



Example 12

In-ground swimming pool



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1. Swimming pool

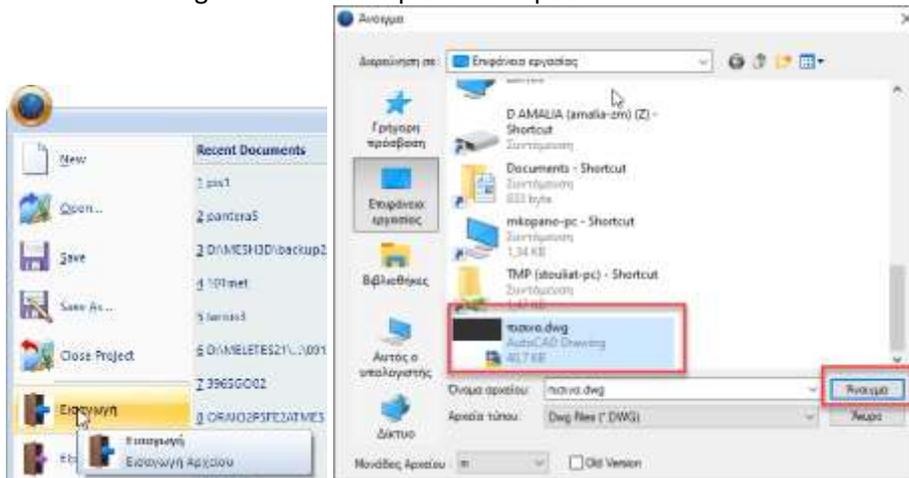
In the new version of SCADA Pro a new integrated tool has been added for design, load calculation and automatic calculation of combinations for in-ground pools, using 3D surface elements and standard structures.

1.1 Design

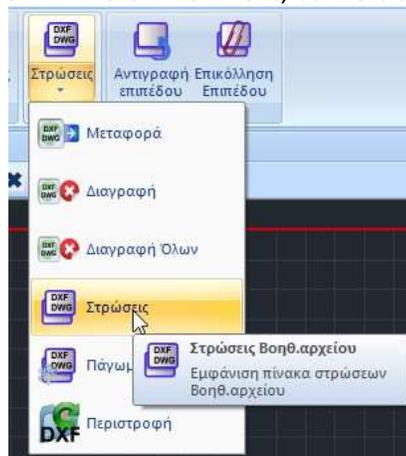
The process requires the drawing of the pool floor plan which can be imported into the SCADA Pro environment via a dwg/dxf drawing, or created directly in the SCADA Pro environment using the design commands:

1. Import dwg/dxf drawing

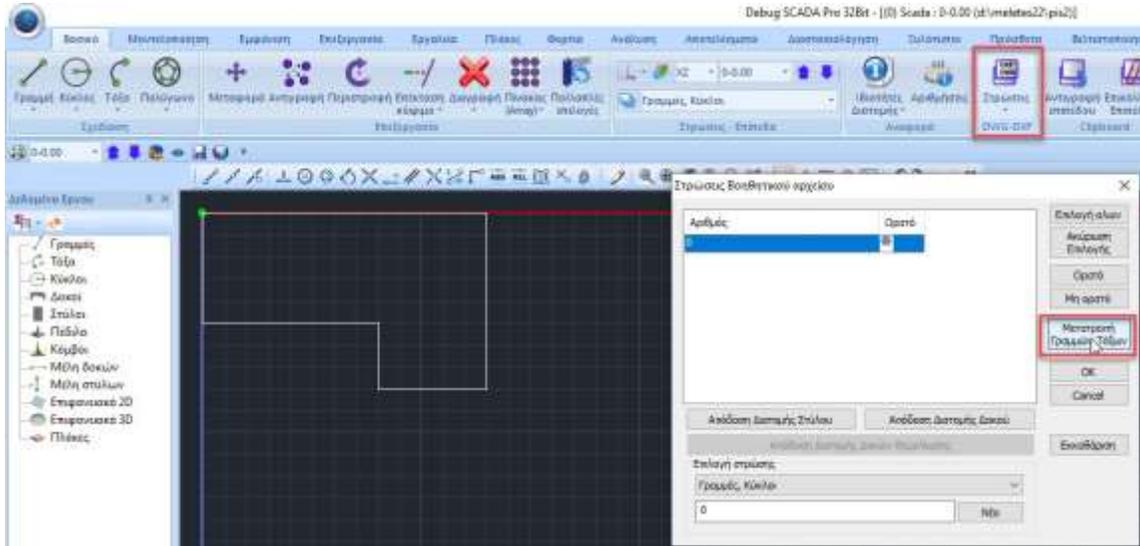
Choose the design with the floor plan of the pool



After importing it into SCADA Pro environment, convert the drawing lines to SCADA Pro lines by



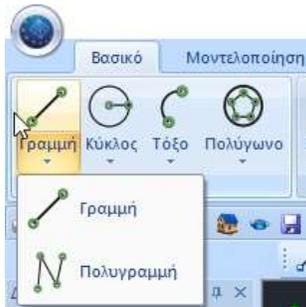
selecting the command:



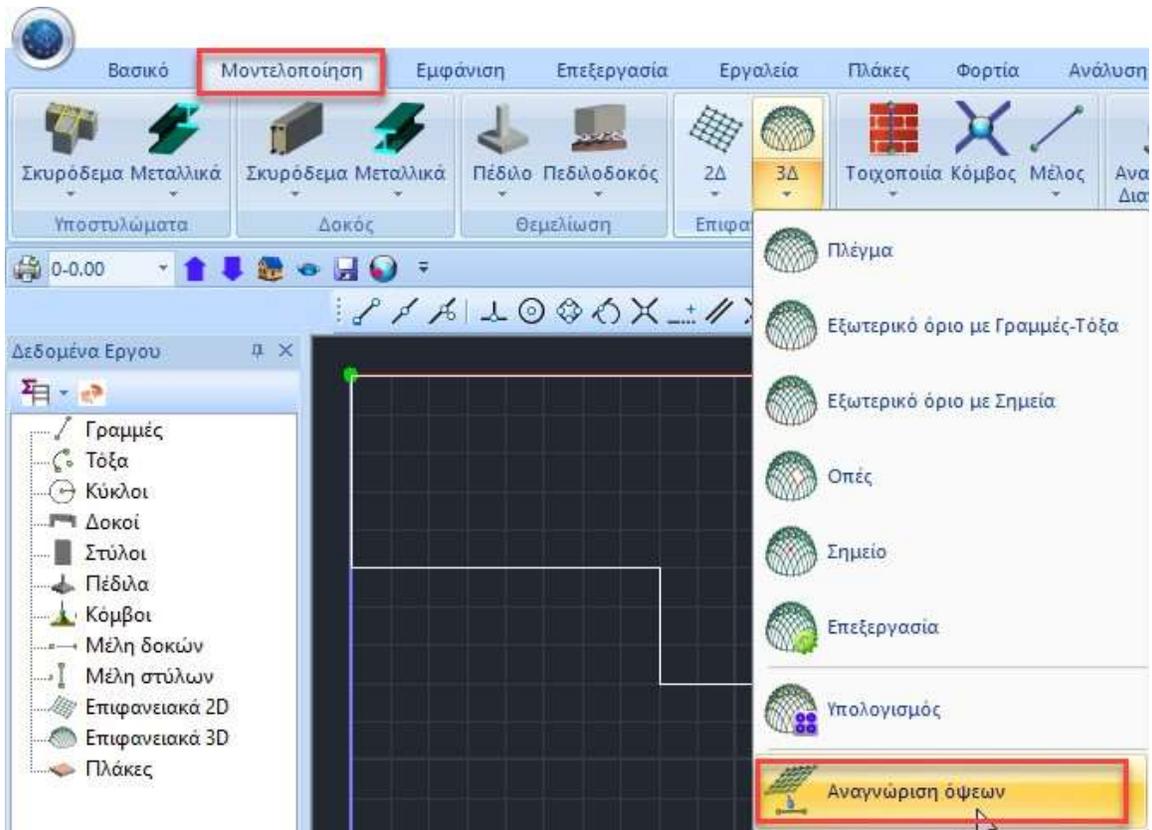
And the Conversion of Lines-Cars.

2. Contour design

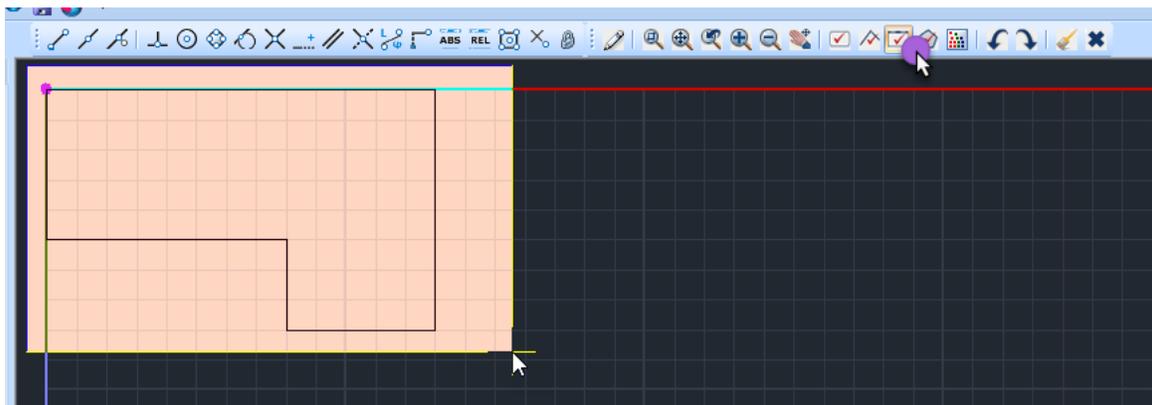
Draw the outline of the pool at level 0 using the design commands.



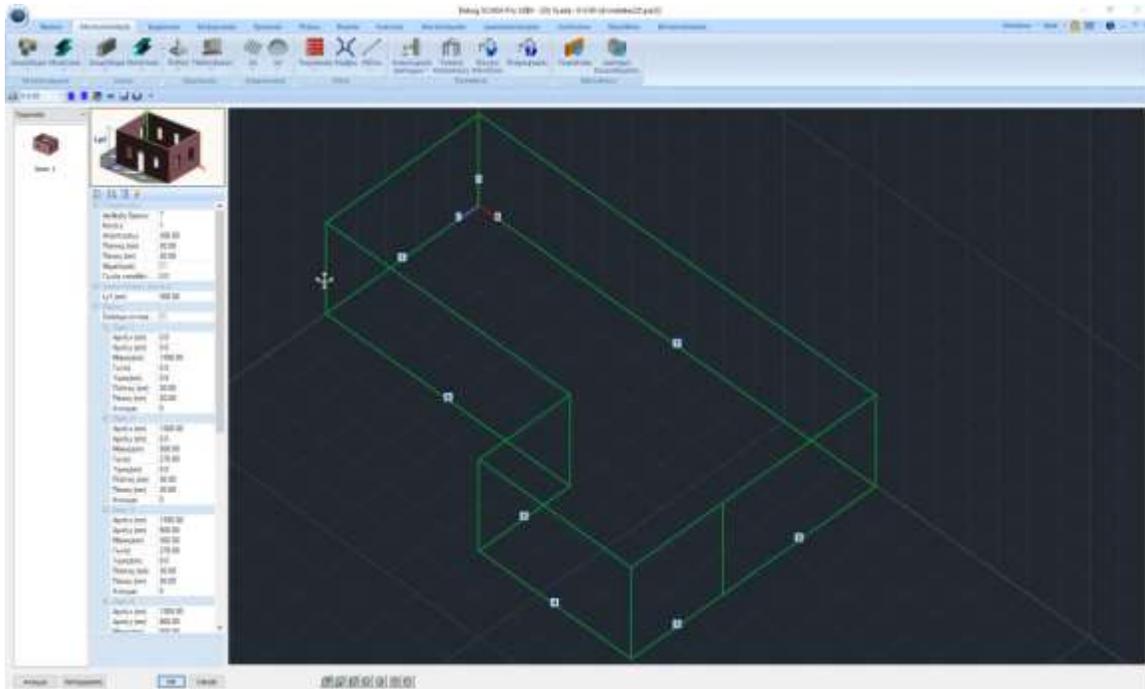
After you have created the contour of the pool at the foundation level in one way or another, go to the Modeling field and the 3D command and select the View Recognition:



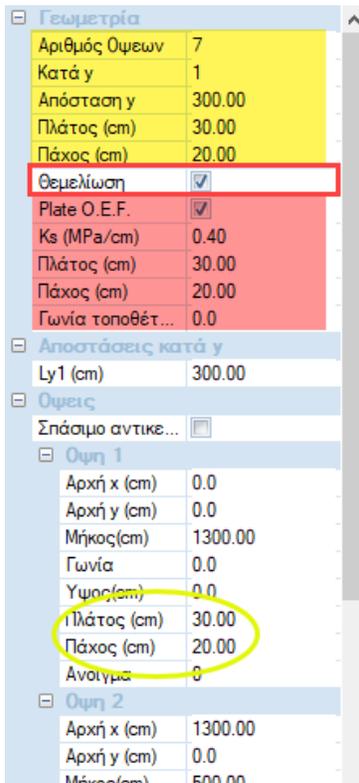
Select the option with Window and scan the floor plan:



Finally, right click and the window of Standard Constructions opens:



In the Geometry field, the option Foundation has now been added:



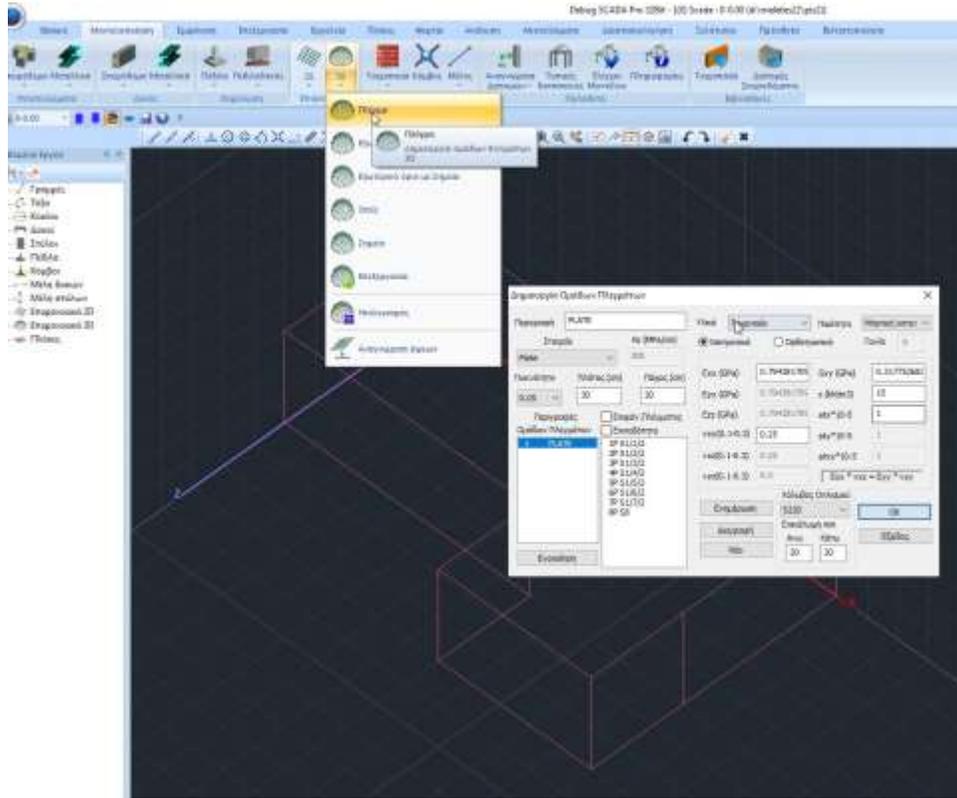
At the top (yellow) you define the general geometry of the views (which you can modify for each of them separately below in the Views section)

and

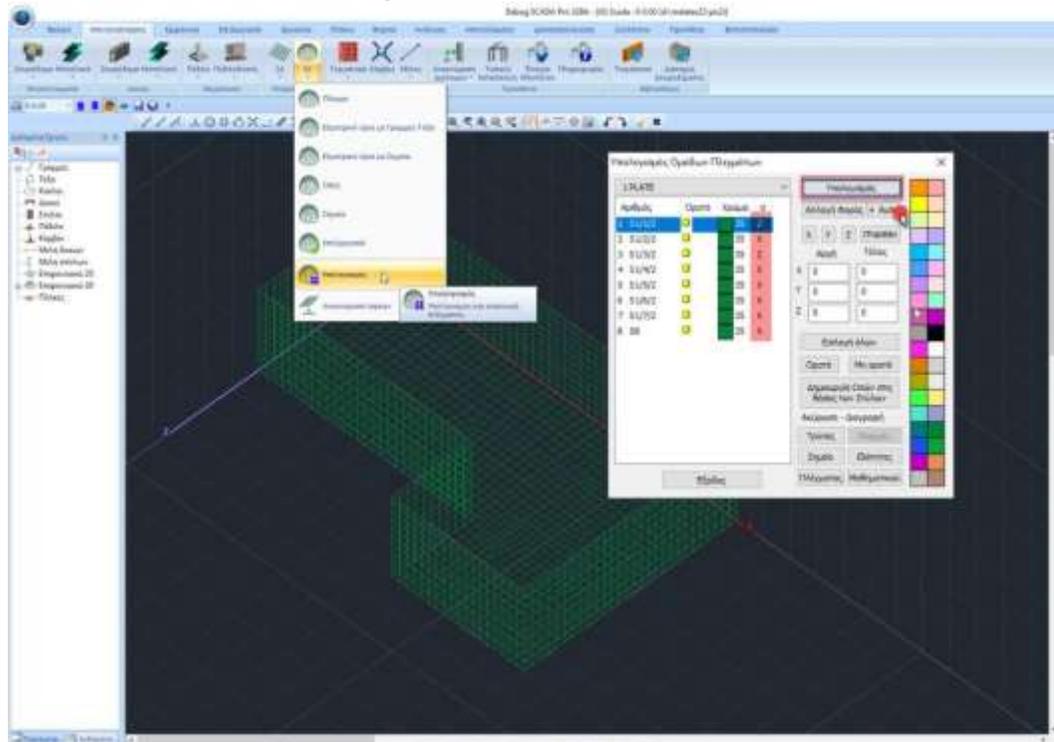
at the bottom (red) you define the characteristics of the foundation.

EXAMPLE 12: 'POOL WITHIN THE TERRITORY'

OK and you are returned to the , where the grids are now ready calculation:

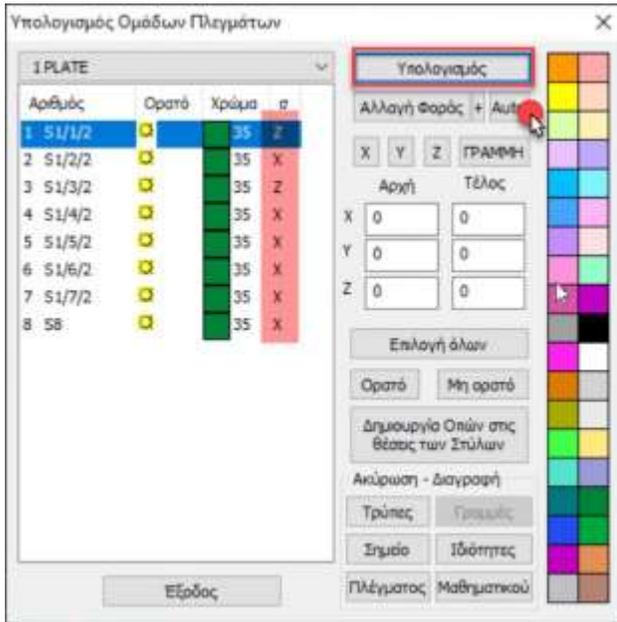


Select Calculate and create the grids:

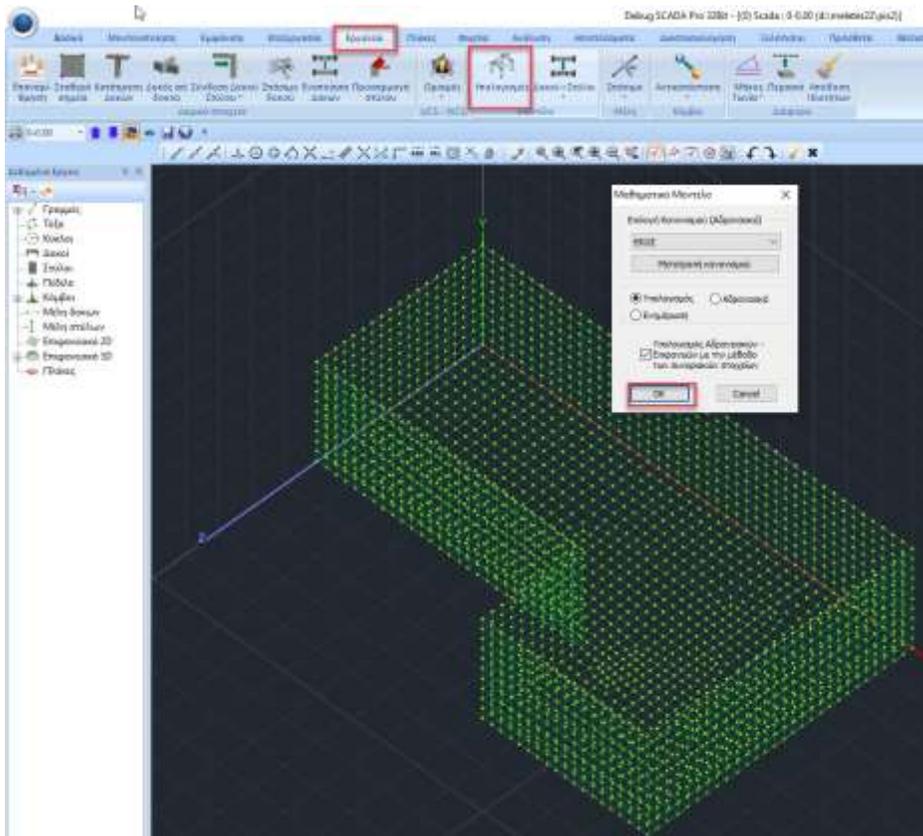


EXAMPLE 12: 'POOL WITHIN THE TERRITORY'

Then, I check that the directions of the grids are correctly set and select Auto to have the correct orientation:



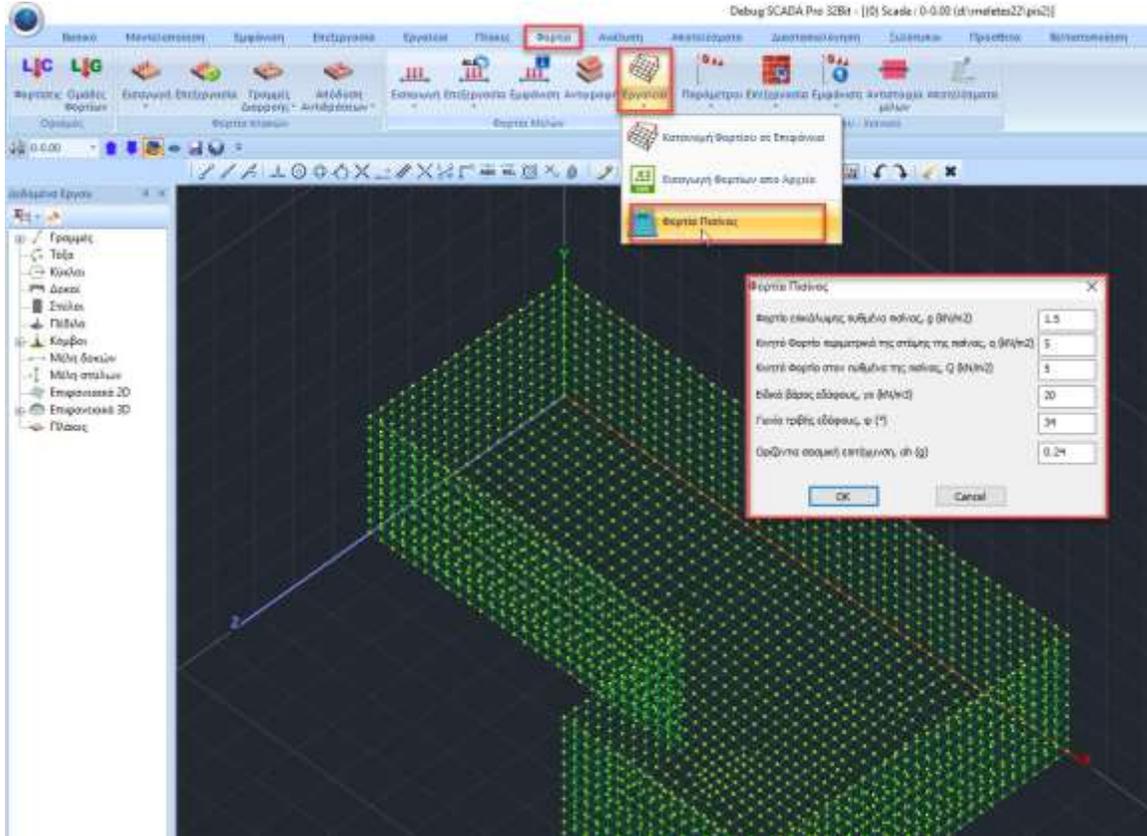
In the Tools field I select the Calculate command to calculate the mathematical model of the pool:



1.2 Loads

Having now completed the pool model, the next step is the loads.

In the Loads field select the Tools command and in the Pool Loads pop-up menu select Pool Loads:



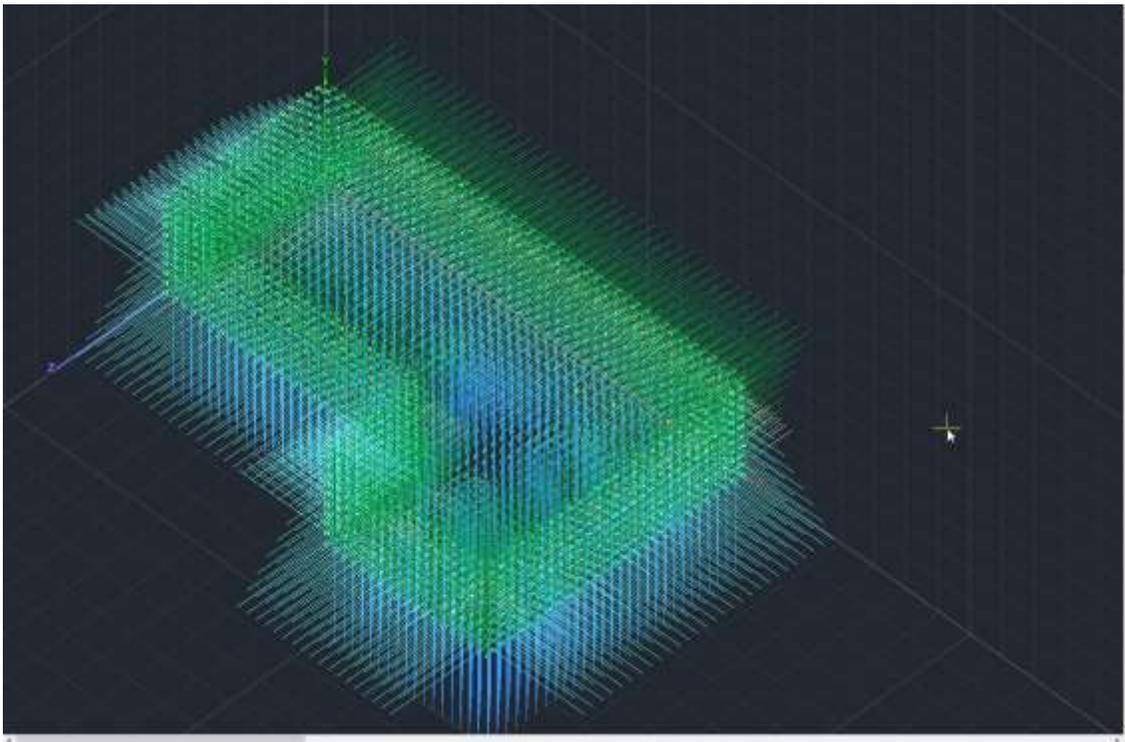
In the new window that opens you can set all the loads related to the loading of an in-ground pool, as well as the Specific Ground Weight, the Friction Angle and the Horizontal Seismic Acceleration, while the corresponding LC Loads are automatically generated.

Φορτία Πισίνας

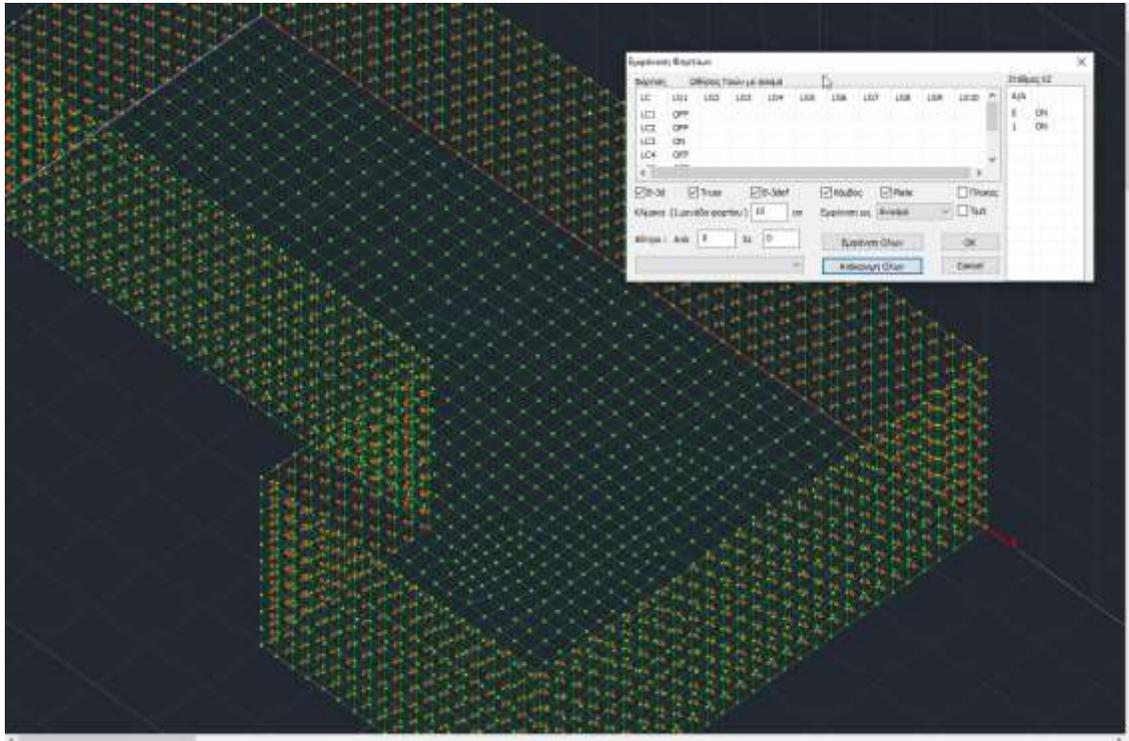
Φορτίο επικάλυψης πυθμένα πισίνας, g (kN/m ²)	1.5
Κινητό Φορτίο περιμετρικά της στέψης της πισίνας, q (kN/m ²)	5
Κινητό Φορτίο στον πυθμένα της πισίνας, Q (kN/m ²)	5
Ειδικό βάρος εδάφους, γ_s (kN/m ³)	20
Γωνία τριβής εδάφους, ϕ (°)	34
Οριζόντια σεισμική επιτάχυνση, a_h (g)	0.24

OK Cancel

By setting the values and selecting OK, the loads are inserted into the surface loads:

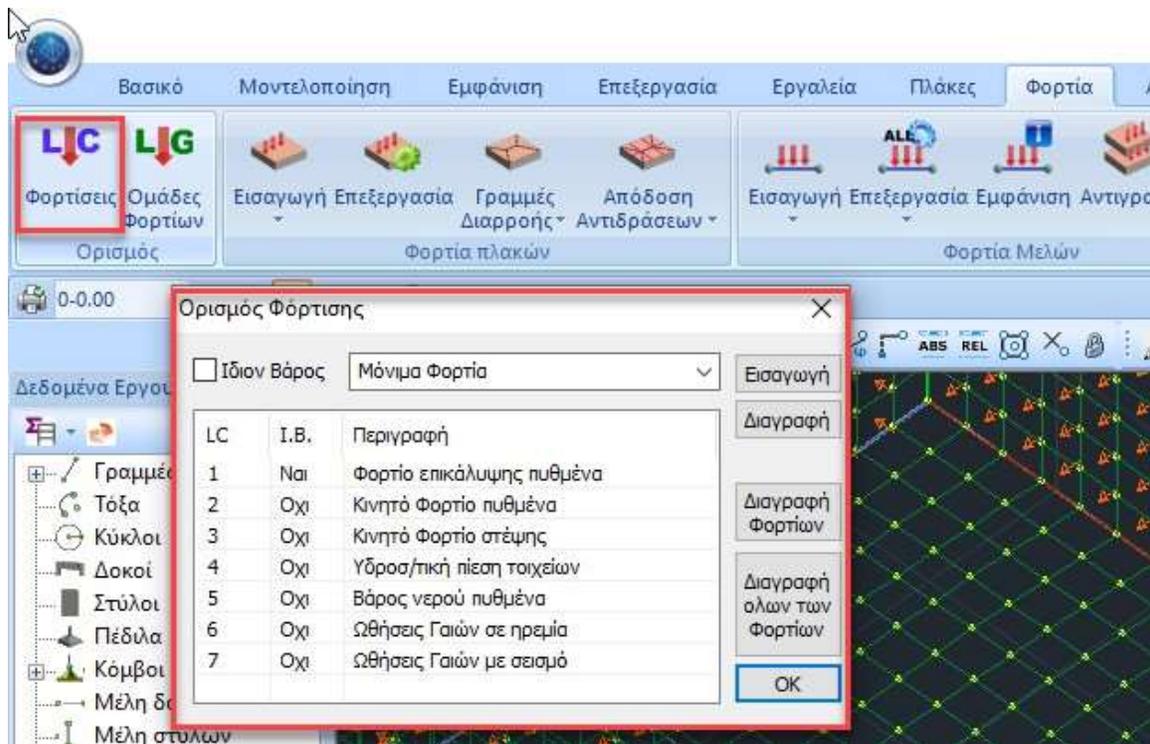


While with Show command, you can hide all, show all, some just one charge to view them:



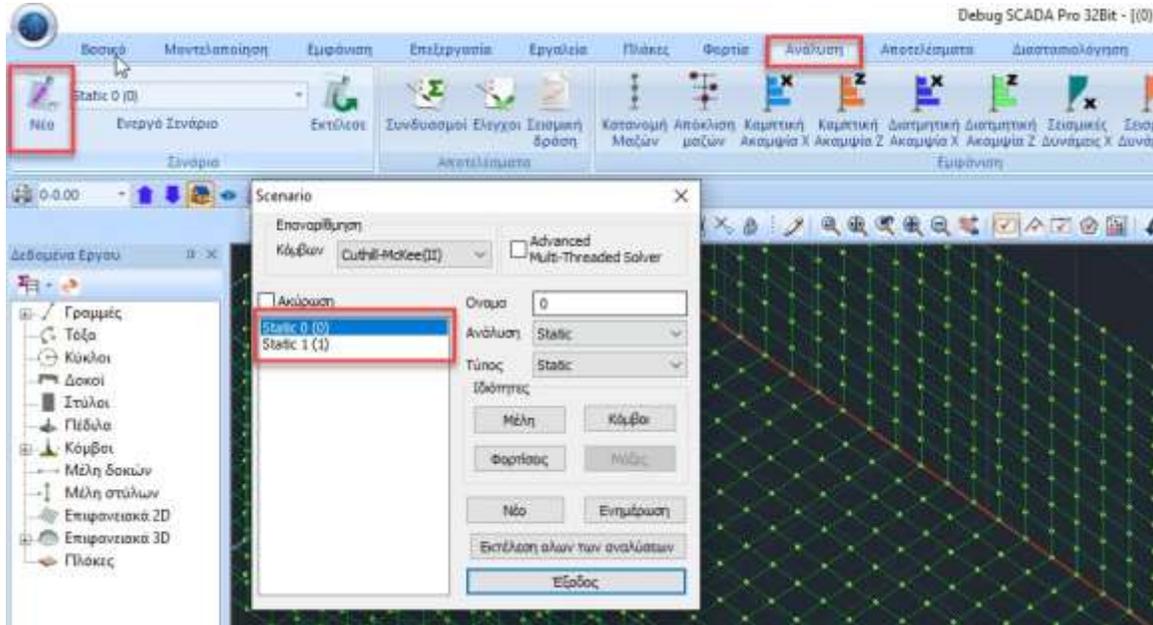
The direction of the loads is determined from the inside of the pool to the outside.

Select the Loadings command to see the LC loadings that are automatically created.

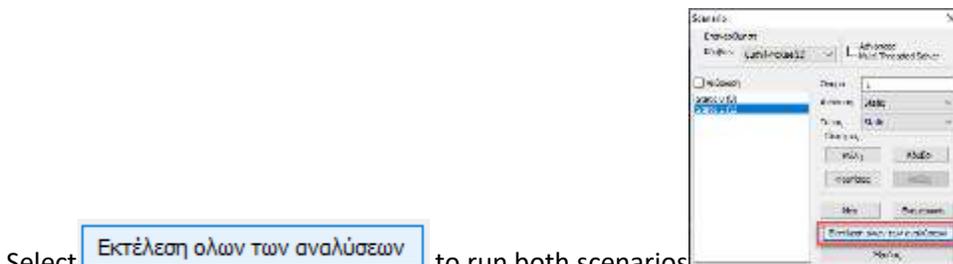
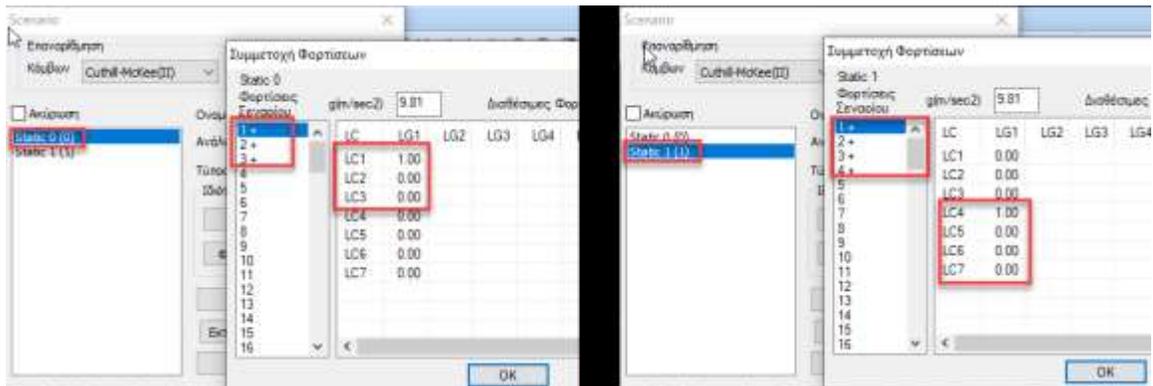


1.3 Analysis

The 7 Loadings that relate to the in-ground pool are automatically generated, while the corresponding static scenarios of the analysis that include them are also automatically generated.



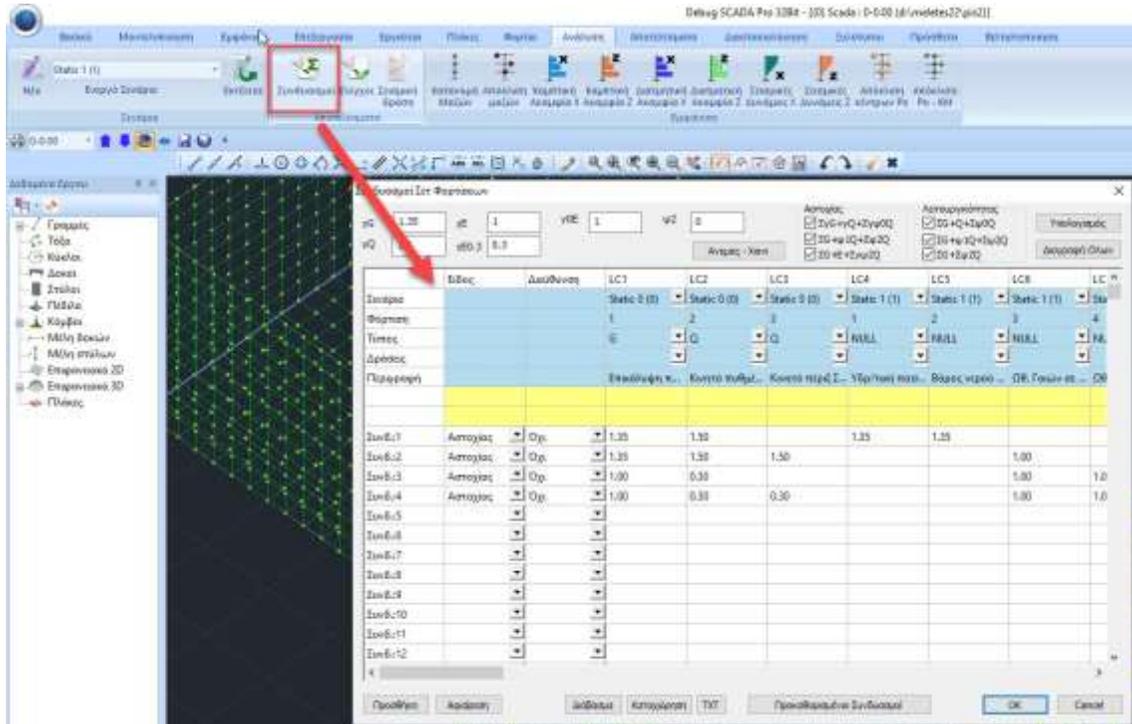
In the first scenario *Static 0 (0)* the first 3 loads are included and in the second scenario *Static 1 (1)* the other 4 are included.



Select **Εκτέλεση όλων των αναλύσεων** to run both scenarios

EXAMPLE 12: 'POOL WITHIN THE TERRITORY'

After they are complete, select Combinations.



The Pool Load Combinations come filled in and correspond to each load of each scenario:

So we have the Static 0 and Static 1 scenarios, with 3 and 4 charges respectively, corresponding to LC1-LC3 and LC4-LC7, the description of which is given at the bottom. For each one the coefficient for each combination is defined, and in total we have 4 combinations.

Διεύθυνση	LC1	LC2	LC3	LC4	LC5	LC6	LC7
	Static 0 (0)	Static 0 (0)	Static 0 (0)	Static 1 (1)	Static 1 (1)	Static 1 (1)	Static 1 (1)
	1	2	3	1	2	3	4
	G	Q	Q	NULL	NULL	NULL	NULL
	Επικάλυψη π...	Κινητό πυθμέ...	Κινητό περίεξ Σ...	Υδρ/τική πίεσ...	Βάρος νερού ...	Ωθ. Γαιών σε ...	Ωθ. Γαιών με ..
Όχι	1.35	1.50		1.35	1.35		
Όχι	1.35	1.50	1.50			1.00	
Όχι	1.00	0.30				1.00	1.00
Όχι	1.00	0.30	0.30			1.00	1.00

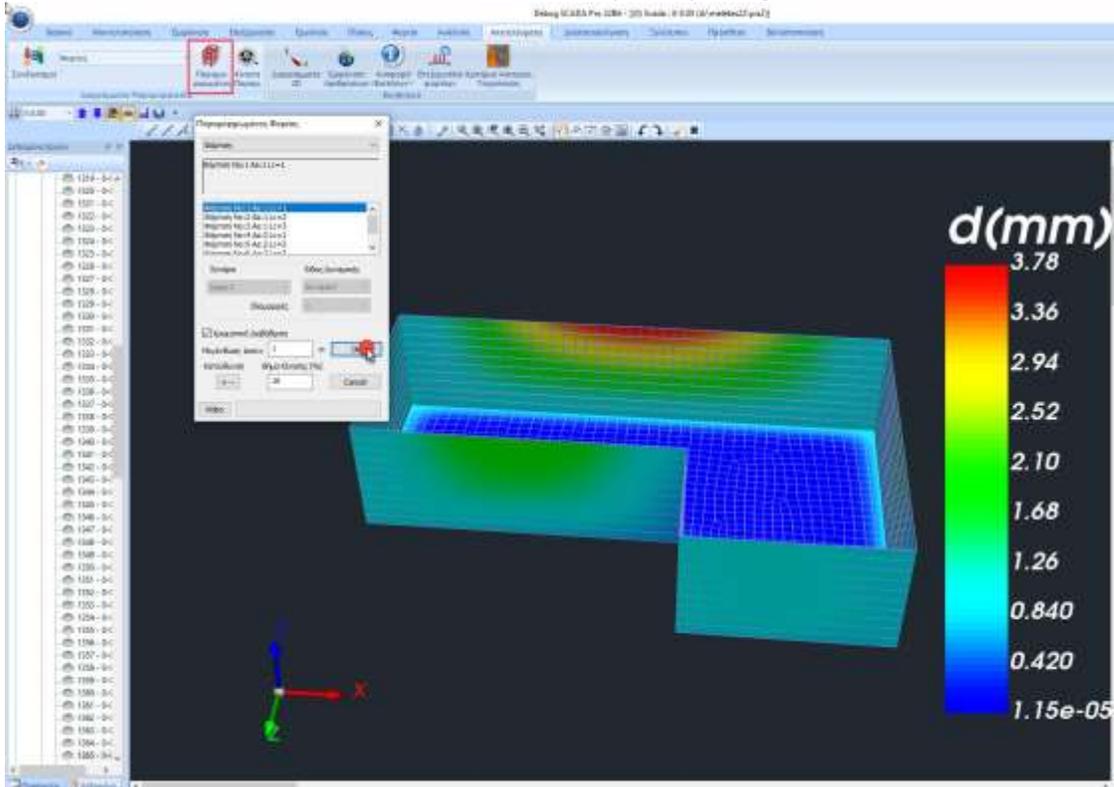
1.4 Results

In the Results field:

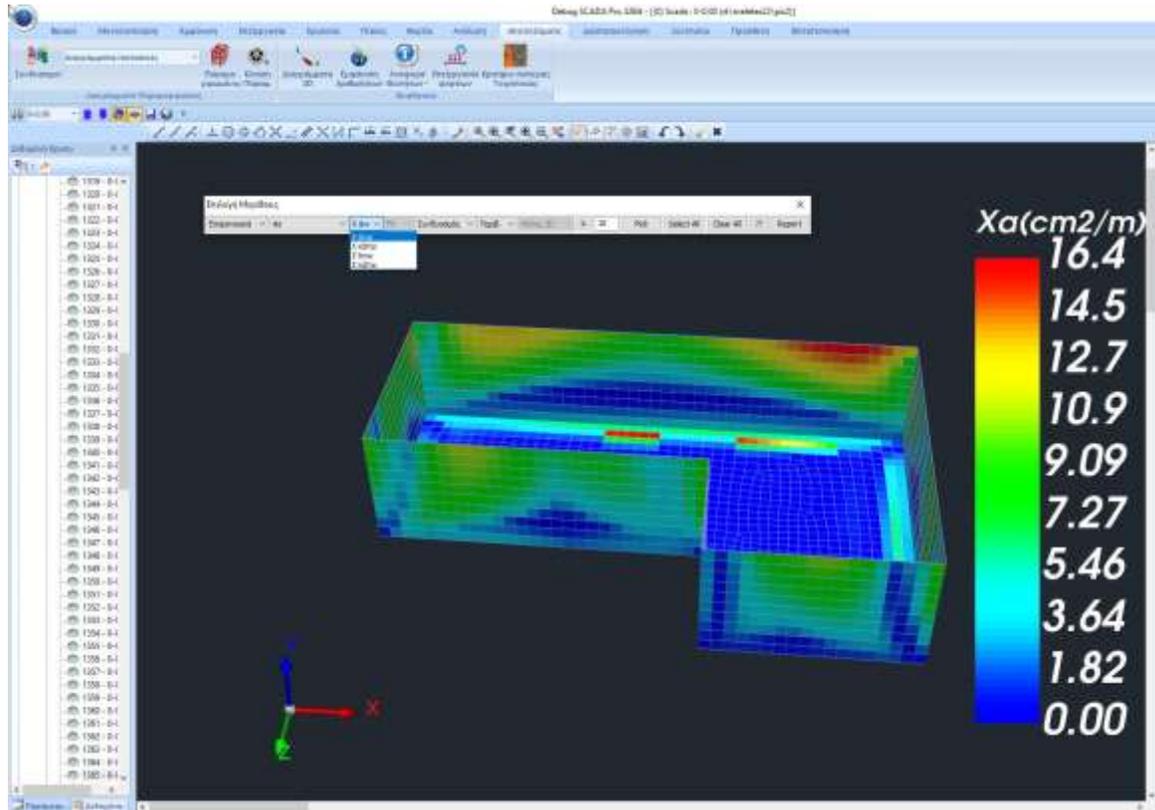
Select Combinations and load their default and OK:



Select the Deformed to see the deformation of the pool by charge or combination:



Selecting Diagrams - Equalities opens a window where you can choose to view the pool's reinforcement from the surrounding area by direction and time:



OBSERVATION:

In addition, you can use the new integrated tool to calculate and design the reinforcement of foundation slabs simulated with surface finite elements.

A detailed description can be found in the User Manual Chapter G "SURFACE DIAGRAMMING".

