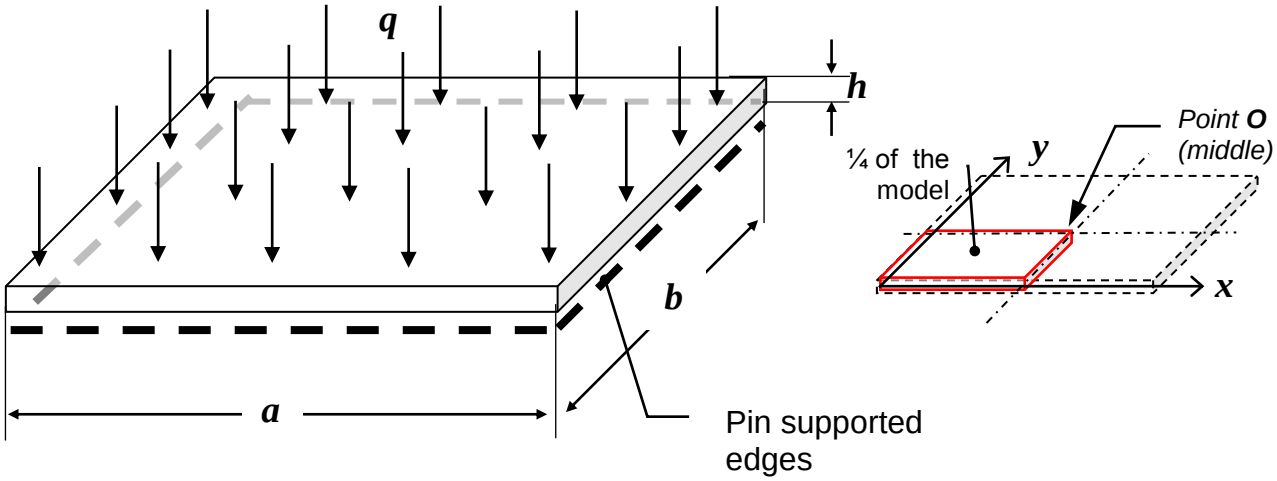
PROBLEM DESCRIPTION

2.1. Bending of the rectangular plate

The goal of the analysis is to find deflection and stress components in rectangular plate supported along edges on pin supports and loaded with constant surface load ***q***.

Data: ***q***=*0.1MPa*, ***a***=*200 mm*, ***b***= *300mm*, ***h***=*4mm*, ***E***=$2\cdot10^5$ *MPa*, ***ν***=*0.3*



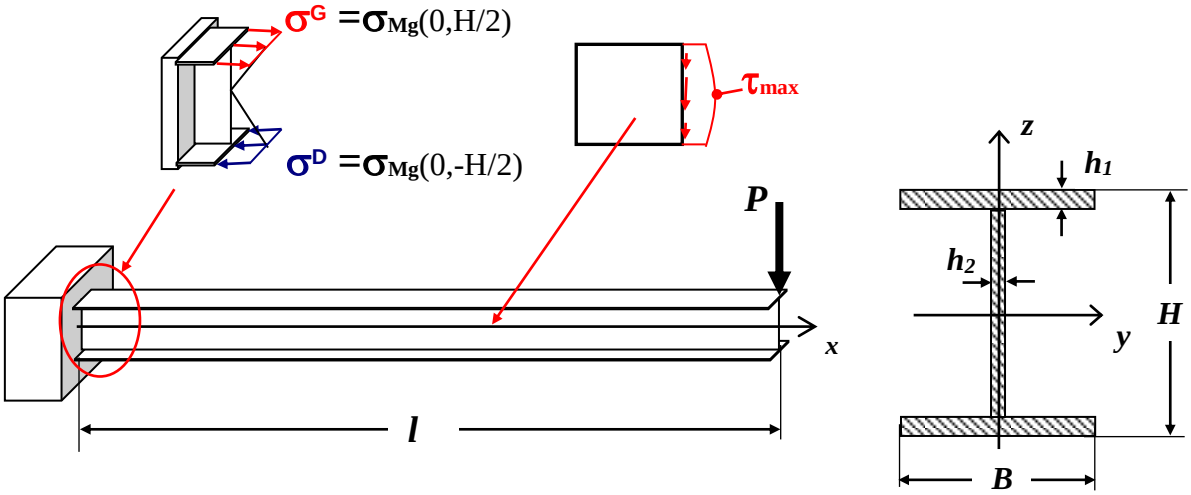
Stress components and deflection at point O:

$$\sigma_x = 0.0812 \cdot \frac{6qa^2}{h^2}, \quad \sigma_y = 0.0498 \cdot \frac{6qa^2}{h^2}, \quad f = 0.00782 \cdot \frac{12qa^4(1-\nu^2)}{Eh^3}$$

2.2. Bending of the thin-walled beam

The goal of the exercise is to find deflection and stresses in the thin-walled cantilever beam loaded with concentrated load.

Data: ***P***=*10 kN*, ***l***=*5 m*, ***B***= *100mm*, ***H***= *240mm*, $\boldsymbol{h_1}$= *13mm*, $\boldsymbol{h_2}$= *9mm*, ***E***=$2\cdot10^5$ *MPa*, ***ν***=*0.3*



$$\sigma(x,z) = \frac{-Mg(x)\cdot z}{Jy}, \quad \text{gdzie: } Mg(x) = P\cdot(x-l), \quad Jy = \frac{B\cdot H^3}{12} - \frac{(B-h_2)\cdot(H-2\cdot h_1)^3}{12}$$

$$\tau_{\max} \cong \frac{P}{(H-2h_1)\cdot h_2}$$

$$f_{\max} = \frac{P\cdot l^3}{3EJ_y}$$

First name and last name: ……

INTERPRETATION OF THE RESULTS. TASKS TO BE DONE

Solve the problems:

a) Bending of the plate using SHELL181:
- rough mesh with about 20 elements *(ESIZE=30)* (**Model 1a**),
- dense mesh with about 150 elements *(ESIZE=10)* (**Model 1b**),

b) Bending of the thin-walled beam:
- model using 4 noded SHELL181 (**Model 2a**)
- model using 8 noded SHELL281 (**Model 2b**)

Discuss the results.

PLATE	**Model 1a** (SHELL181) rough	**Model 1b** (SHELL181) dense	**BEAM**	**Model 2a** 4 noded (SHELL181)	**Model 2b** 8 noded (SHELL281)
No. of nodes			No. of nodes		
No. of elements			No. of elements		
UZ_{max}			UY_{max}		
SX_{max}			SZ_{max}		
SY_{max}			SYZ_{max} *(web)*		
f_{max}			f_{max}		
σ_x^{max}			σ^G		
σ_y^{max}			σ^D		
			τ_{max}		

Plots needed (should be archived during program session for each model)**:**

For plate:	**for beam**:
1) FE mesh.	1) FE mesh.
2) UZ(x,y)	2) UY(x,y)
3) SX(x,y)	3) SZ(x,y)
4) SY(x,y)	4) SYZ(x,y) in the web
	5) graph: SYZ along DG (point 26)

Final report:
1) Introduction
2) Assumptions for the modeling
3) model description *(solid model, mesh, boundary conditios and loads)*
4) Results
5) Results in the Table
6) Discursion
7) Conclusion

Conslusion: