LABORATORY ASSIGNMENT

Using the Abaqus package, perform static calculations for a 20 cm thick C35/45 concrete plate under a load of 8 kPa over the entire surface. Assume boundary conditions such that parts of the plate edge are fixed (BC_1), pin-supported (BC_2) and free (BC_3). Fill the results table, mark the points (A, B) on the plate drawing where extreme values of the given quantities appeared. Include a deflection map and a map of von Mises equivalent stresses in the report.

For the same area, calculate the frequencies and modes of natural vibrations for the plate. Compare the results for the following cases:

I - plate geometry and boundary conditions as in the assignment

II - plate thickness 30 cm and boundary conditions as in the assignment

III - plate thickness 20 cm, all boundaries are fixed.

Include in the report the solution maps of the first two vibration modes.



ν =

Poisson ratio

Data:

 $\rho = \dots kg/m^3$ density

RESULTS:

Number of finite elements:

Analysis type	Quantity	
	max deflection at point A	[m]
static response	max equivalent stress at point B	[Pa]

Eigen problem	1 st angular frequency (case I)	[Hz]
	2 nd angular frequency (case I)	[Hz]
	1 st angular frequency (case II)	[Hz]
	2 nd angular frequency (case II)	[Hz]
	1 st angular frequency (case III)	[Hz]
	2 nd angular frequency (case III)	[Hz]

Examples of boundary conditions:

No.	boundary 1	boundary 2	boundary 3	boundary 4	a [m]	b [m]
1	BC_1	BC_3	BC_2	BC_3	7	4
2	BC 2	BC 1	BC 3	BC 3	6	4
3	BC 1	BC 3	BC 2	BC 1	7	5
4	BC 3	BC 1	BC 2	BC 1	6	5
5	BC 1	BC 3	BC 2	BC 2	6	4
6	BC 2	BC 1	BC 3	BC 2	7	4
7	BC 1	BC 2	BC 3	BC 1	7	5
8	BC 1	BC 3	BC 2	BC 3	7	4
9	BC 2	BC 1	BC 3	BC 3	6	4
10	BC 1	BC 3	BC 2	BC 1	7	5
11	BC 3	BC 1	BC 2	BC 1	6	5
12	BC_1	BC 3	BC 2	BC 2	6	4
13	BC 2	BC 1	BC 3	BC 2	7	4
14	BC 1	BC 2	BC 3	BC 1	7	5
15	BC 1	BC 2	BC 2	BC 3	6	<u>у</u>
16	BC_3	BC_1	BC_2	BC_2	7	5