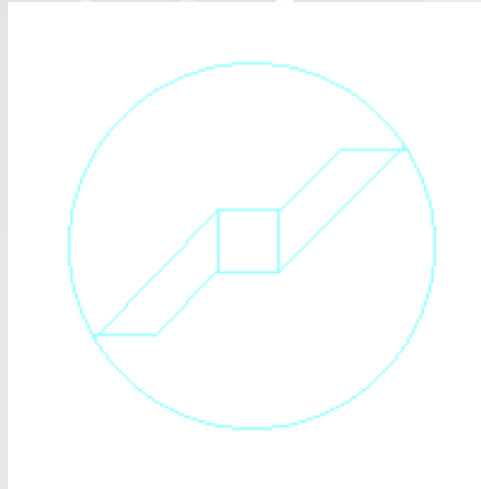


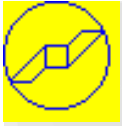
# ICAB

## FEA applied to hydraulic structures



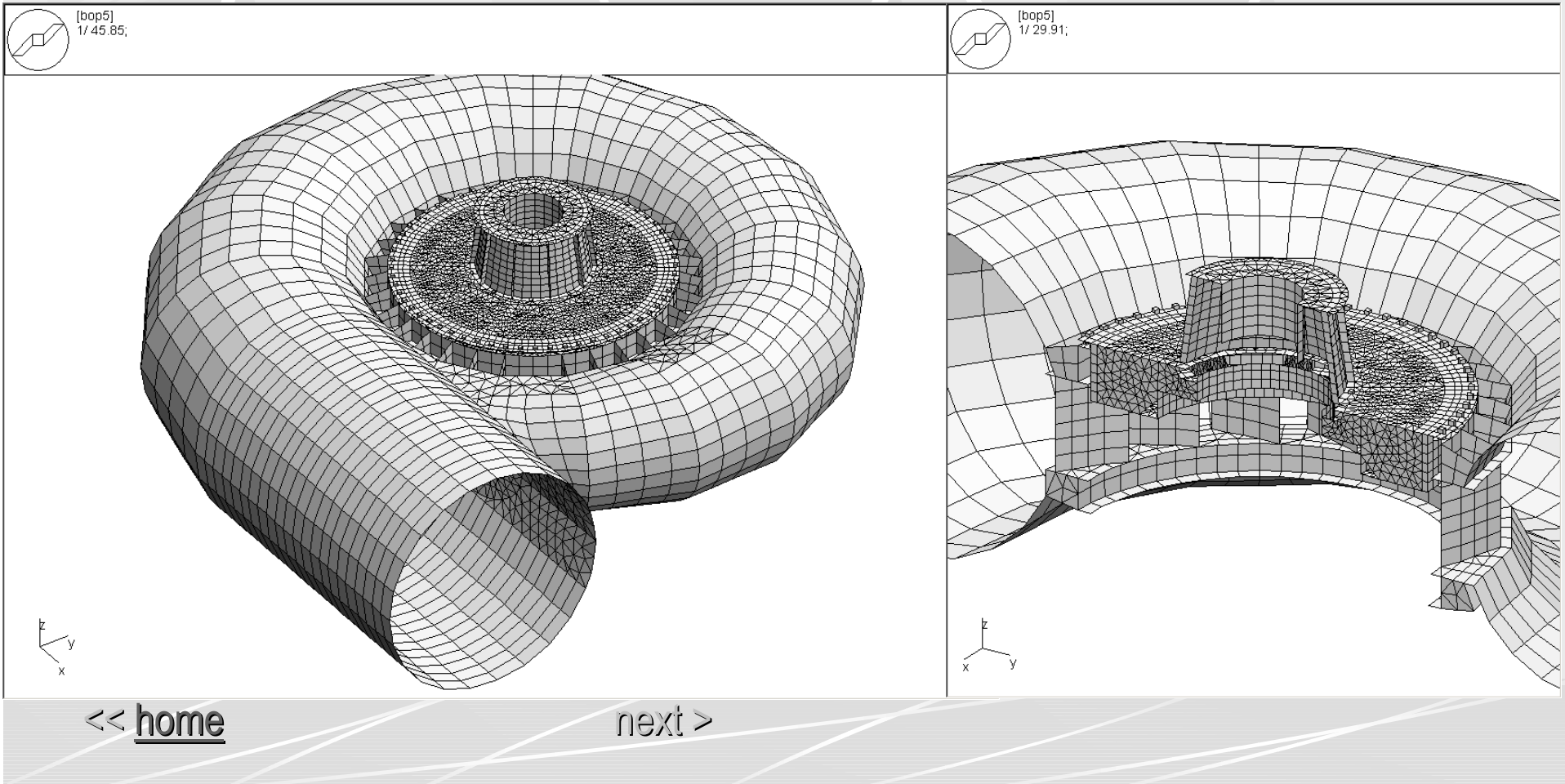
Quit

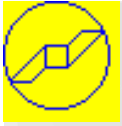
internet: <http://www.icab.fr/>



# Design and FE Analysis

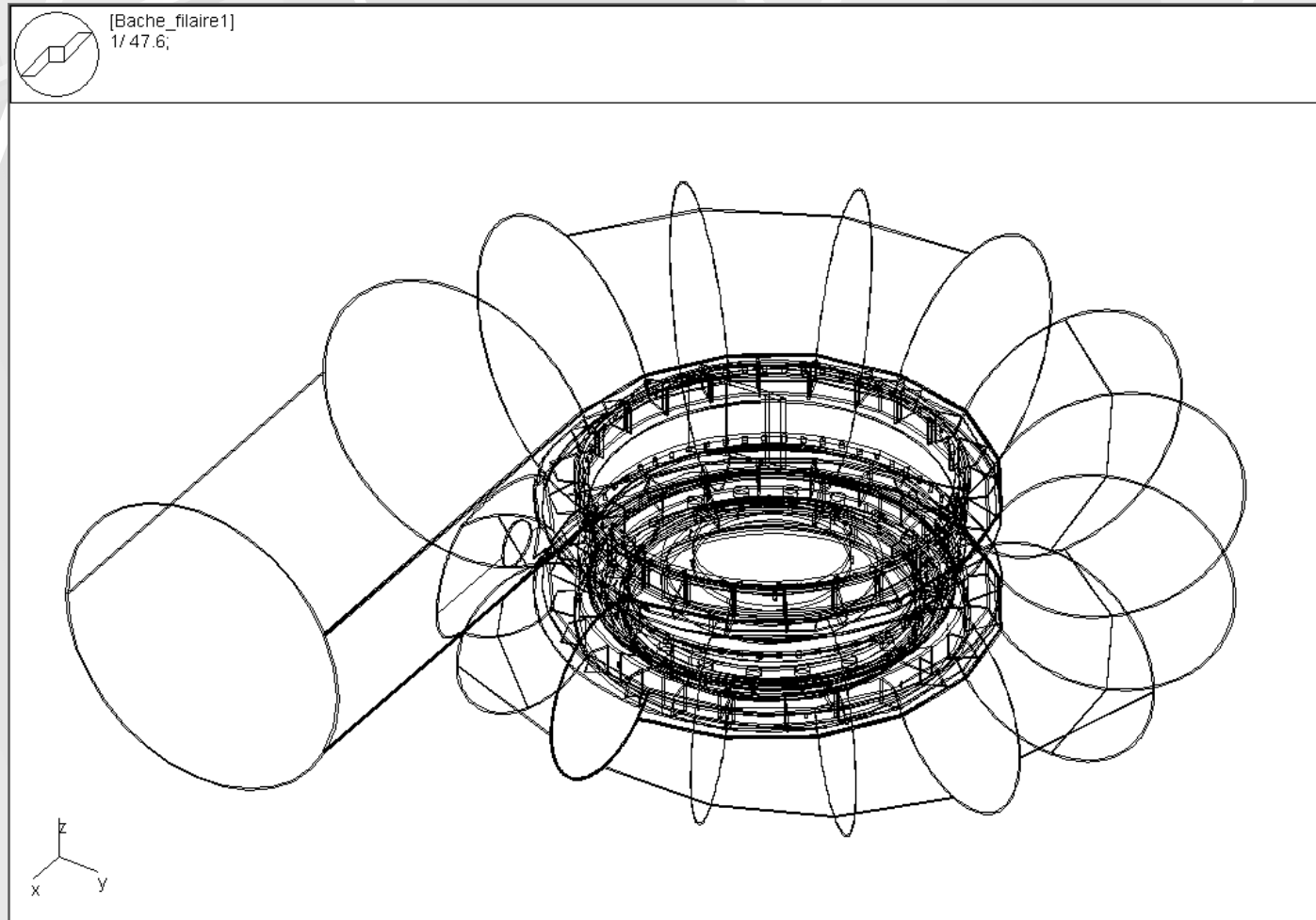
- Graphical data capture interface :
  - General view:





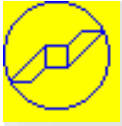
# CAD data input

- Import IGES (or DXF AutoCAD) file



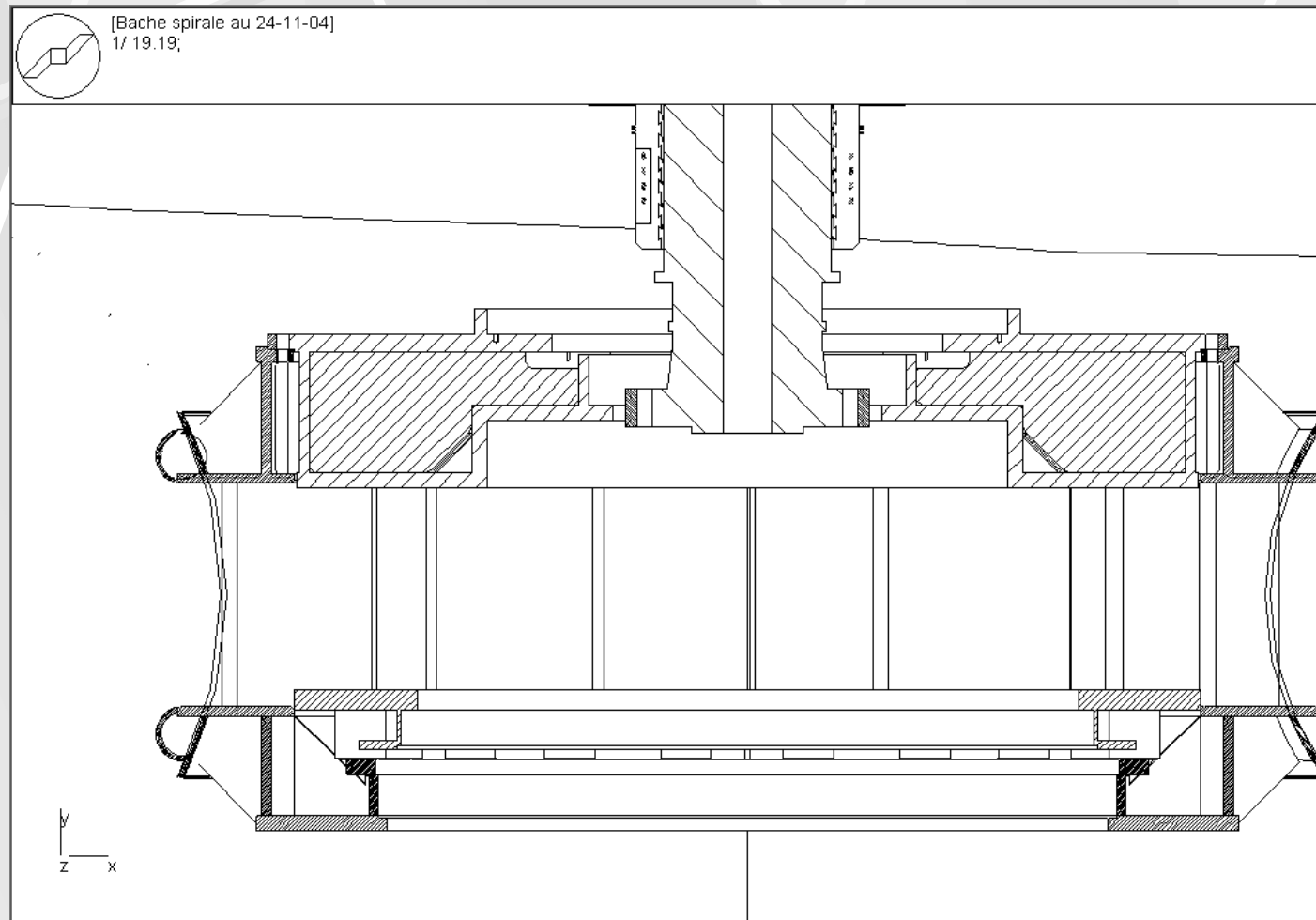
<< home

next >



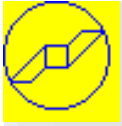
# CAD detail

- Detail of the import



<< home

next >

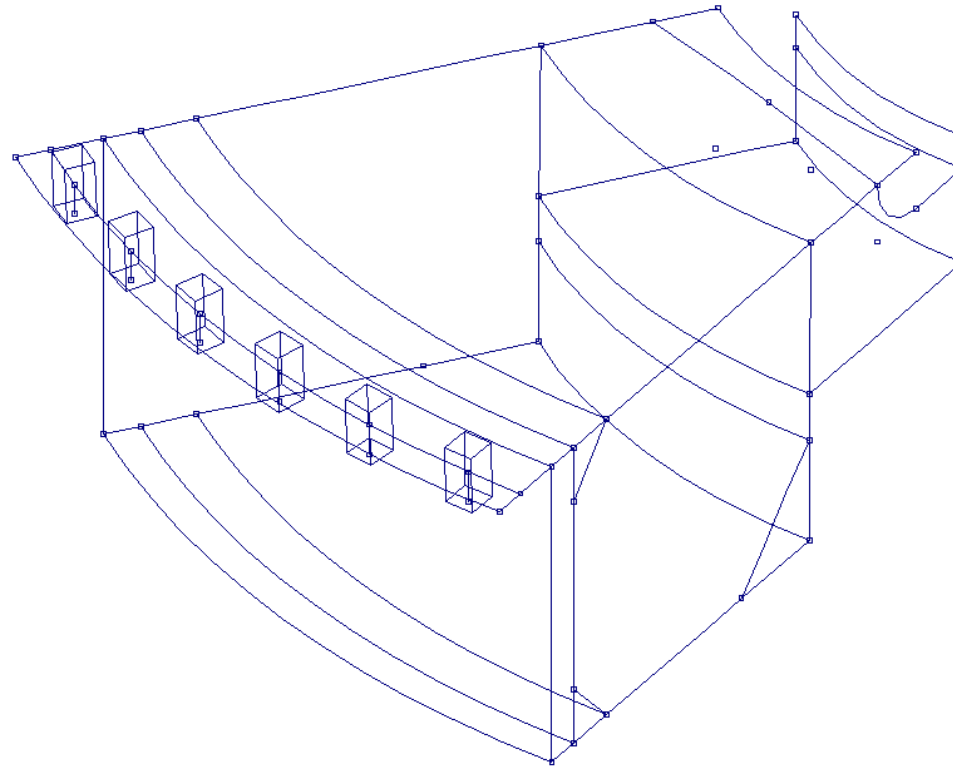


# Meshing

- Meshing :
- Preliminary mesh

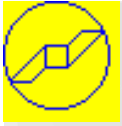


[bop\_bache\_flasque\_B041124\_mesh]  
1/ 7.175;



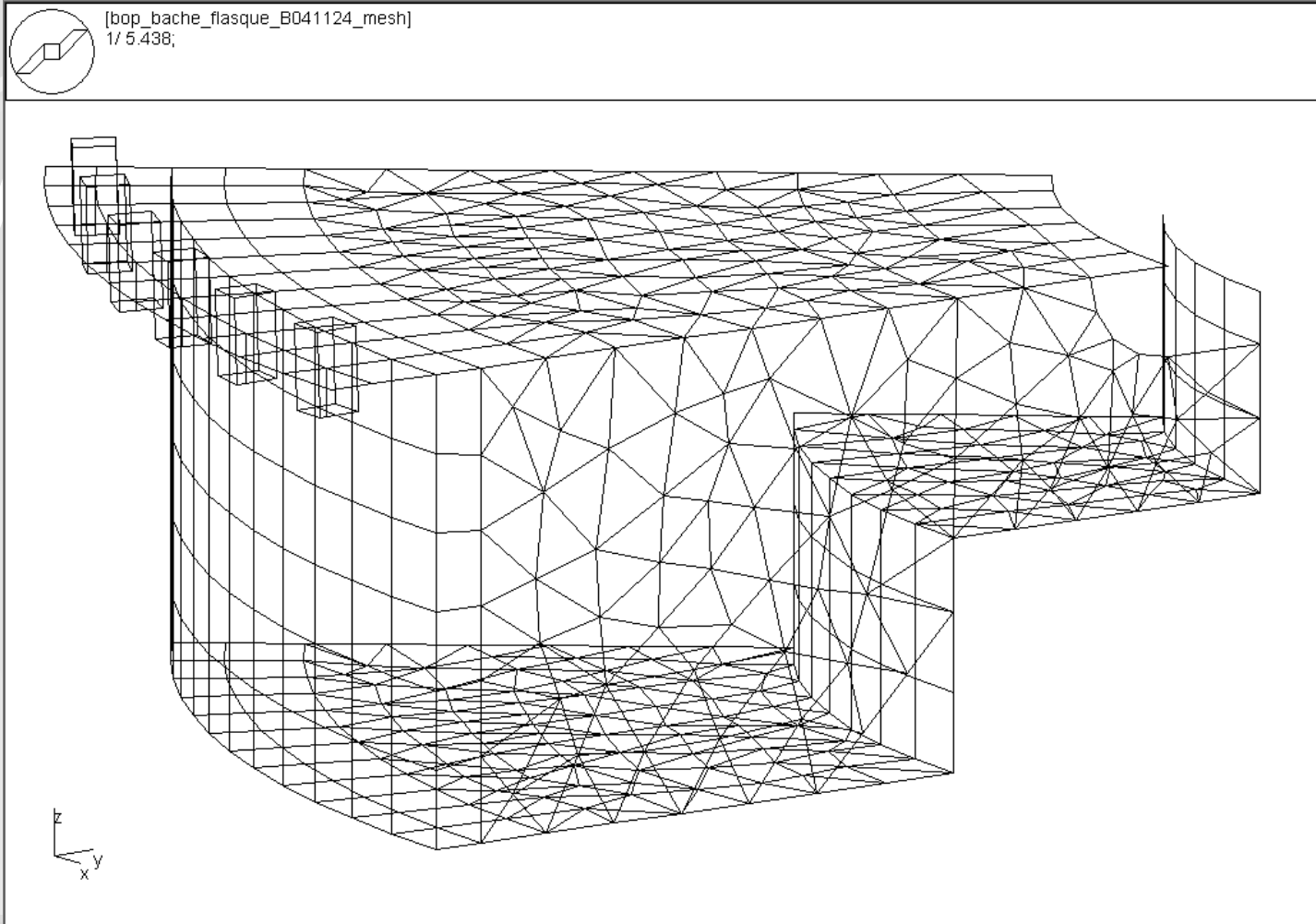
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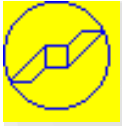
# Finite element Meshing

- Creation of the shell elements



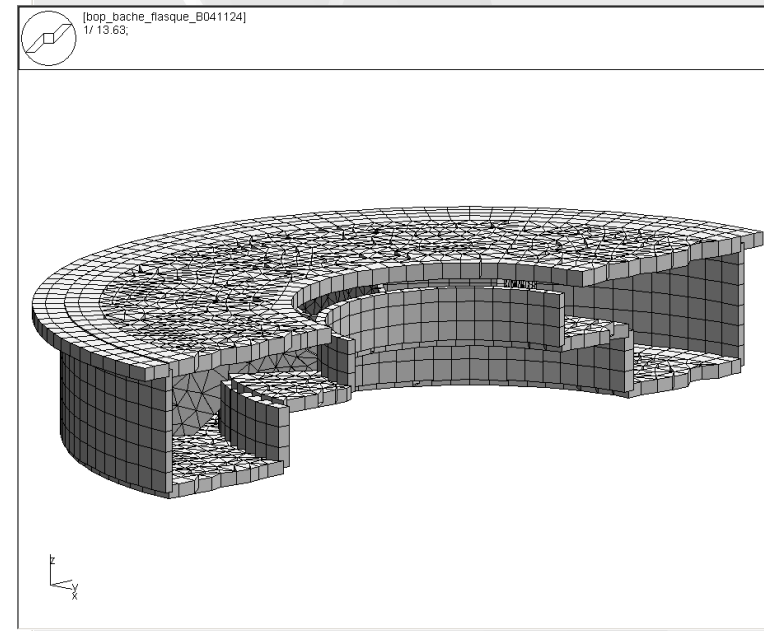
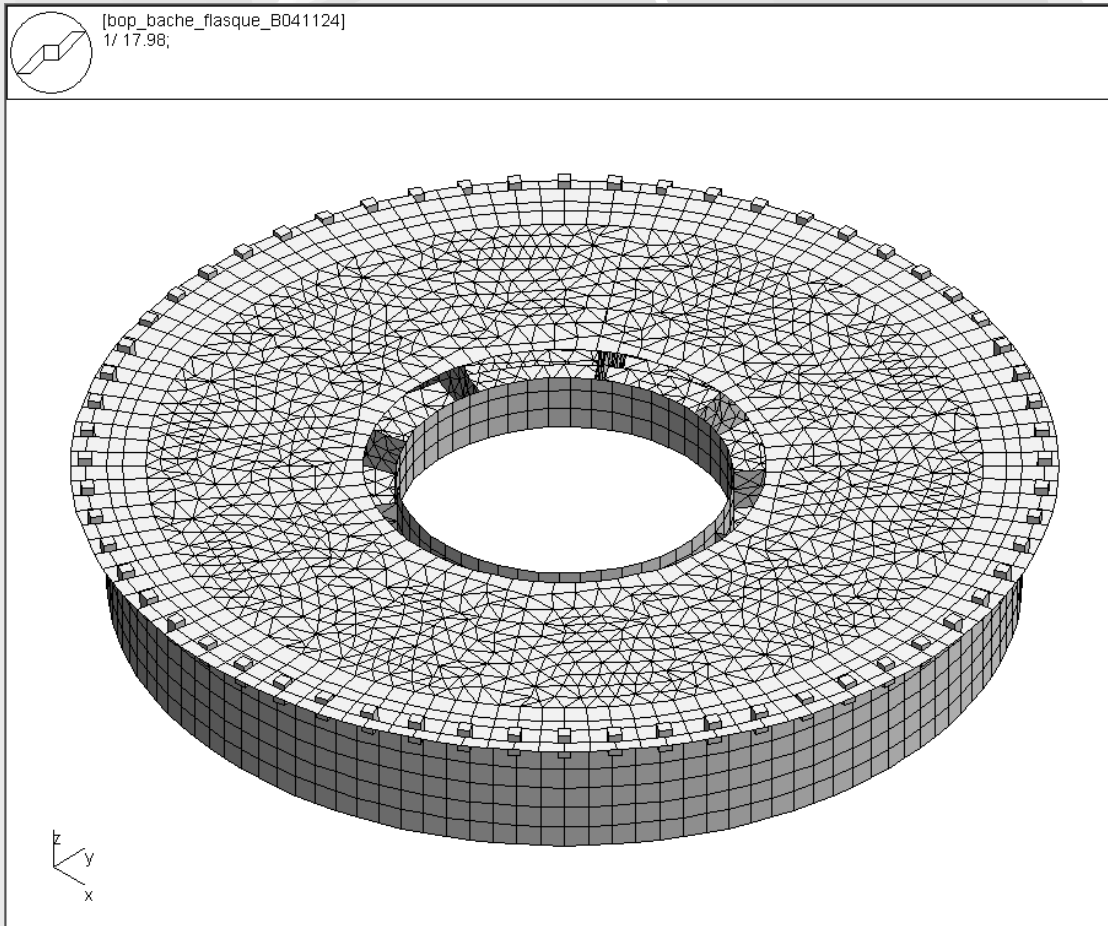
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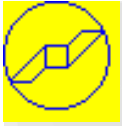
# Model completion

- Completion of the meshing by rotation



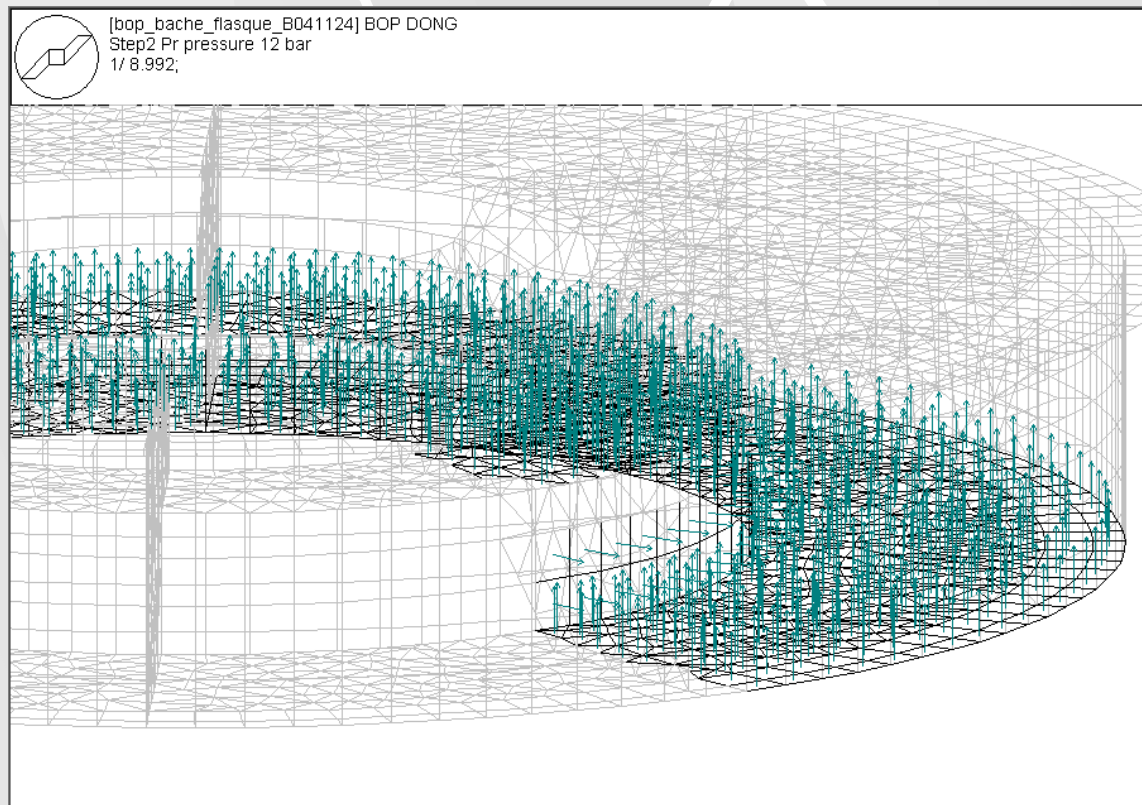
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next >

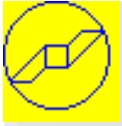


# Pressure load

- Applying of boundary conditions :
  - Pressure = 12 bars :

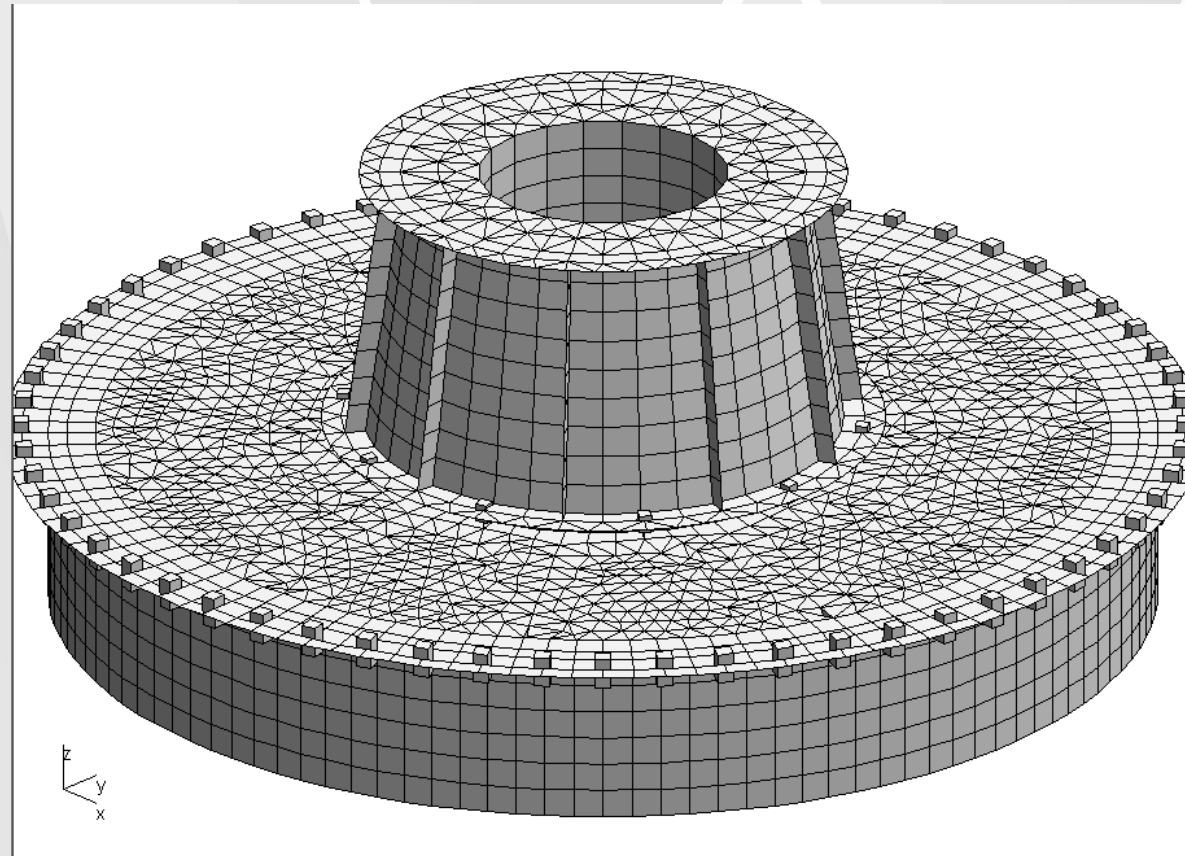


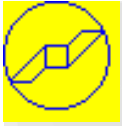




# Assemble parts

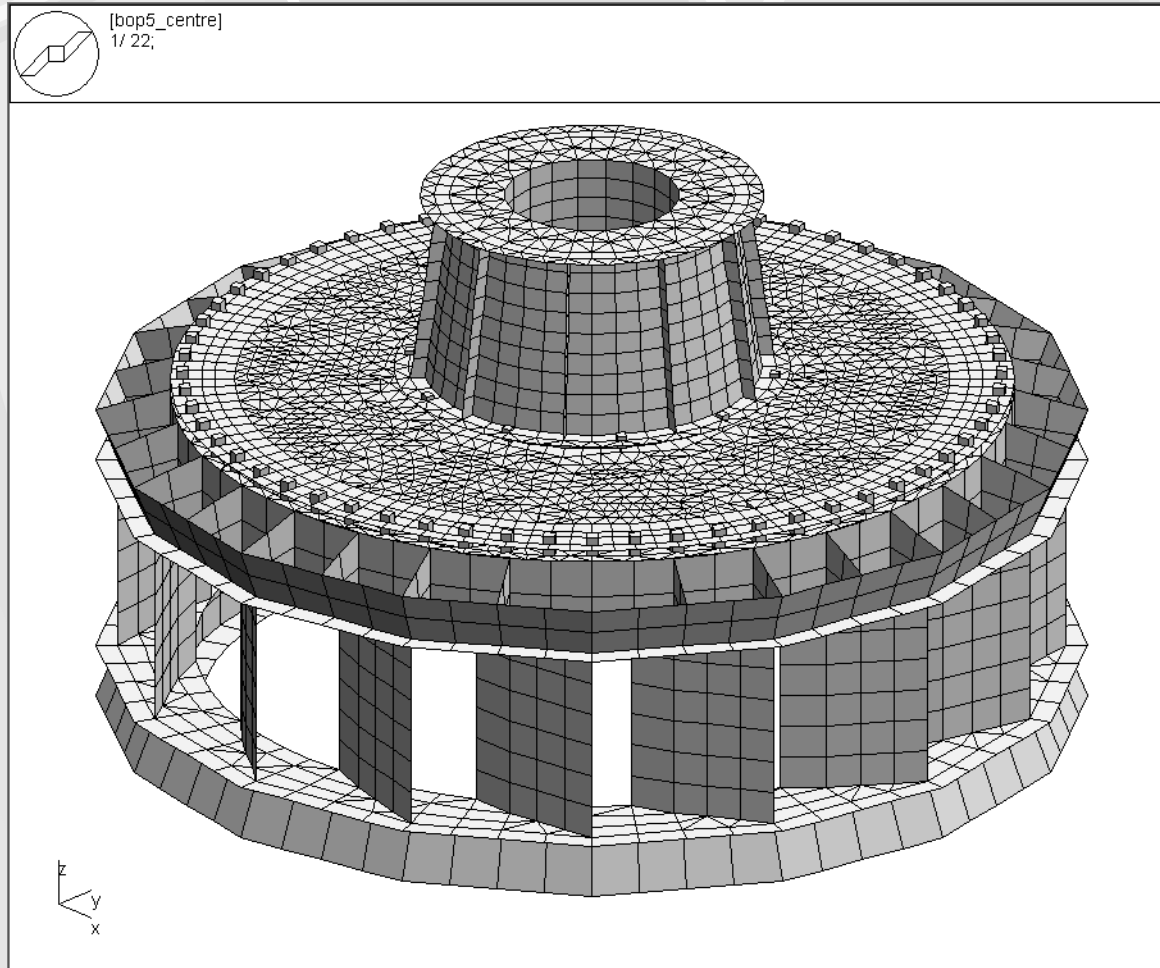
- Assembly of the other parts :
  - + cover with bearing





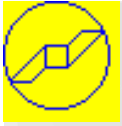
# Assemble parts (2)

- + support of the case



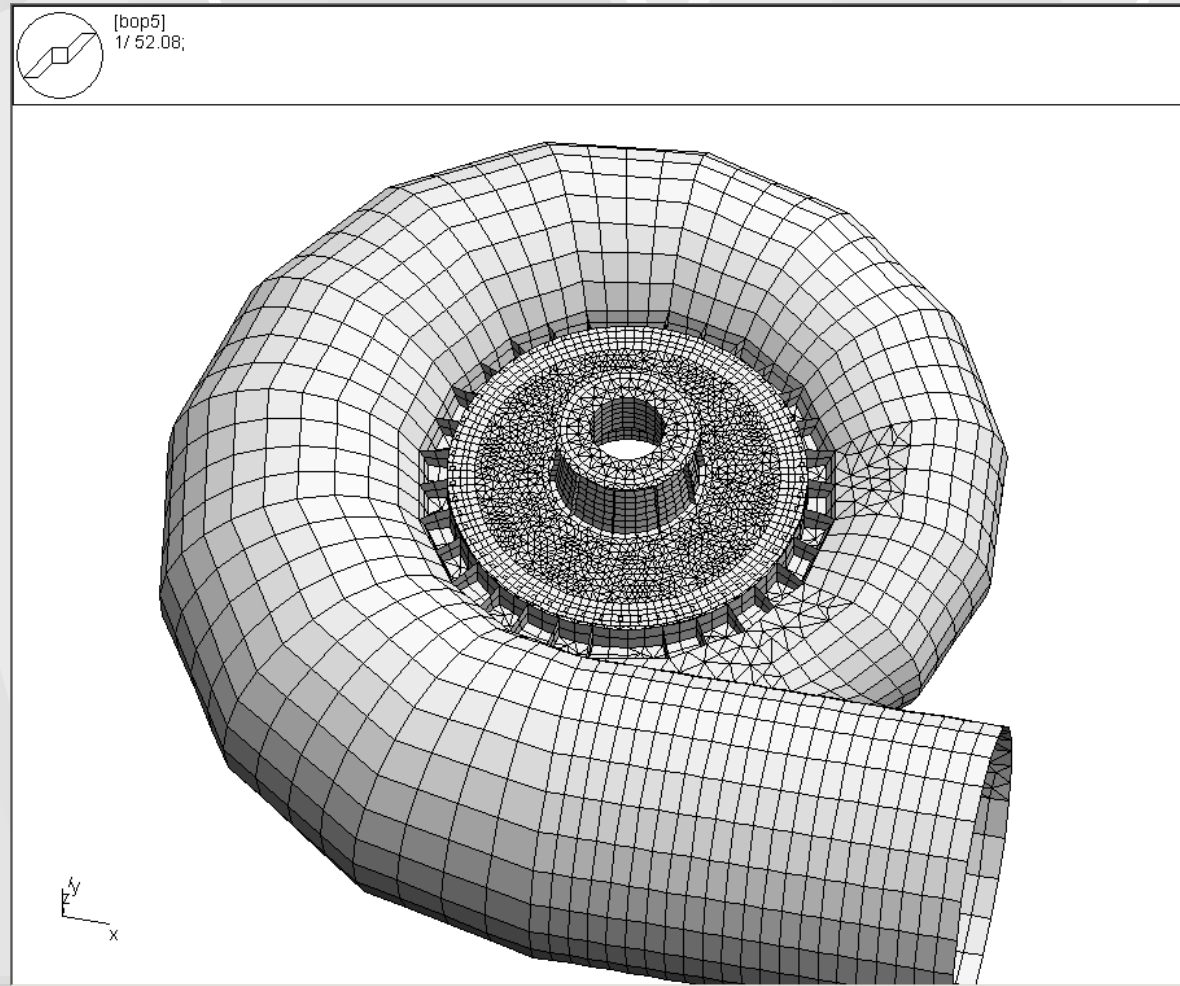
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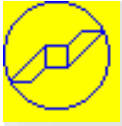
# Assemble parts (3)

- The full structure



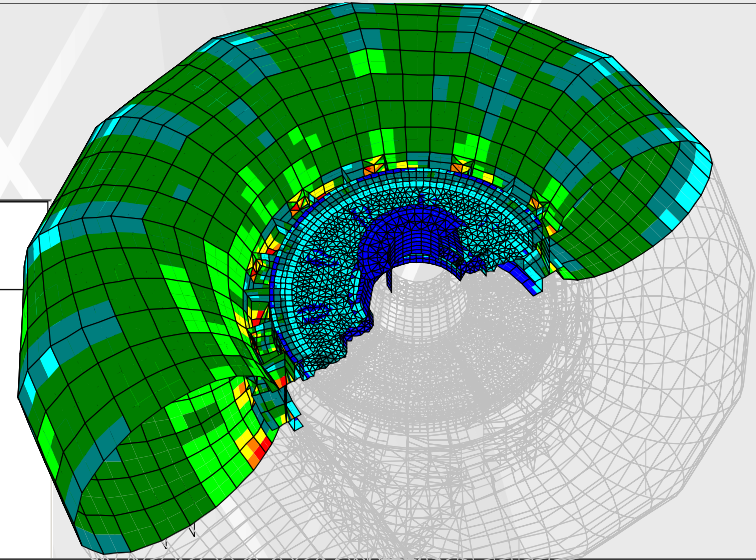
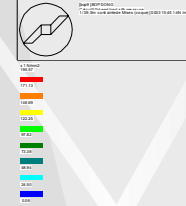
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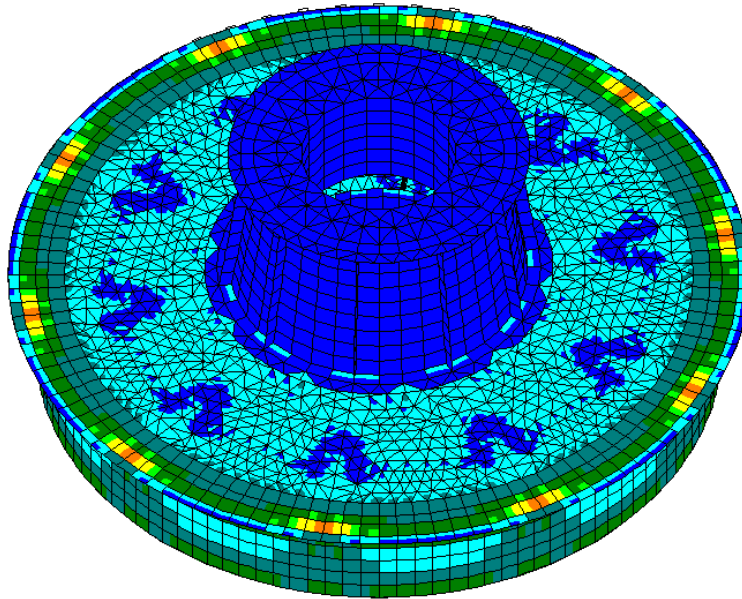
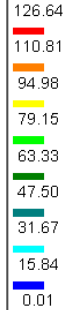
# Results - stresses

- Visual output :
  - Stresses



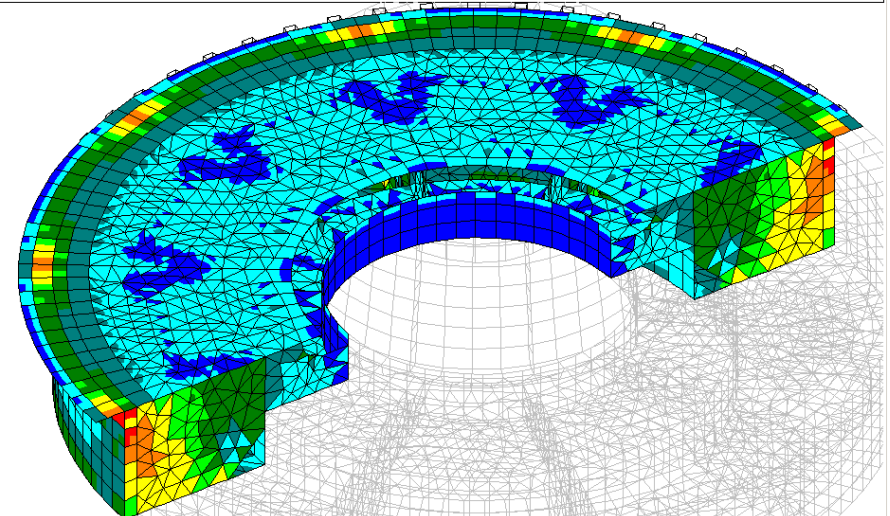
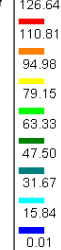
[bop5\_top] BOP DONG  
Calcul3 G dead load + Pr pressure  
1/ 22.55; Sm contrainte de Mises (coque) [0.01049; 126.6 N/mm2]

x 1 N/mm2



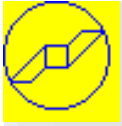
[bop5\_top] BOP DONG  
Calcul3 G dead load + Pr pressure  
1/ 14.88; Sm contrainte de Mises (coque) [0.01049; 126.6 N/mm2]

x 1 N/mm2



<< home

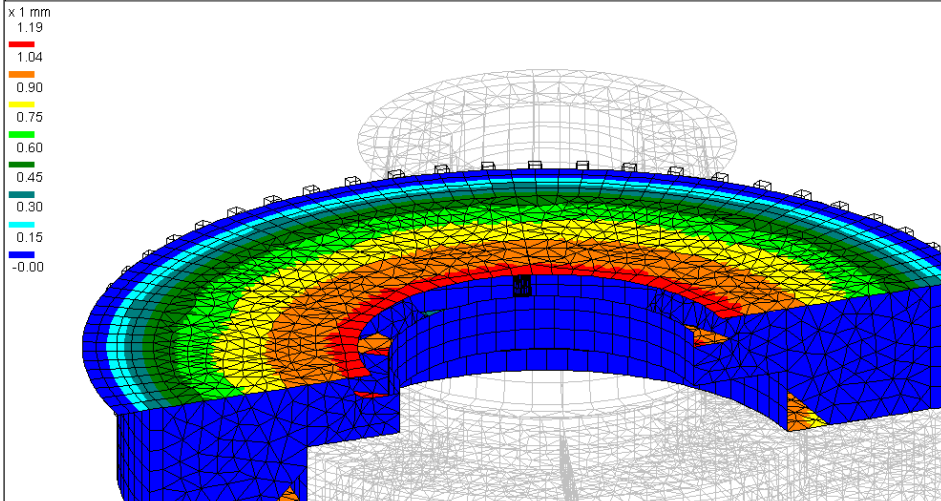
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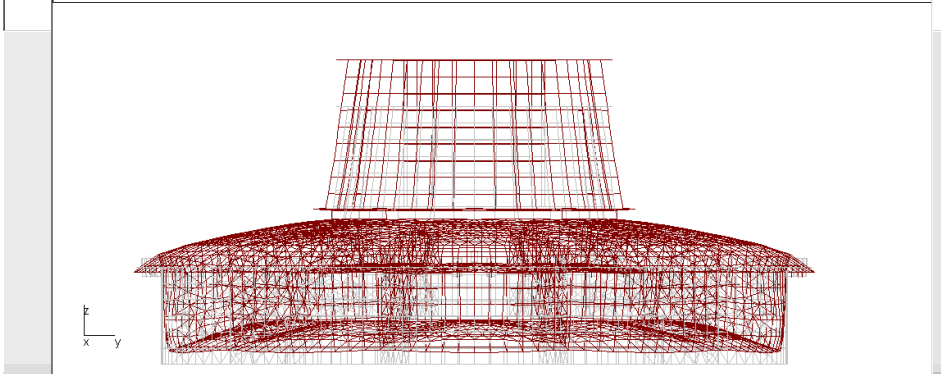
# Results -displacement

- Deflection

[bop5\_top] BOP DONG  
Step3 G dead load + Pr pressure  
1/ 14.88; W deflection of the shell (norm) [1.519E-008; 1.193 mm]

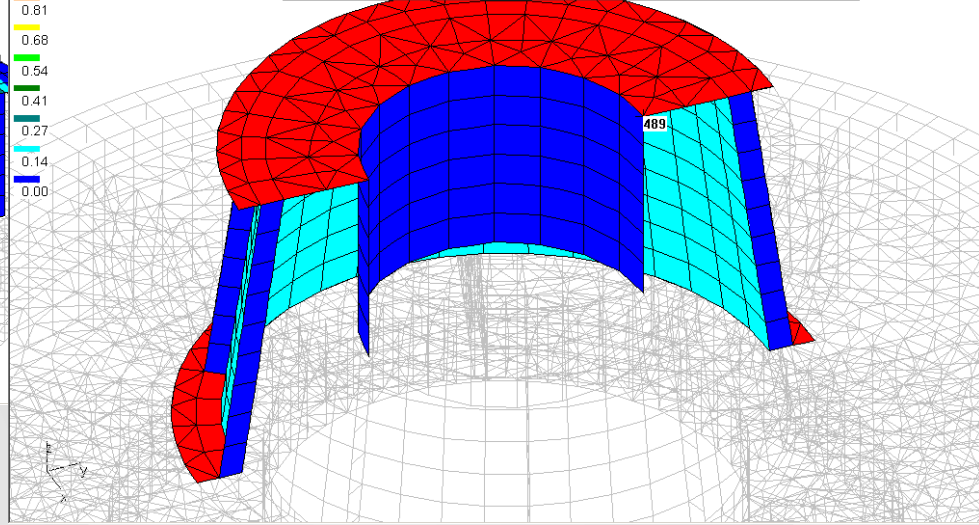


[bop5\_top] BOP DONG  
Step3 G dead load + Pr pressure  
1/ 17.55; (deform x 250)



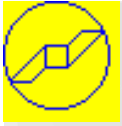
[bop5\_top] BOP DONG  
Step3 G dead load + Pr pressure  
1/ 9.814; W deflection of the she

Node	X displacement mm	Y displacement mm	Z displacement mm	RX rotation rad	RY rotation rad	RZ rotation rad	D full displac mm	R full rotatio rad
489	1.682e-5	-0.0002211	1.033	5.405e-6	6.993e-16	-4.205e-8	1.033	5.405e-6



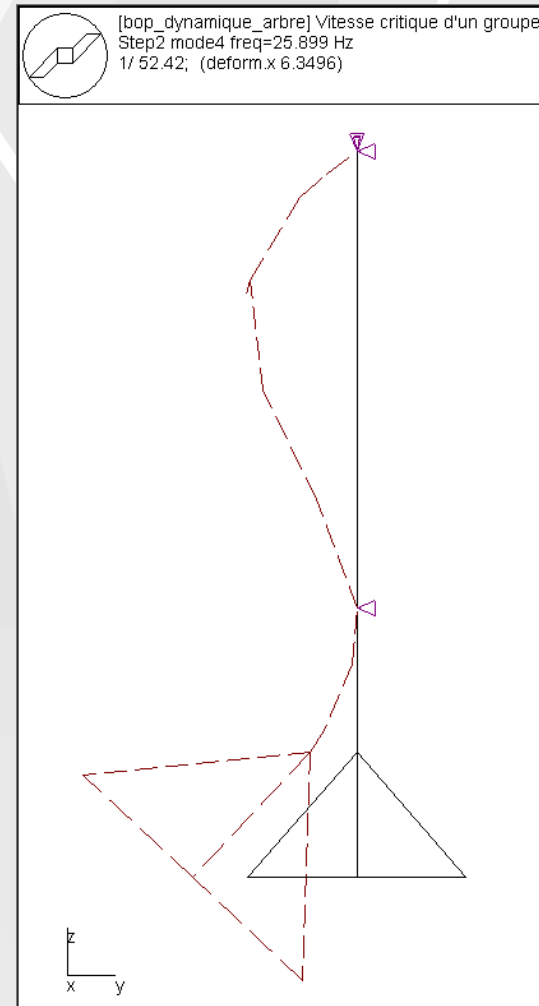
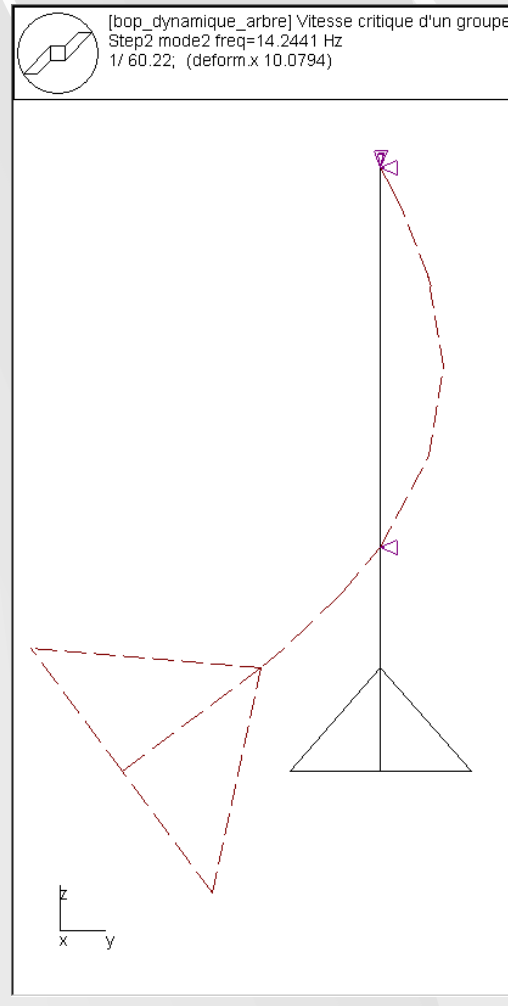
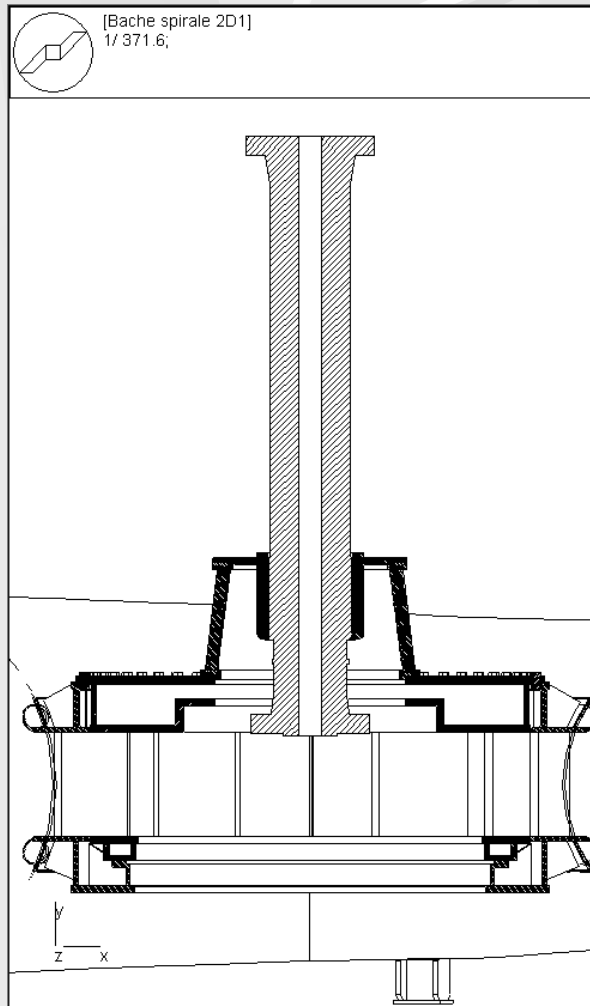
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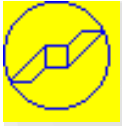
next >



# Dynamic analysis

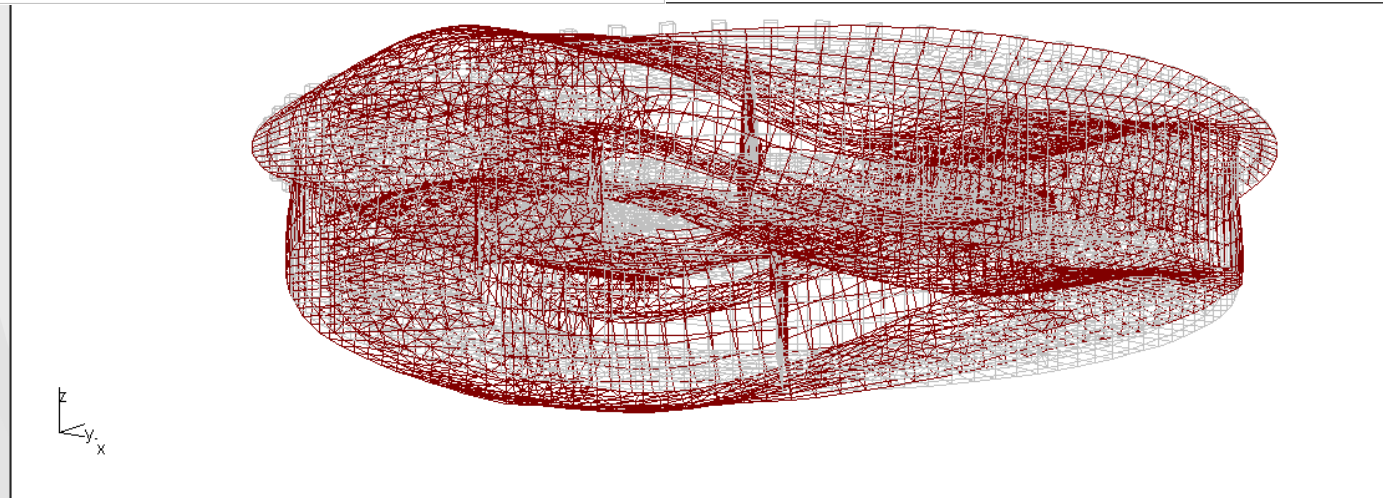
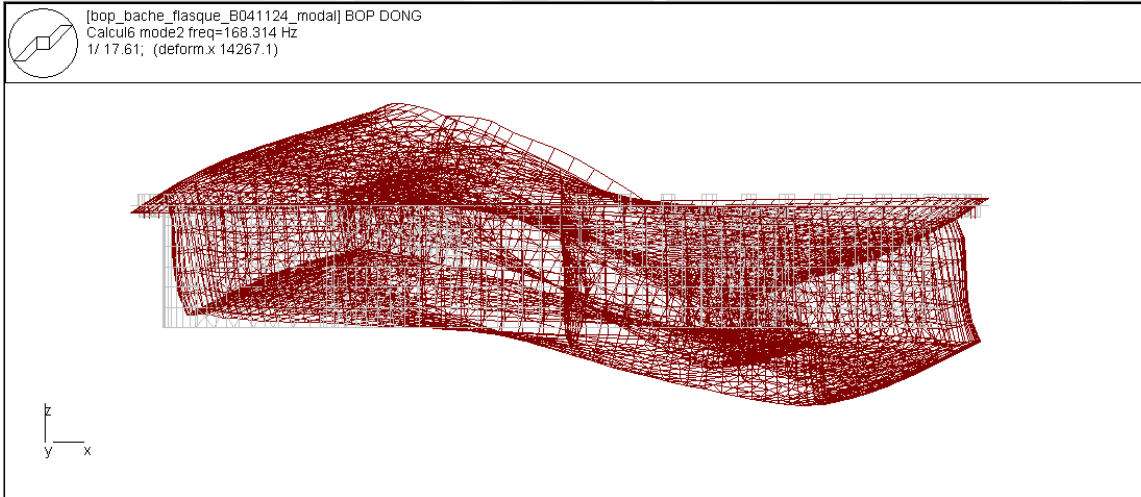
- Critical rotating speed of the shaft

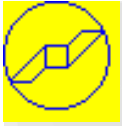




# Vibration analysis

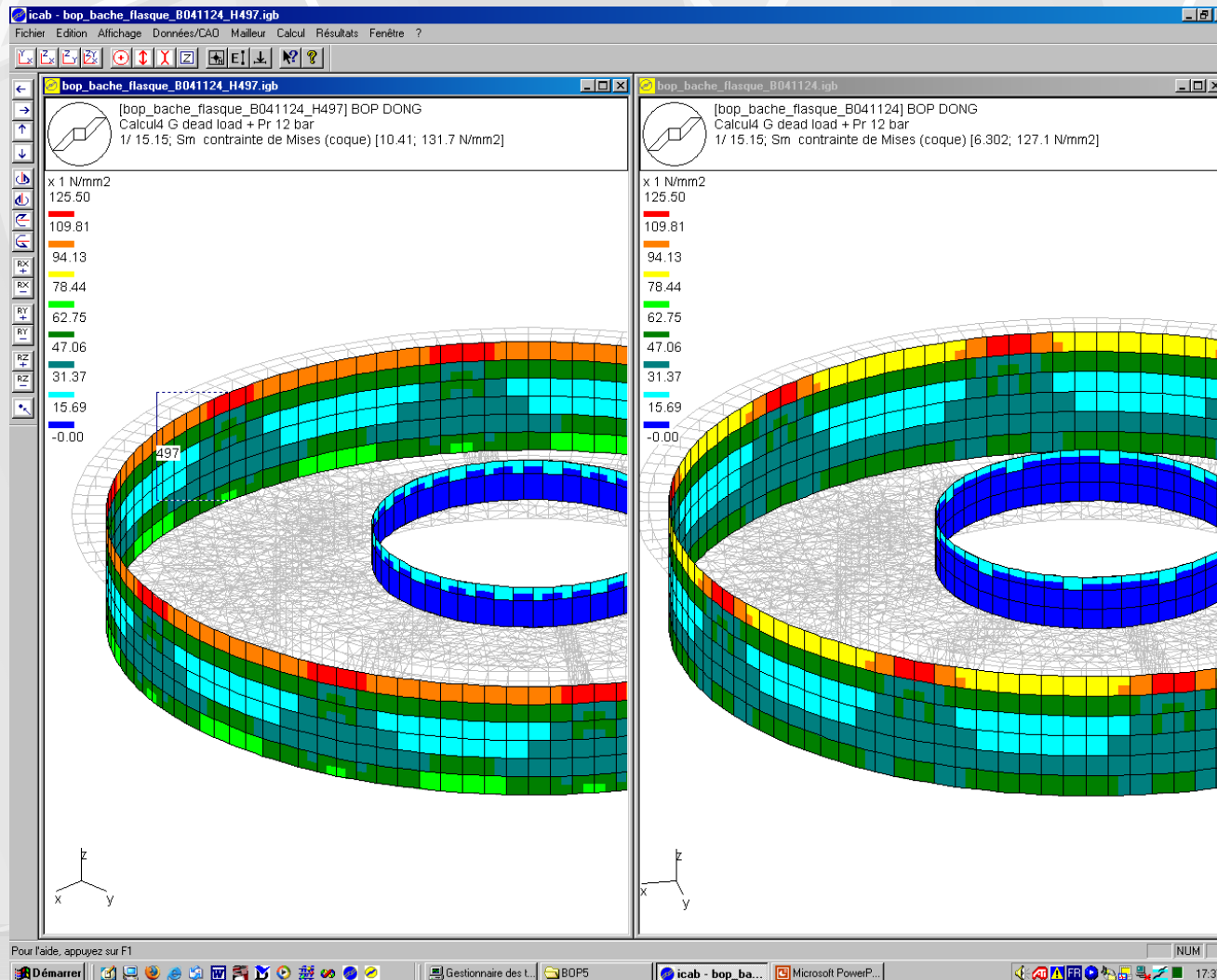
- modal analysis to extract eigen modes:





# Parametric study

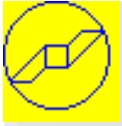
- +10% increase of stiffener height reduces stresses (-6% - 20%)



<< home

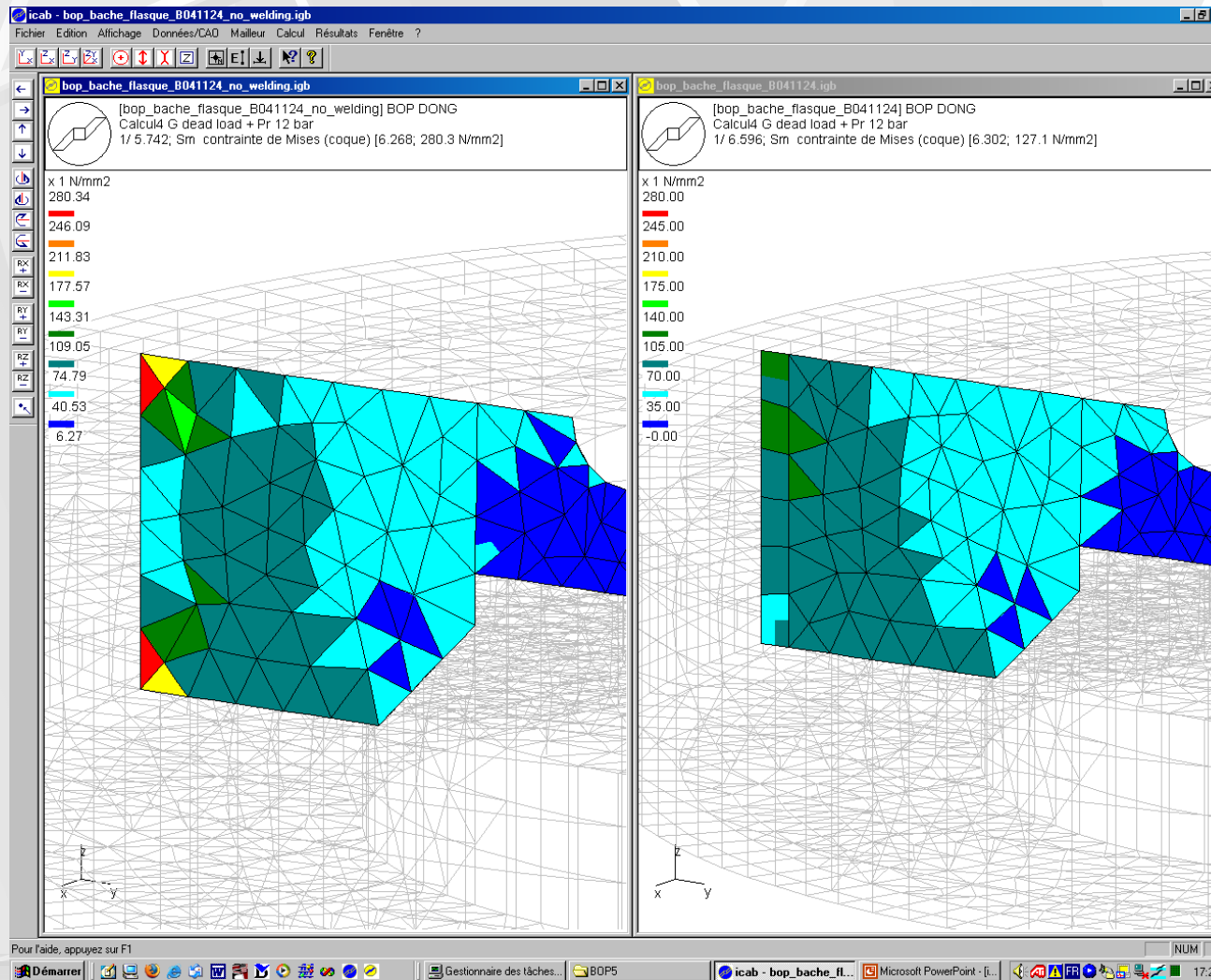
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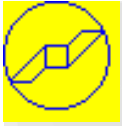




# Welding effect

- Stress concentration in missing welding area





# ICAB

## FEA software used to predict

- deflection
- Stresses
- Dynamic response

**to improve design and reliability**