CALCULATIONS REPORT

FLOATING 3.00m HEIGHT POOL

Report made by:

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1. FLOATING 3m HIGH POOL

1.1.1. PURPOSE OF THE REPORT

The purpose of the report is to assess the behavior of the floating system of 3 m high pools with a beach integrated into its 3 m structure.

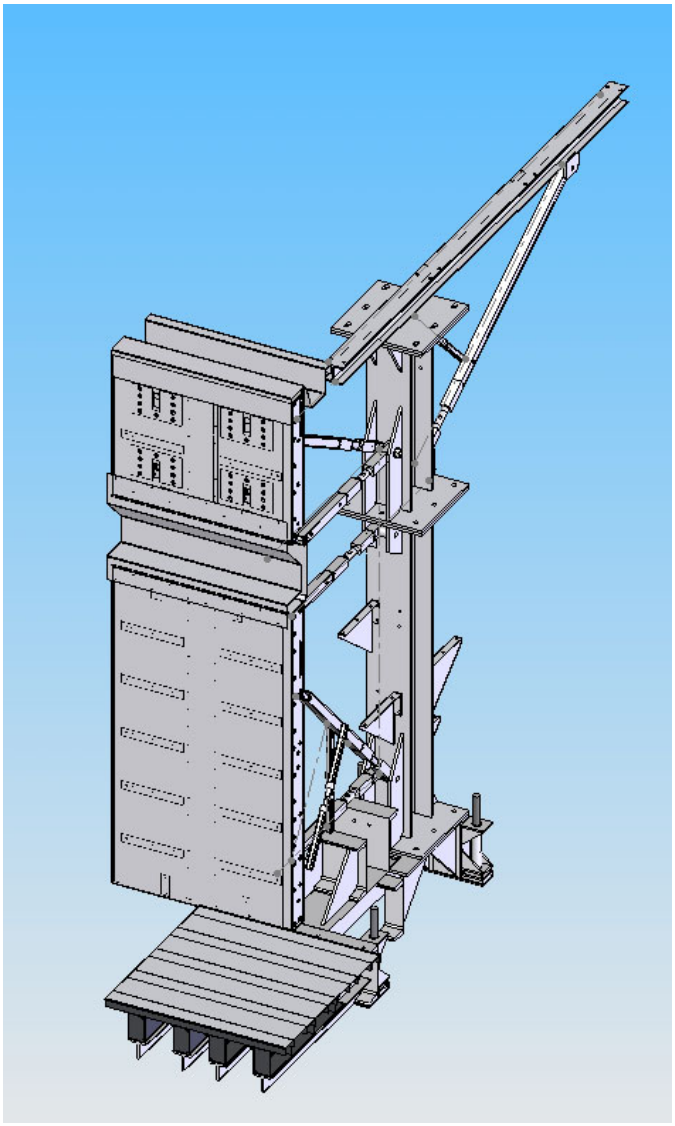


FIGURE 1: FLOATING 3M STUCURE ASSEMBLY MODULE

1.1.2. STRUCTURE CALCULATION BASIS

The NBE-AE/88 is considered as the basic regulation applicable for the study of the structure calculations in this report.

In addition, as the type of structure tested is subject to water pressure, its hydrostatic pressure is used as the predominant load; thus the use of the integrated beach are taken with predominant efforts.

1.1.3. CONSIDERED ACTIONS

1.1.3.1.1. GRAVITATIONAL ACTION

• **Own weight**: own weight of the structure formed by metallic profiles. The weight of the water is considered with a density tabulated by 1000 kg/m3 for calculation purposes.

• **Beach Use Overload**: 500 kg/m3

1.1.3.1.2. HORIZONTAL ACTION:

No horizontal overload is considered because it does not exist.

1.1.4. SEISMIC ACTION:

Not considered. The structure is floating, it is not anchored. Any seismic movement or vibration does not affect it.

1.1.5. RESISTANT ELEMENTS CHARACTERISTICS

The structure object in the study is built entirely by metal plates and standard structural profiles with type A-42b steel, joined together by welding.

For the A-42 steel, the following values are taken:

- Elastic limit 2600 kgf./cm^2 for thickness < 16 mm
- Elastic limit 2500 kgf./cm^2 for thickness between 16 mm - 40 mm

1.1.6. BALANCED COEFFICIENTS OF RESISTANT ACTIONS AND ELEMENTS

The balanced coefficients are established for the elements of the pool under study.

• Increase coefficient of permanent actions

If they are favorable: 1.00

If they are unfavorable: 1.33

• Overload increase coefficient: 1.50

• Steel resistance reduction coefficient: 1.00

1.1.7. STRUCTURE CALCULATION

A calculation is made by the finite element method using the **ABAQUS / Standard software.**

The calculation is made in accordance with all the provisions established in current regulations.

The load level of the structure and the state of deformation are evaluated.

1.1.8. NUMERICAL MODEL

From the geometry of the floating floor structures, a numerical model is generated by evaluating their behavior.

This numerical model has the following characteristics:

• Modeling of steel strips using solid elements.

• Modeling of the sheets through generic sheet-type elements.

• Articulated joints

The 3D model is made.

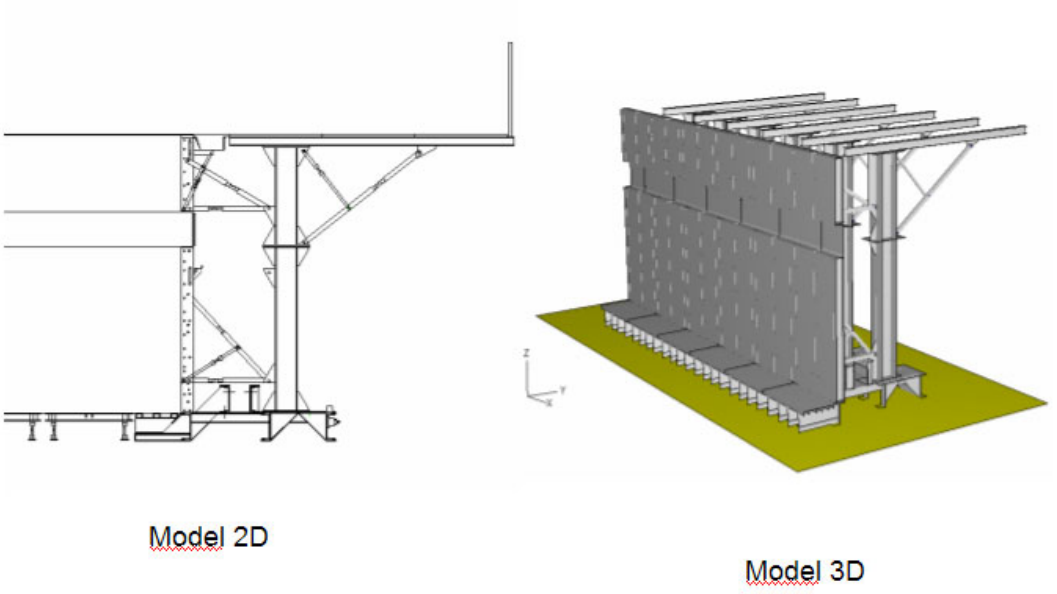
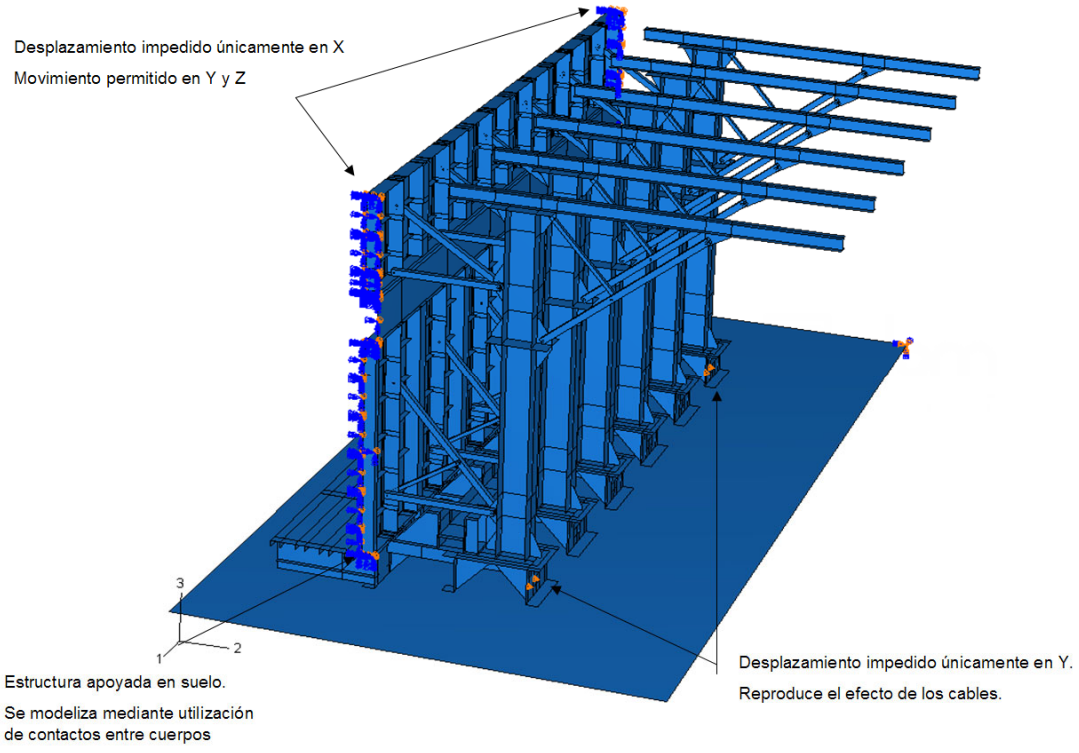


FIGURE 2: FLOATING SYSTEM MODEL

The structure is fixed to reproduce the effects.



Hydraulic and use loads are placed on different parts of the structure.

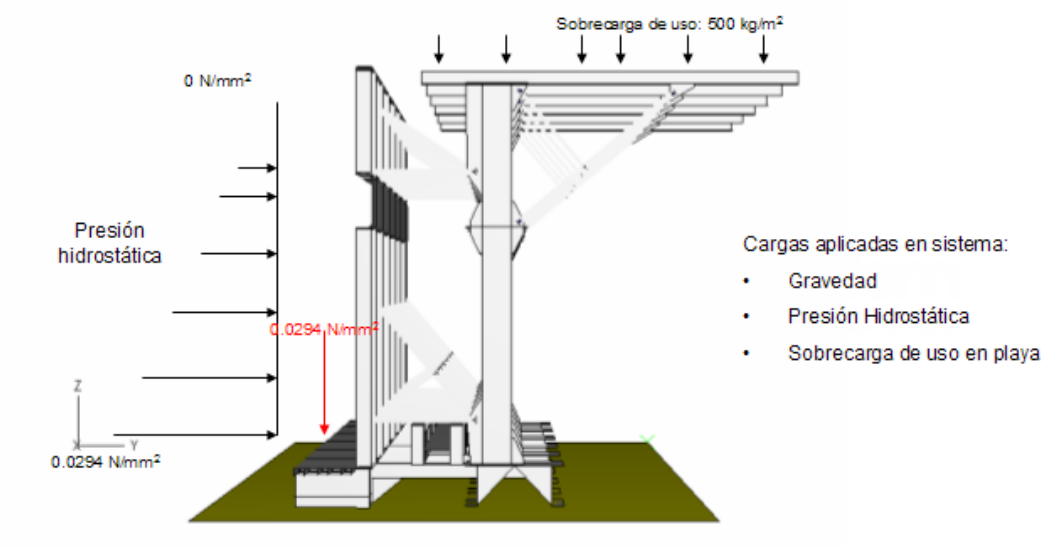


FIGURE 3: HYDROSTATIC LOADS

The loads applied to the model are:

• Own weight (with g = 9.8Kg / m3)

• Hydrostatic pressure corresponding to 3 m.c.a.

• Use overload on the beach corresponding to 500 Kg / m2

1.1.9. RESULTS

1.1.9.1. DISPLACEMENT MAP IN Z AXIS

Maximum displacements occur in the inner area of the beach with a value of 3 mm

This value is considered ADMISSIBLE.

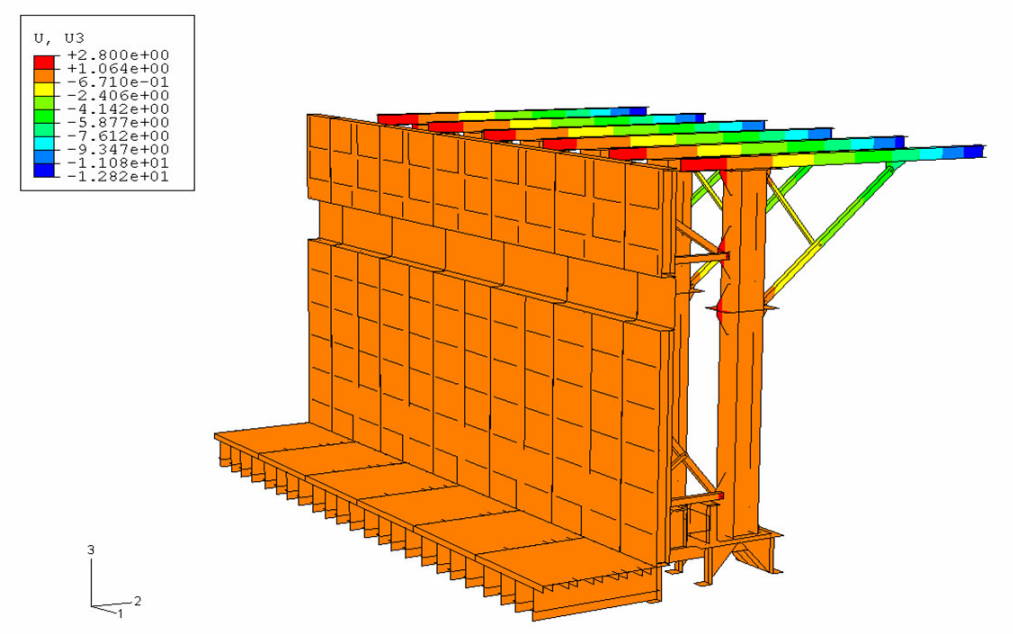


FIGURE 4: DISPLACEMENT MAP IN Z AXIS

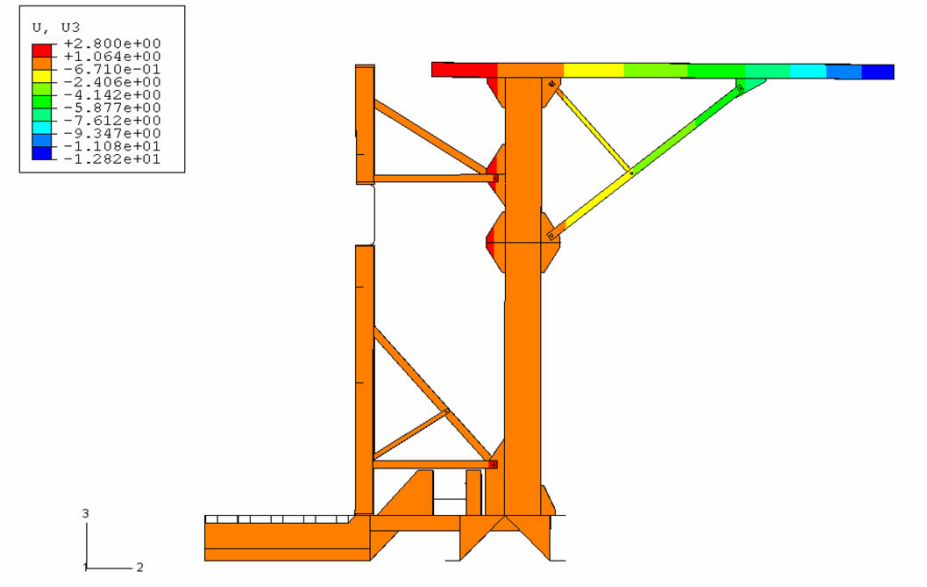


FIGURE 5: DISPLACEMENT MAP IN Z AXIS

1.1.9.2. DISPLACEMENT MAP IN Y AXIS

Maximum displacements occur in the beach area with a value of 2 mm

This value is considered ADMISSIBLE.

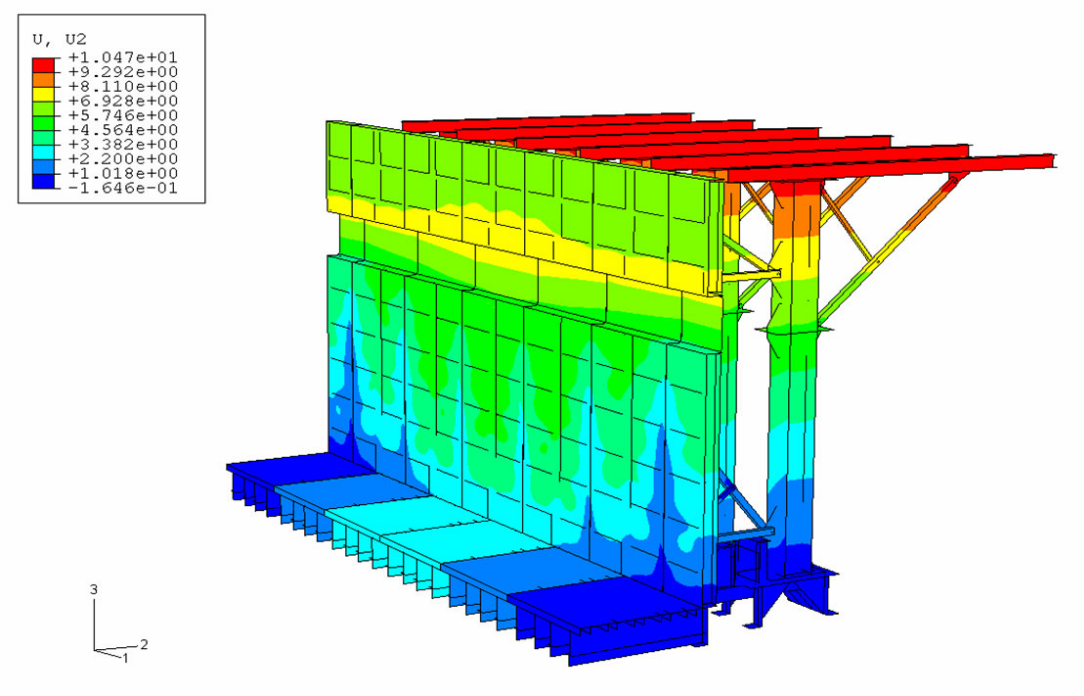


FIGURE 6: DISPLACEMENT MAP IN Y AXIS

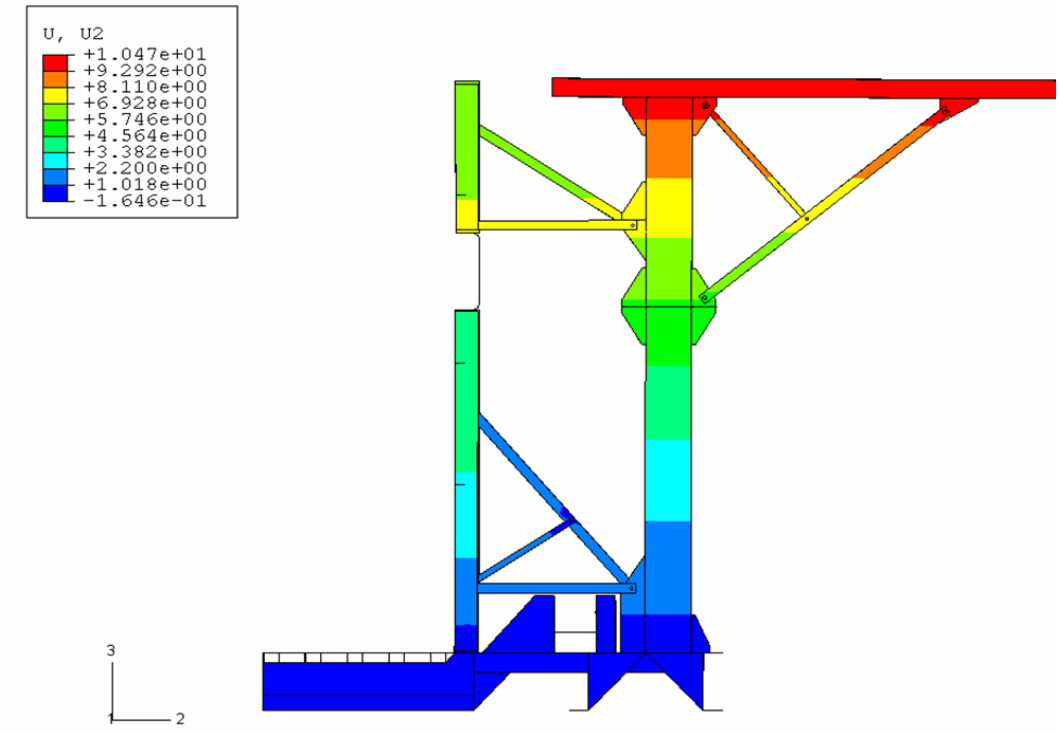


FIGURE 7: DISPLACEMENT MAP IN Y AXIS

1.1.9.3. 8-VON MISES EQUIVALENT TENSION MAP (MPa)

The maximum state of equivalent tensions seen in the model take values in small points above the elastic limits of the material, in which they are verified where they are located to make a study in the prototype.

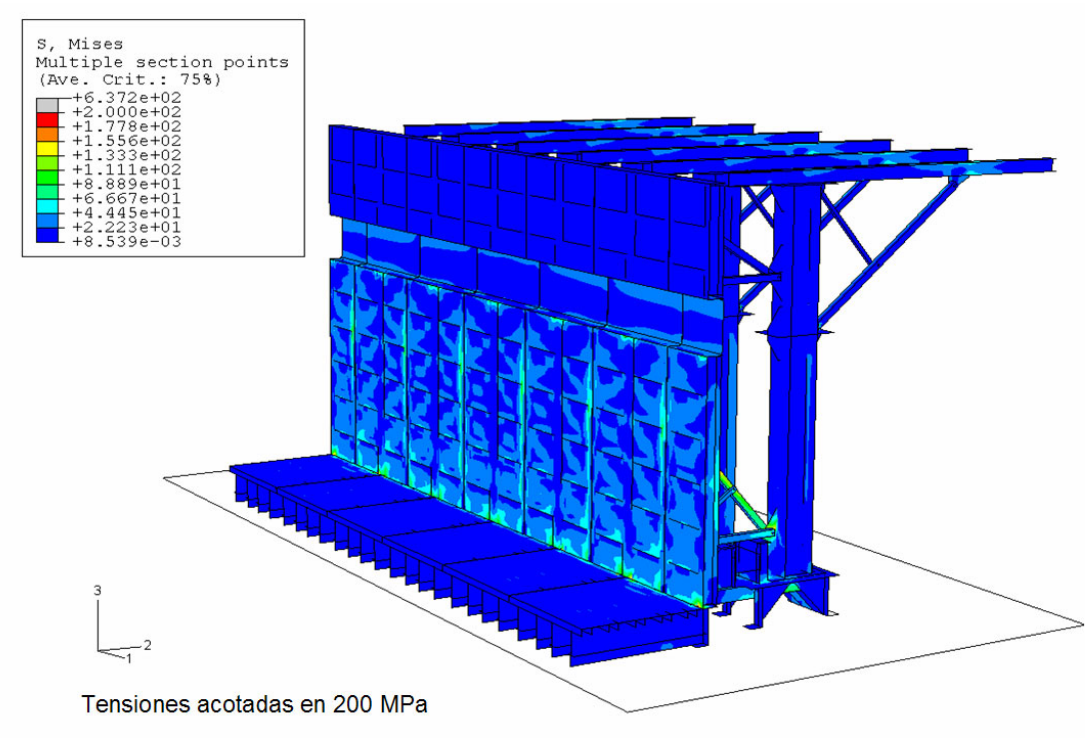


FIGURE 8: VON MISES TENSIONS STATE

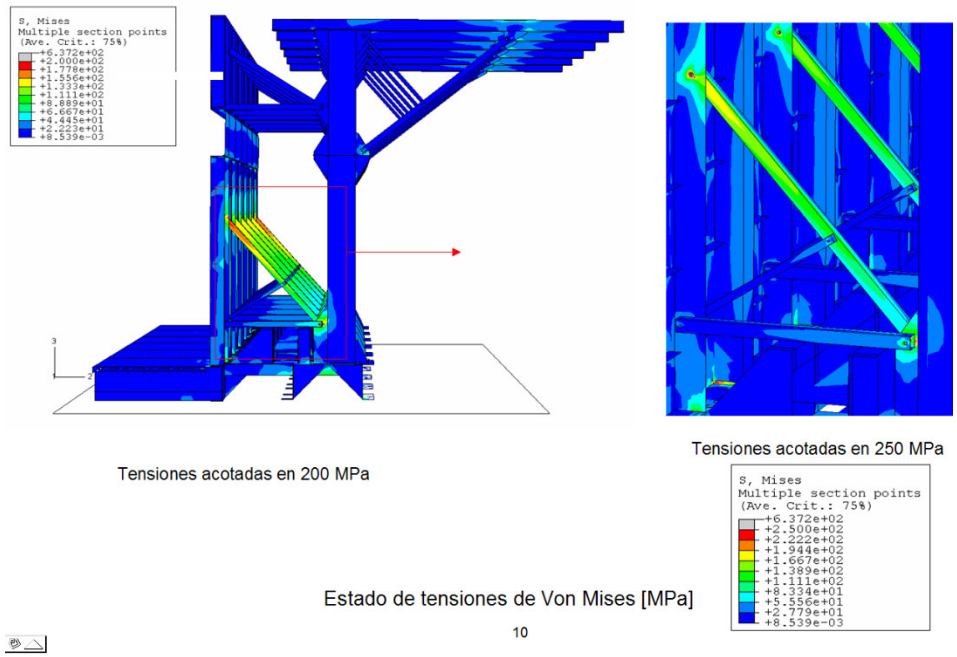


FIGURE 9: VON MISES TENSIONS STATE

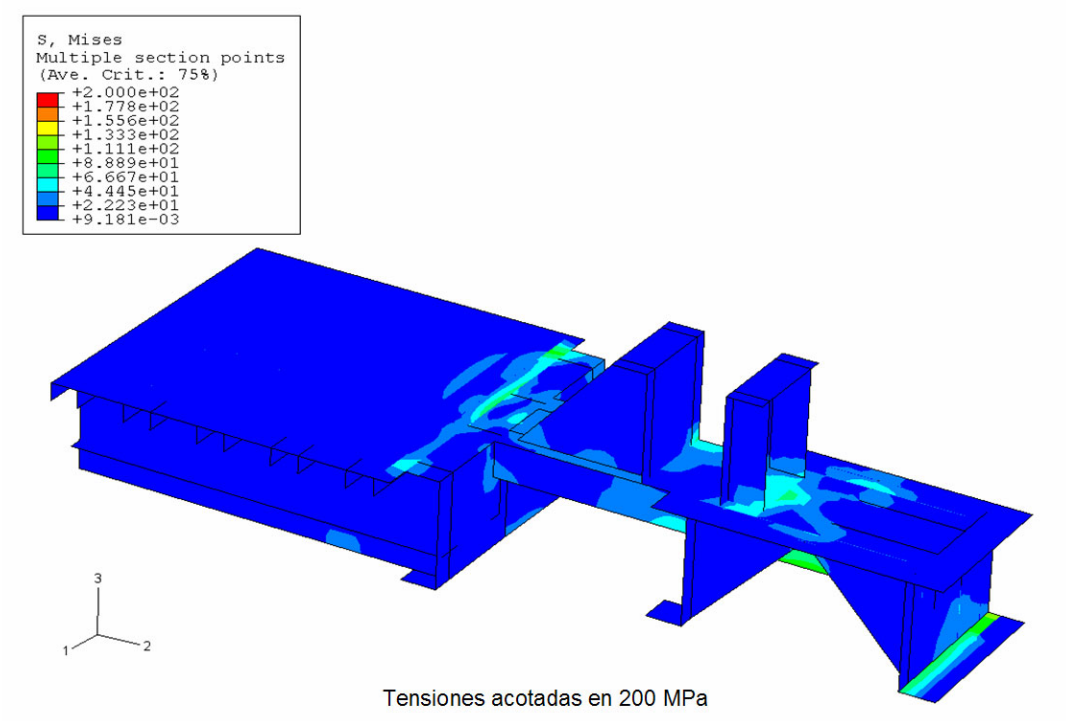


FIGURE 9: VON MISES TENSIONS STATE

1.1.10. ACTIONS ON SLAB (N)

The actions on the slab of the structure, for a depth of 3 m are 35 Tm, located mainly in the back. In the floating structure of AstralPool, the forces with full load are reflected in 64 Kg / Cm2 in the back and 32 Kg / Cm2 in the front.

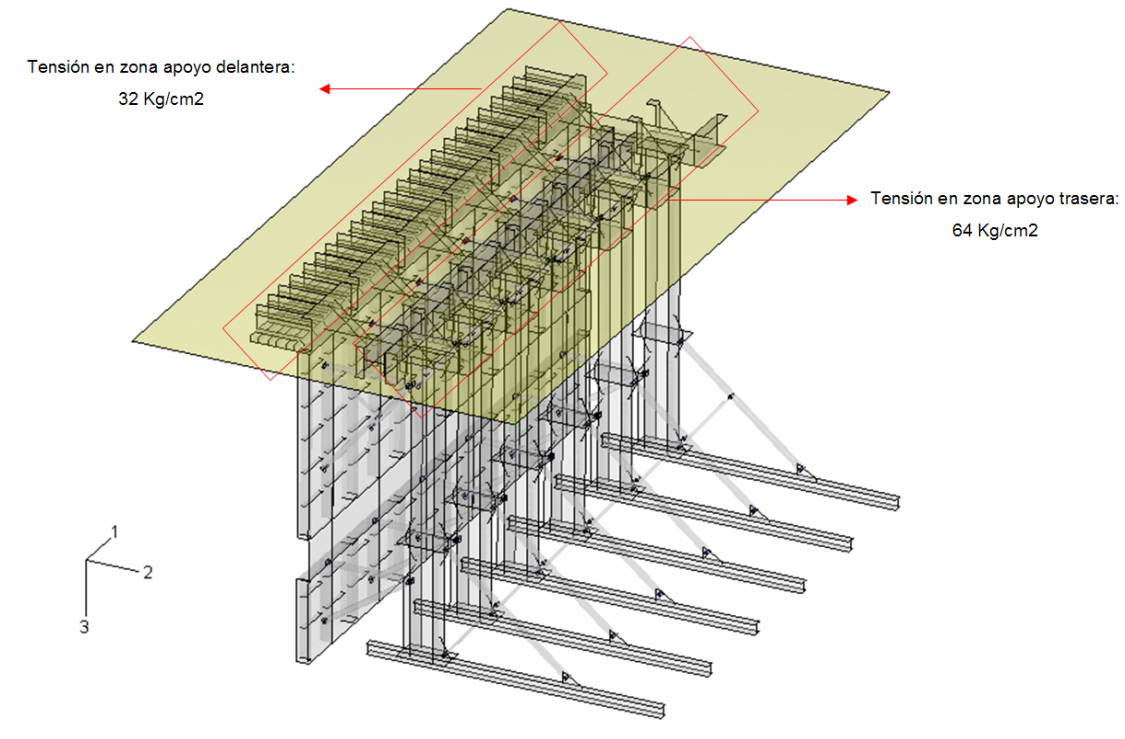


FIGURE 10: BASE REACTIONS