z coordinates. The following parameters can be assigned for each point:

- x [m]: Coordinate x , expressed in meters, of the topographic surface point;
- y [m]: Coordinate y , expressed in meters, of the topographic surface point;
- z [m]: Coordinate z , expressed in meters, of the topographical surface point;

Description: Text field available for entering a description of the point:

x [m]	0
y [m]	0
z [m]	0
Description	

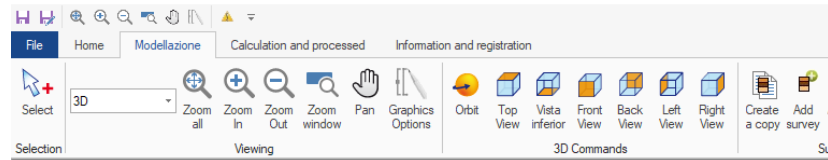
The following functions can act on the topographic surface:

- Add topographic surface point;
- Remove topographic surface point;
- Topographic surface point modification;

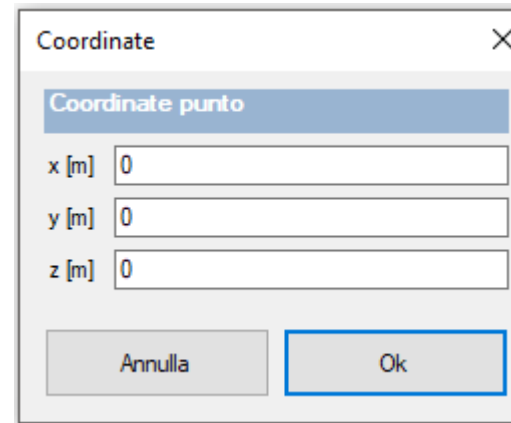
- Import topographic surface points from txt;

The function allows you to insert a point to the data structure that manages the topographic surface of the model. To insert a point on the topographic surface to the model, apply the following procedure:

1. Click on the modeling tab, then click on the "Add topographic point" function;



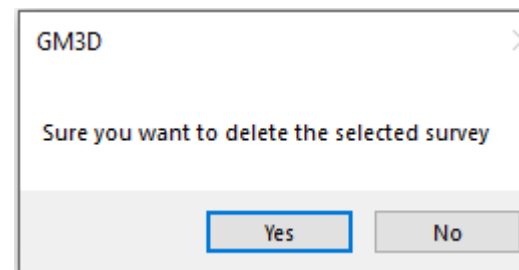
2. Enter the coordinates of the point, then click ok;



Remove point from topographic surface

To remove a point from the topographical surface of the model, apply the following procedure:

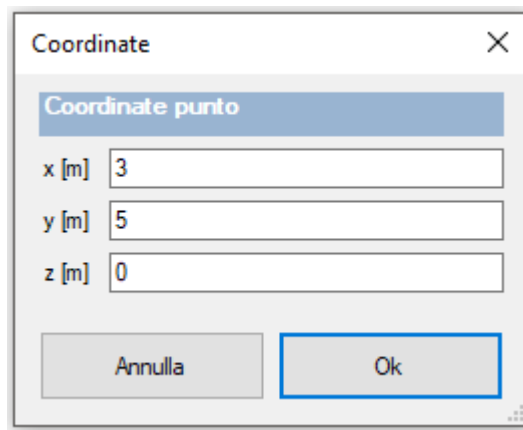
1. Click on the modeling tab, then click on the "Remove topographic point" function;
2. Click on the point on the topographic surface to be removed and then accept the operation:



Topographic surface point modification

To modify a point from the topographical surface of the model, apply the following procedure:

1. Click on the modeling tab, then click on the "Edit topographic surface point" function;
2. Click on the point of the topographic surface to be modified and then enter the new coordinates of the point. Then click on Ok:



The image shows a software dialog box titled "Coordinate". It contains a section labeled "Coordinate punto" with three input fields for x, y, and z coordinates in meters. The x field contains the value 3, the y field contains 5, and the z field contains 0. At the bottom of the dialog, there are two buttons: "Annulla" (disabled) and "Ok" (active).



Changing a point on the topographic surface will cancel the calculations already performed. The software will automatically request whether or not to re-execute the stratigraphy calculation.

Import topographic surface points from txt

To import a set of points from a file in txt format, apply the following procedure:

1. Click on the modeling tab, then click on the "Import topographic surface points" function;
2. Select the text file to import the points contained in the file;



The text file has the following format: Each line represents a point on the topographic surface. In each row there are four values (separated by ";"):

- The first value is the identifier (progressive) of the point;
- The second value is the x coordinate of the point (in m);

- The third value is the y coordinate of the point (in m);
- The fourth value is the z coordinate of the point (in m);

4.2 Survey processing

The following groups of parameters refer to Survey Processing:

- Stratigraphic profiles associated with individual surveys;
- Sections;

The stratigraphic profiles allow to manage the stratigraphic columns detected in the field (through direct and / or indirect tests).

The sections aggregate the necessary parameters to identify the geotechnical sections to be created after the processing.

Stratigraphic profiles

The screenshot shows the 'Add survey' dialog box. It contains the following sections and data:

- General data:** Survey code: C13, Survey description: D13.
- Survey placement:** xs [m]: 0, ys [m]: 0, zs [m]: 0, Lat. [°]: 0, Long. [°]: 0, Alt. [m s.l.m.]: 0.
- Defined stratigraphy:** A table with columns 'DH [m]', 'Terrain', 'Color', and 'Texture'.

DH [m]	Terrain	Color	Texture
1	Sand	[Brown]	C:\GE...
1	Gravel	[Yellow]	C:\GE...
- Field tests:** A table with columns 'Depth [m]' and 'NSPT [-]'. It is currently empty.

Each stratigraphic profile is identified by the following parameters:

- Survey code: Short code, to identify the survey with respect to the ongoing survey campaign;
- Survey description: Short description of the survey;
- Xs [m]: X Coordinate of positioning of the survey with respect to the origin;

- Ys [m]: Y coordinate of positioning of the survey with respect to the origin;
- Zs [m]: Z coordinate of positioning of the survey with respect to the origin;
- Lat. [°]: Latitude of probing positioning (see next note);
- Long. [°]: Longitude of probing positioning (see next note);
- Alt. [M s.l.m.]: Altitude of the survey with respect to the sea level (see next note);
- Zf [m]: Groundwater depth relative to the head of the reference stratigraphic profile;

Stratigraphy: The stratigraphy identifies the stratigraphic succession of the soils that characterize the profile. The stratigraphy is defined by a succession of layers characterized by thickness and type of soil.

On the stratigraphy it is possible to act through the following procedures:

- Add layer: Allows to insert a new layer to the stratigraphy;
- Remove layer: Remove the currently selected stratigraphic layer.

It is possible to import a stratigraphy from .txt file.

At the stratigraphy it is possible to associate a test (SPT, Qc or VS) possibly imported from txt format files.



At the current software version the parameters Lat., Long. and Alt. do not enter into the calculation of stratigraphy. They are exposed for completeness of input.



The text file for importing the stratigraphy has the following format: each line represents a stratigraphic layer. In each row there are three values (separated by ";"):

- The first value is the identifier (progressive) of the layer;
- The second value is the thickness of the layer (in m);
- The third value is the index of the land assigned to the stratum (in the numbering assigned in the land archive);



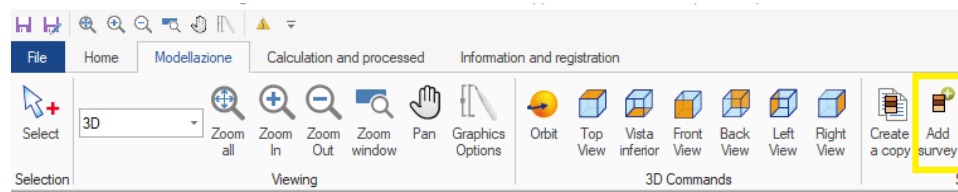
Each test can be imported from a text file with the following format: Each line represents a point in which the test value is evaluated. In each row there are three values (separated by ";"):

- The first value is the identifier (progressive) of the depth at which the test is estimated;
- The second value is the test evaluation depth;
- The third value is the test value;

Add survey

To add a survey, apply the following procedure:

1. Click on the Modeling tab, then click on the "Add survey" button:



2. Enter the survey data and then click on "Ok":

Add survey

General data

Survey code

Survey description

Survey placement

xs [m] Lat. [°]

ys [m] Long. [°]

zs [m] Alt. [m s.l.m.]

* Georeferencing data must be entered in the WGS84 system

Defined stratigraphy

zf [m] (Depth of the water table)

DH [m]	Terrain	Color	Texture

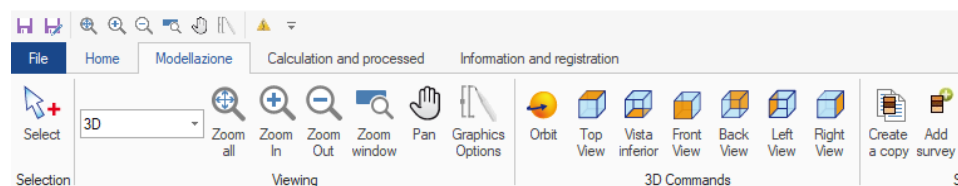


Each survey entered must have at least one defined layer.

Add survey from .txt file

To add a survey from txt file, apply the following procedure:

1. Click on the Modeling tab, then click on the "Add survey from txt file" button:



2. Click on the point in which to insert the stratigraphic profile (from this point the survey positioning parameters will be taken);
3. Select the text file to import the points contained in the file;



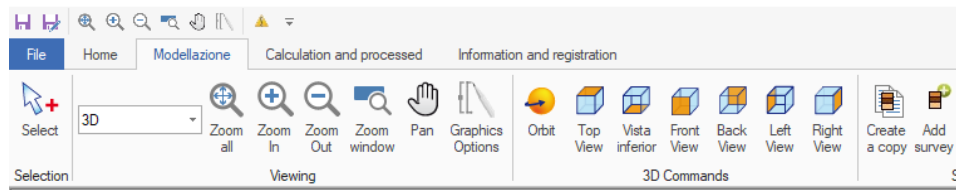
The text file has the following format: Each line represents a point on the topographic surface. In each row there are four values (separated by ";"):

- The first value is the identifier (progressive) of the layer;
- The second value is the thickness of the layer (in m);
- The third value is the index of the land assigned to the stratum (in the numbering assigned in the land archive);

Add survey from .edp file

To add a survey from an EDP file, apply the following procedure:

1. Click on the Modeling tab, then click on the "Add poll from edp file" button (file export format from other GEOSTRU software):



2. Click on the point in which to insert the stratigraphic profile (from this point the survey positioning parameters will be taken);
3. Select the edp file to import the points contained in the file;

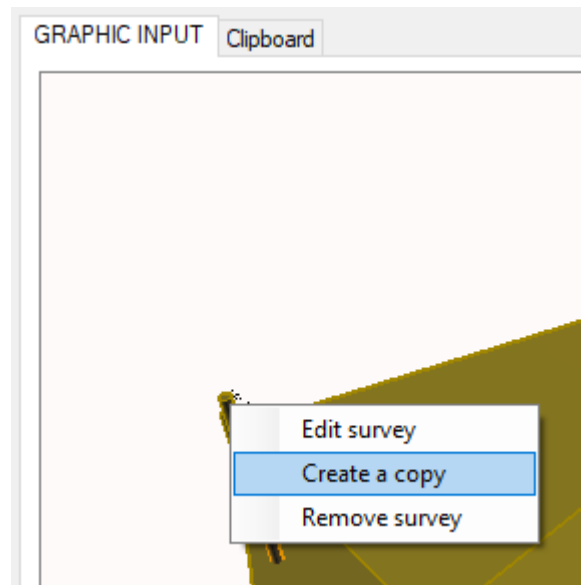


The text file has the following format:

Create a copy

To create a copy of a survey, use the following procedure:

1. Place the mouse on the survey to copy:



2. Click with the right mouse button;
3. Click the "Create a Copy" menu item of the previous image;
4. Click where you want to create the copy of the survey;

Remove survey

To remove a survey, use the following procedure:

1. Place the mouse on the survey to be removed
2. Click with the right mouse button;
3. Click on the "Remove survey" menu item in the previous image.



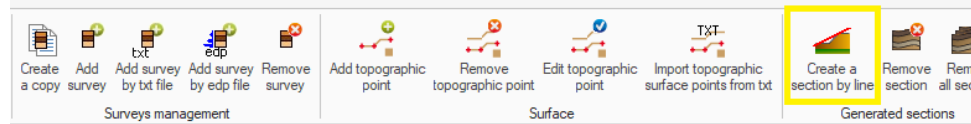
Alternatively you can click on the Modeling tab then click on "Remove survey" and select the survey to remove.

4.3 Sections

Create section by line

To create a section from a line, apply the following procedure:

1. Click on the modeling tab and on the "Create a section by line" button:



2. Click on the starting point of the section;
3. Click at the end point of the section;
4. Enter the name of the section:



Clearly the insertion of a section presupposes that the two points indicated (as extremes of the section trace) intercept in at least two points the stratigraphic model.

Remove section

To remove a section, apply the following procedure:

1. Click on the modeling tab and on the "Remove section" button;
2. Click with the mouse on the section to be deleted and accept;

Remove all sections

To remove all the sections apply the following procedure:

Click on the modeling tab and on the "Remove all sections" button.

4.4 Terrain Archive

The terrain archive contains the types of soils that can be used to create stratigraphic profiles. The following parameters are defined for each terrain:

- Type: Cohesive or Inconsistent;
- g [kg / mc]: Weight of the unit of volume of the drained soil;
- gs [kg / mc]: Weight of the volume unit of the saturated soil;
- fi [°]: Angle of cutting resistance;
- c [kg / cmq]: Drained cohesion;
- cu [kg / cmq]: Undrained cohesion;

Terrain archive

+ - Duplicate Detail Export to .txt Import from .txt

<< [#=1][Name=Gravel] >>

Name	Gravel
Type	Cohesive ▾
g [kg/mc]	1800
gs [kg/mc]	2100
fi [°]	30
c [kg/mq]	1000
cu [kg/mq]	0



At the current version the soil parameters (except the name) are not taken into account in the calculation of the stratigraphy.

Adding a soils

To add new terrain, apply the following procedure:

1. Click on the "+" button:

Terrain archive

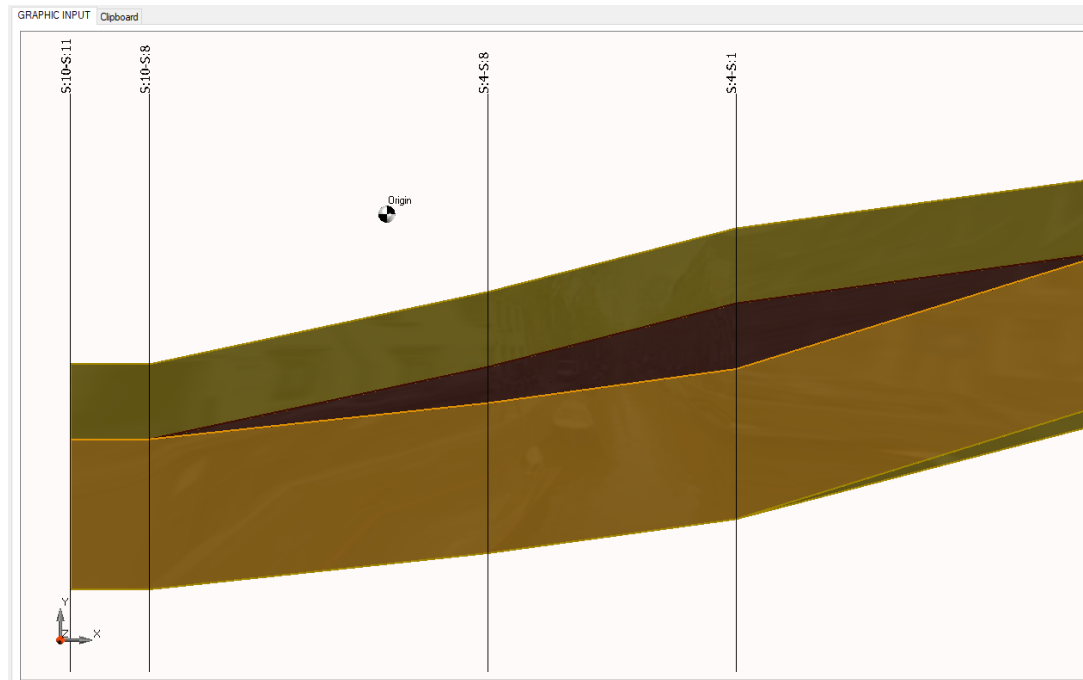
+ - Duplicate Detail Export to .txt Import from .txt

<< [#=1][Name=Gravel] >>

2. Enter the values of the terrain parameters.

5 Processing

The elaboration consists in the creation of a three-dimensional stratigraphic model from which it is possible to generate two-dimensional geotechnical sections:



The algorithm for generating the 3d stratigraphy can be summarized in the following steps:

1. A triangulation is performed on the set of points constituted by the union of the points of the topographic surface and the positioning of the defined surveys;
2. Select the Master survey;
3. The first layer is set as the layer being processed by the Master survey;
4. In the connection metric defined by the triangulation of the points, all the surveys for which the first unprocessed layer has the same soil as that of the layer being processed by the master survey are connected;
5. Once all the stratigraphic profiles have been connected, one moves on to the next layer of the master survey and re-executes the operation as per point 4.

6 Geoapp

Geoapp: the largest web suite for online calculations

The applications present in [Geostru Geoapp](#) were created to support the worker for the solution of multiple professional cases.

Geoapp includes over 40 [applications](#) for: Engineering, Geology, Geophysics, Hydrology and Hydraulics.

Most of the applications are free, others require a monthly or annual subscription.

Having a subscription means:

- access to the apps from everywhere and every device;
- saving files in cloud and locally;
- reopening files for further elaborations;
- generating prints and graphics;
- notifications about new apps and their inclusion in your subscription;
- access to the newest versions and features;
- support service through Tickets.

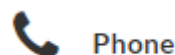
6.1 Geoapp Section

General and Engineering, Geotechnics and Geology

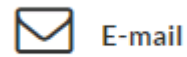
Among the applications present, a wide range can be used for **GM3D**. For this purpose, the following applications are recommended:

- [NSPT Form](#)
- [Horizontal reaction coefficient of foundation piles](#)
- [Load test on poles](#)
- [Liquefaction \(Boulanger 2014\)](#)
- [Reinforced earth](#)
- [Soil Classification](#)
- [Bearing capacity](#)
- [Lithostatic tensions](#)

7 Contact



(+39) 0690 289 085
(+40) 737 28 38 54



E-mail

info@geostru.eu
office@geostru.eu



Working hours

Luni – Vineri
9 – 17 (GMT + 2)



Customer support

For customer support please open a [ticket](#).