Membrán Mérnöki Kft.
Alapítva:1990

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Technical data sheet

Static documentation

"Biggy Pool" and Smally Pool" polymer pool steel load-bearing structure
and about the load capacity adequacy of the reinforced concrete base plate

Client: **Square Plastic Kft.**
2890 Tata, Schneer István u. 7.

1.) Introduction

This technical documentation is Squre Plastic Kft. commissioned, 6.0x3.0 m sn 4,5x2,4m in size, 1.5 m deep, steel support structure and reinforced concrete base plate of a rectangular polymer pool prepared for inspection.

The verification was performed using the finite element modeling program AXIS VM.
The geometry of the supporting structure and the dimensions of the base plate were determined by the customer.

During the inspection, the adequacy of the supporting steel structure and the reinforced concrete base plate we verify.

Standards used during sizing:
Eurocode 0 - Basics of the design of supporting structures
Eurocode 1 - Effects on supporting structures
Eurocode 2 - Design of concrete structures
Eurocode 3 - Design of steel structures

2.) Built-in materials

Structural steel: S235

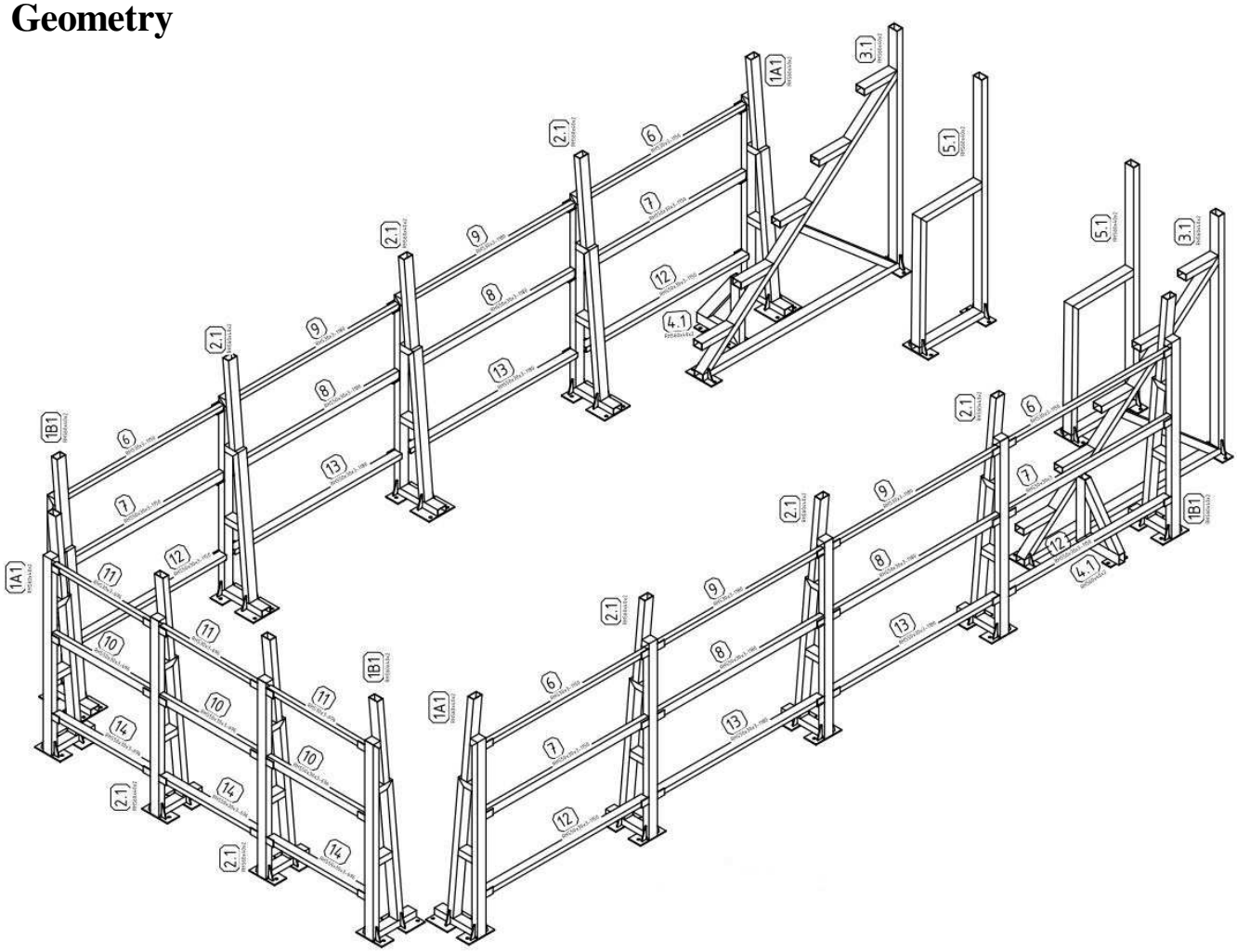
Flow limit:	$f_y := 235 \frac{N}{mm^2}$	Flexibility modulus:	$E_a := 210 \frac{kN}{mm^2}$
Tensile strength:	$f_u := 360 \frac{N}{mm^2}$	$\gamma_{M0} := 1.0$	$\gamma_{M1} := 1.0$

Screw material: 8.8

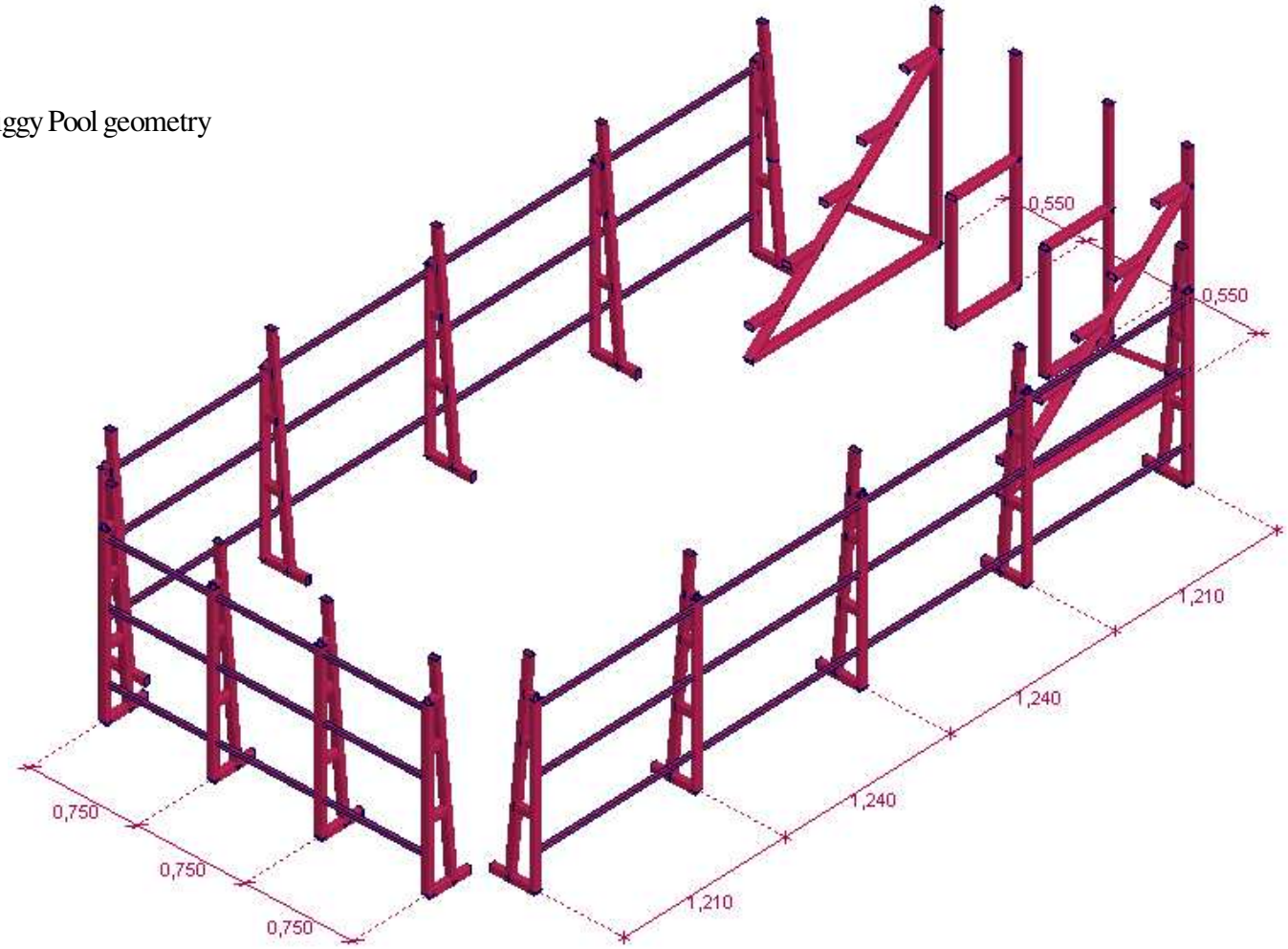
Concrete: C30/37-XF3-16-F2

$\rho_c := 25 \frac{kN}{m^3}$	$\varepsilon_{cu} := 3.5 \cdot ‰$	$\xi_{c0} := 0.49$	$\gamma_c := 1.50$
Compressive strength characteristic e..:	$f_{ck} := 30 \frac{N}{mm^2}$	Compressive strength design value:	$f_{cd} := \frac{f_{ck}}{\gamma_c} = 20 \cdot \frac{N}{mm^2}$
Tensile strength:	$f_{ctd} := 1.4 \frac{N}{mm^2}$	Tensile strength expected value:	$f_{ctm} := 2.9 \frac{N}{mm^2}$

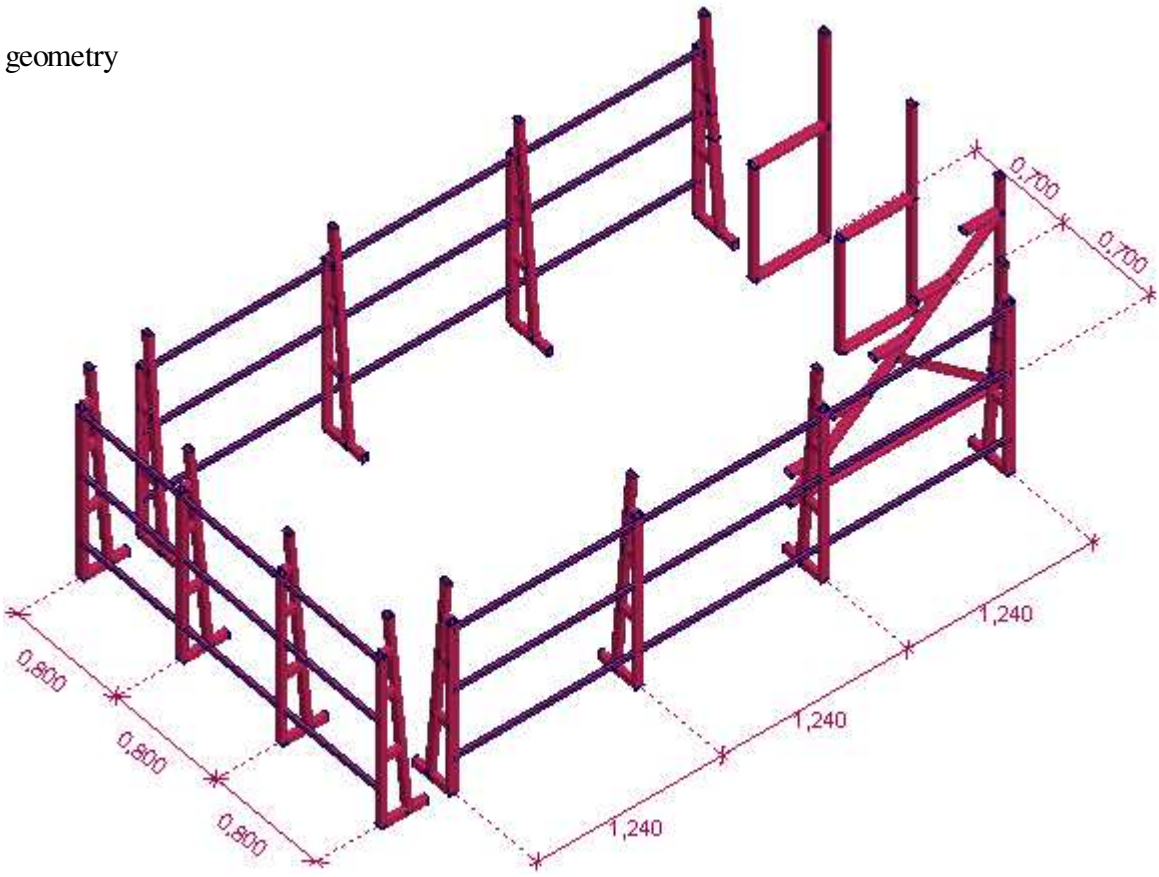
3.) Geometry



Biggy Pool geometry



Smally Pool geometry



4.) Examination of the steel support structure

4.1.) Loads:

- Pool water was taken into account as a permanent load
- The water load varies between 0.0 and 15.0 kN/m2 depending on the depth
- Due to the waves generated in the pool, it is dynamic above the safety factor (1.35) of permanent loads safety factor (1.2) was applied

Permanent loads: - weight of support structure (Axis)
- load of water

$$G_{k.max} := 15\,\frac{kN}{m^2}$$

4.2.) Load combinations:

Safety and concurrency factors					
Load type	**γ**	**ψ0**	**ψ1**	**ψ1**	**K.FI**
Permanent load	1,35	1,0	-	-	-
Dynamic	1,20	-	-	-	0,9

- Permanent and temporary planning situation:

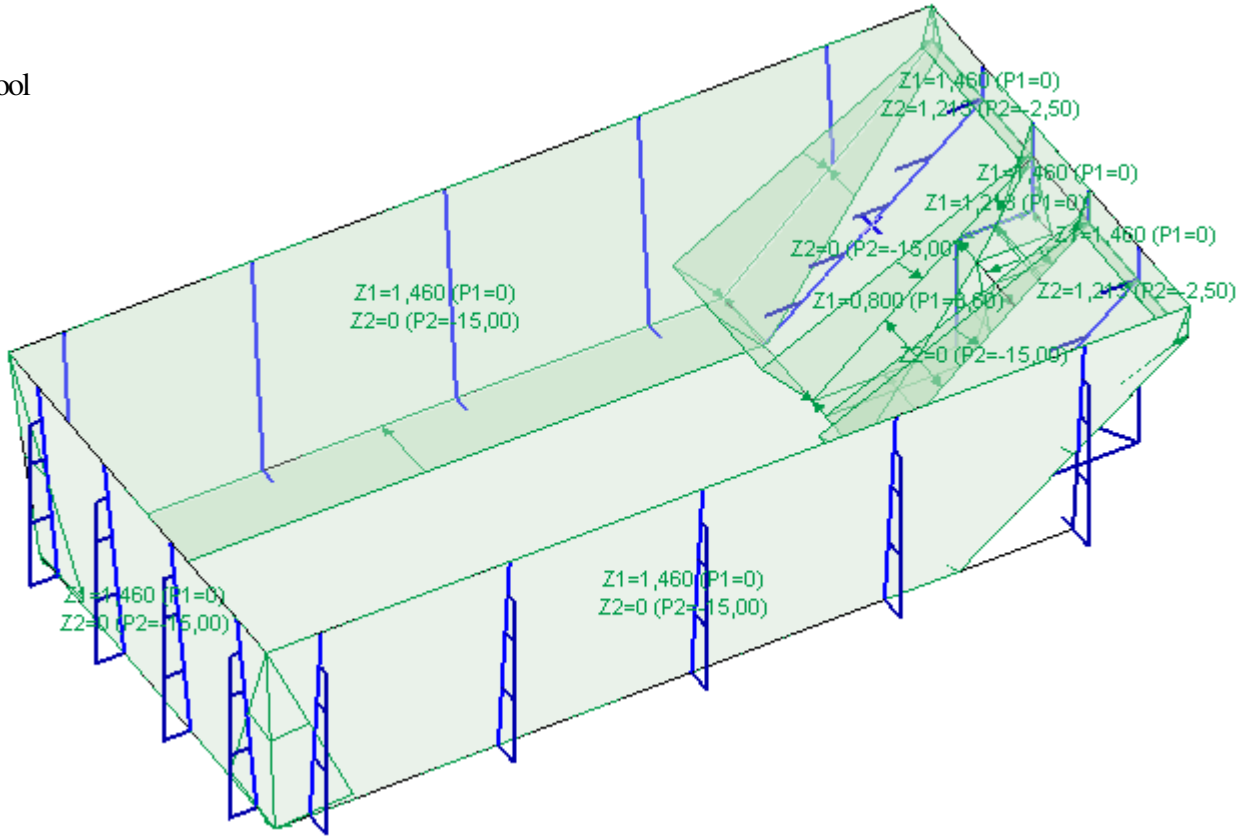
$$E_{d.t} := \gamma_G \cdot G_k + K_{FI} \cdot \gamma_Q \cdot Q_k$$

- Quasi-permanent design situation:

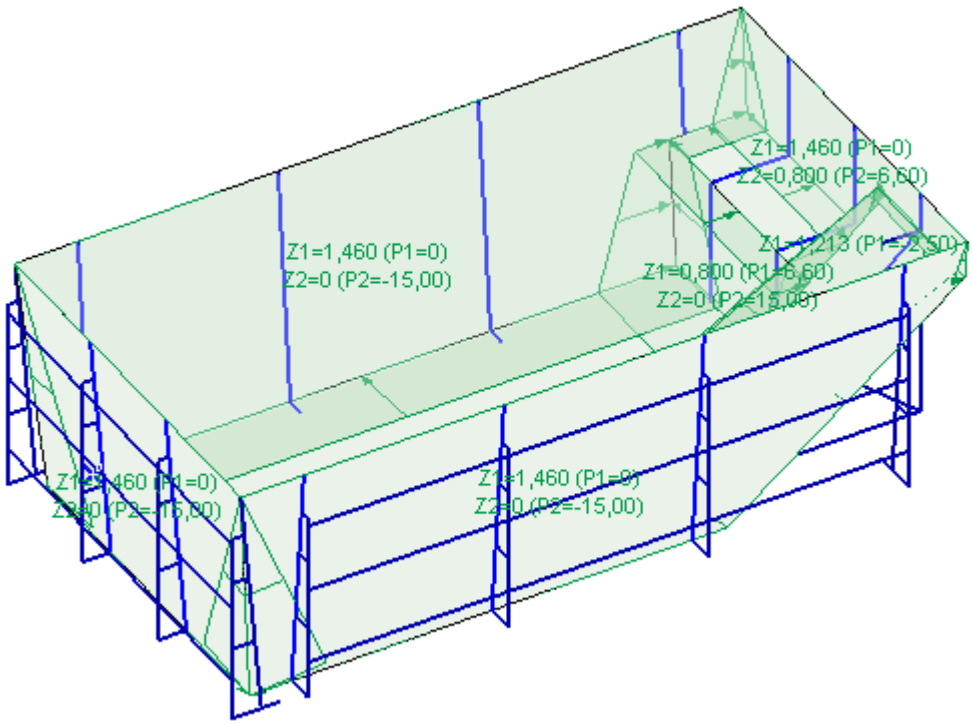
$$E_{d.k} := G_k + \psi_{2.h} \cdot Q_k$$

- The water load varies between 0.0 and 15.0 kN/m2 depending on the depth

Biggy Pool



Smally Pool



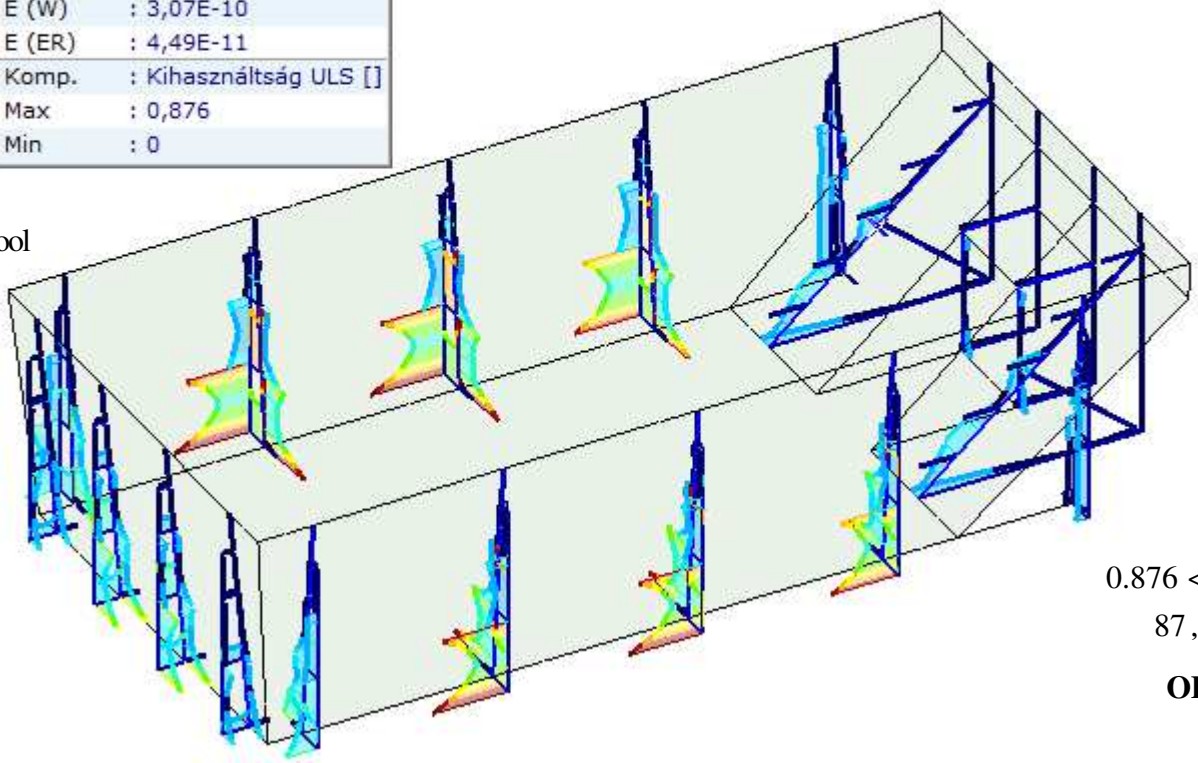
The water pressure acting on the structure

4.3.) Utilization

The stresses were carried out using the AXIS VM sizing program.

Lineáris számítás	
Szabvány	Eurocode-H
Eset	: 1. Tk
E (P)	: 3,07E-10
E (W)	: 3,07E-10
E (ER)	: 4,49E-11
Komp.	: Kihasználtság ULS []
Max	: 0,876
Min	: 0

Biggy Pool



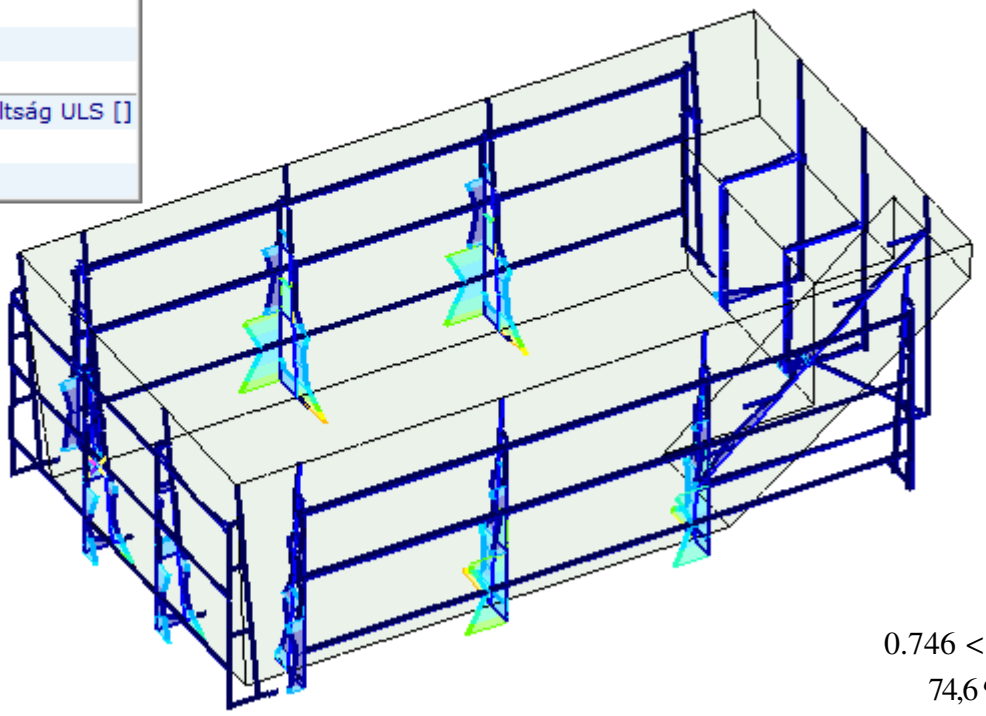
0.876 < 1.00

87 ,6%

OK!

Lineáris számítás	
Szabvány	Eurocode-H
Eset	: 1. Tk
E (P)	: 1,21E-9
E (W)	: 1,21E-9
E (ER)	: 5,63E-11
Komp.	: Kihasználtság ULS []
Max	: 0,746
Min	: 0

Smally Pool



0.746 < 1.00

74,6 %

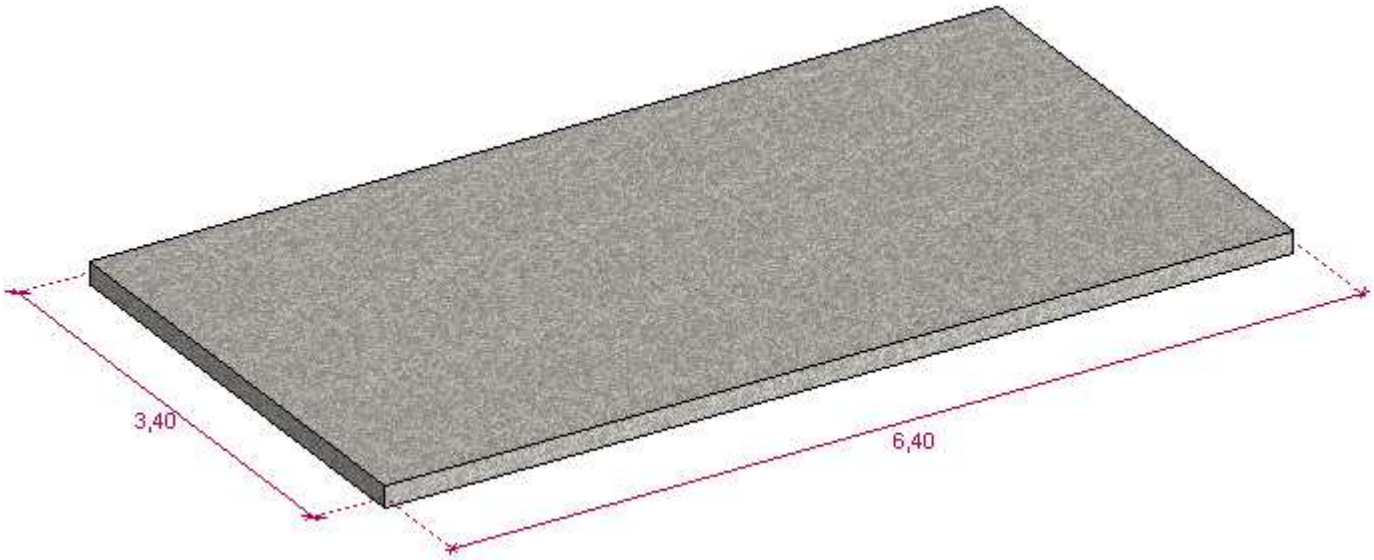
OK !

5.) Inspection of reinforced concrete plate

Base plate data:

- The thickness of the reinforced concrete base plate is 15 cm
- Planned service life min. 10 years
- Concrete structural class C30/37-XF3-16-F2
- Degree of concrete cover min. 3.5 cm
- Mesh reinforcement: ϕ8/15x15 two-layer reinforced rebar mesh

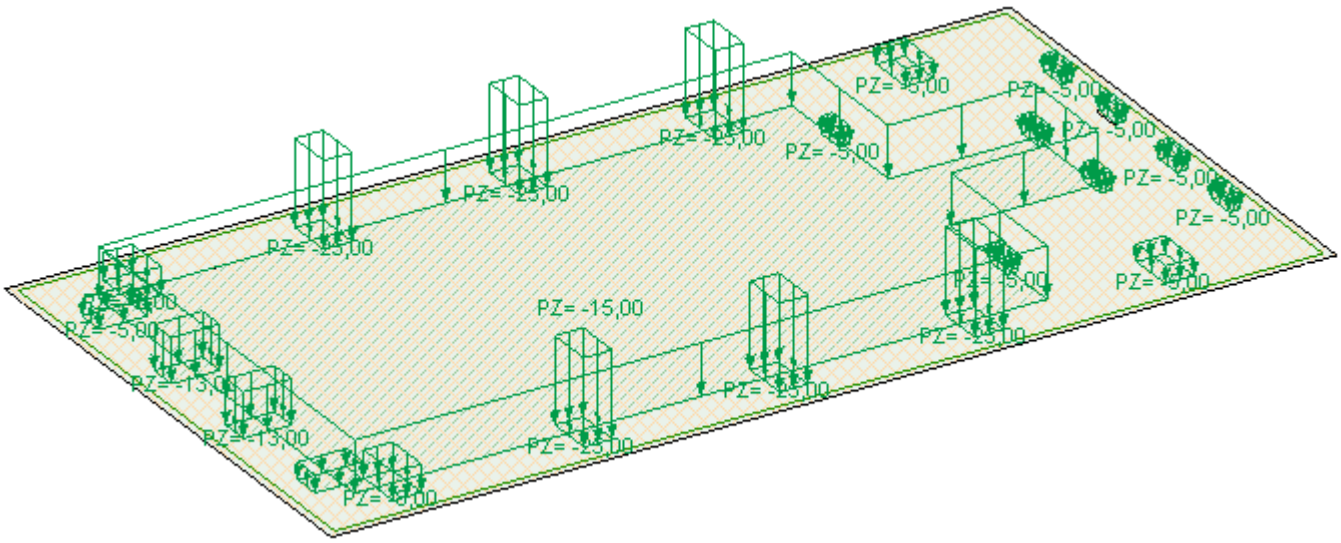
5.1.) Geometry



5.2.) Loads:

Permanent loads: - Self-weight of support structure (Axis)
- Weight of water mass

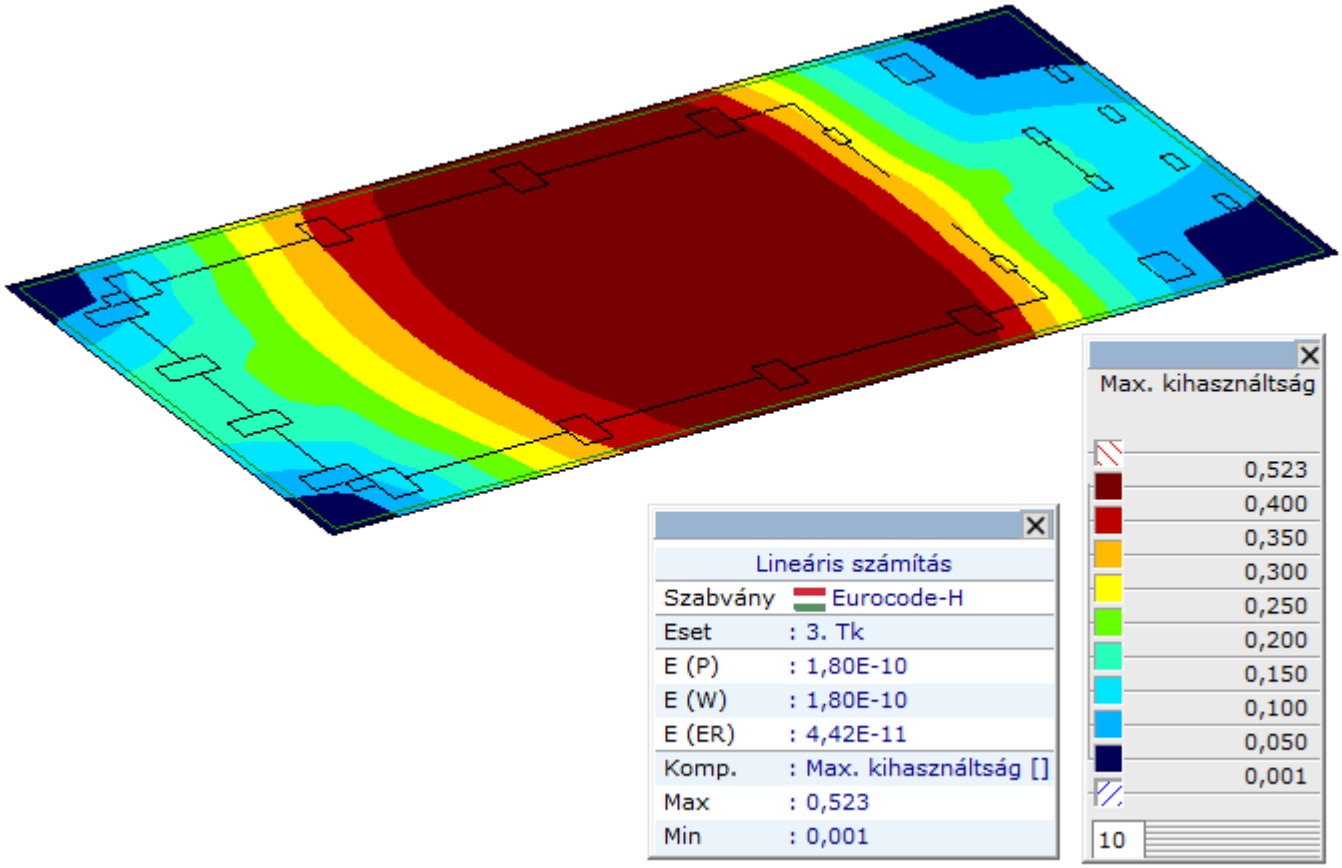
$$G_{k.max} := 15 \frac{kN}{m^2}$$



The load exerted by the water on the base plate

5.2.) Utilization

The stresses were carried out using the AXIS VM sizing program.



0.523 < 1.00

52.3%

6.) Static statement:

Undersigned Mrs. Hédi Stolczenberger Fülöp structural engineer, Europlanning engineer, I declare that the subject structure satisfies the statics in terms of support structure and stability requirements.
During the examination of the structure meeting the static requirements, I used the same method a to determine effects (loads) and resistances (load capacity) during my examination in full.
No deviations from national standards were necessary during the inspection.
I declare that I have the appropriate authorization to perform the task.

Tatabánya, November 12, 2024

Stolczenbergerné Fülöp Hédi

acc. civil engineer structural designer

T07-01607