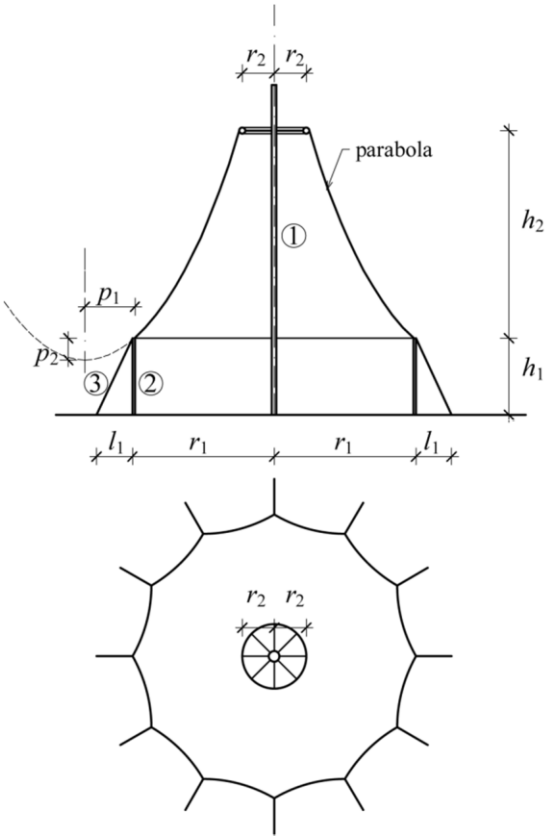
Bonus questions 3. 1/2

Exercise 1. Tent structure

The following rotationally symmetric tent has a parabola-shape section. The tensioning of the tent is achieved by lifting up element 1 (and the top ring).



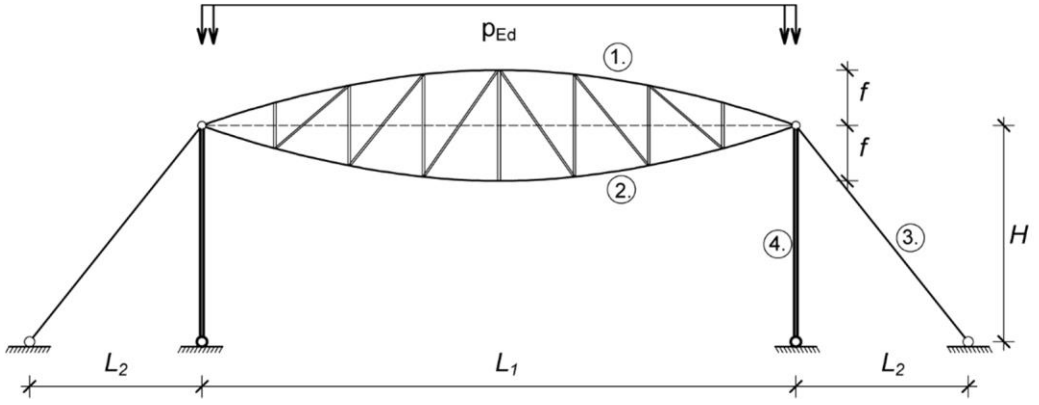
Calculate the utilization of the tent material along the top ring, if the tensile strength of the tent material is $N_{br,k} = 3000\ N/5cm, \gamma = 2.5$ and the normal force in the mast is $N_{Ed} = 200\ kN$!

Data: $r_1 = 5{,}0\ m;\ r_2 = 1{,}0\ m;\ h_2 = 8{,}0\ m;\ p_1 = 1\ m$

Exercise 2. Cable-truss structure

Calculate the maximal value of the distributed load P_{Ed} rounded to the nearest integer based on the load-bearing capacity of the top and bottom chords. The tensile strength of the top and bottom chords is N_{Rd} = 1200 kN, the prestress is 1697 kN in member 3. Don't forget to check whether tension arises in the cables under the total load!

Data: L_1=18,0m, L_2=5 m, f=1,5m, H=5m, the shape of the top and bottom chords is parabola.



Exercise 3. Pneumatic tent

In the following pneumatic tent P_{Ed}=2,1 kN/m^2 over-pressure is applied to bear the load in case of exceptional snow load. We use 3 layers of tent material. Calculate the minimal strength of the material rounded to the nearest hundred! The material safety factor is γ=2,5.

Data: l_1=40 m; l_2=15 m; f=8 m.