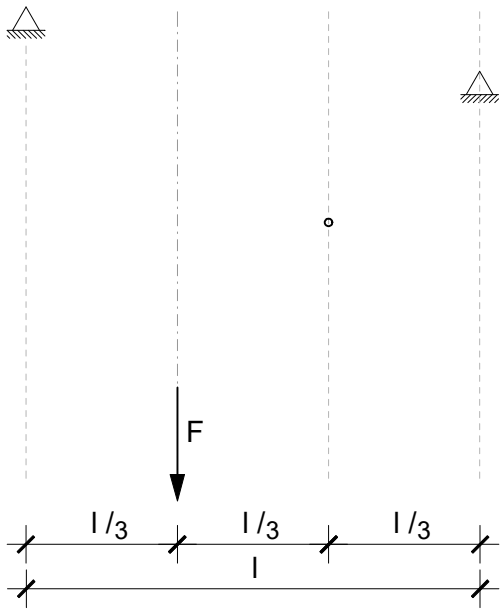
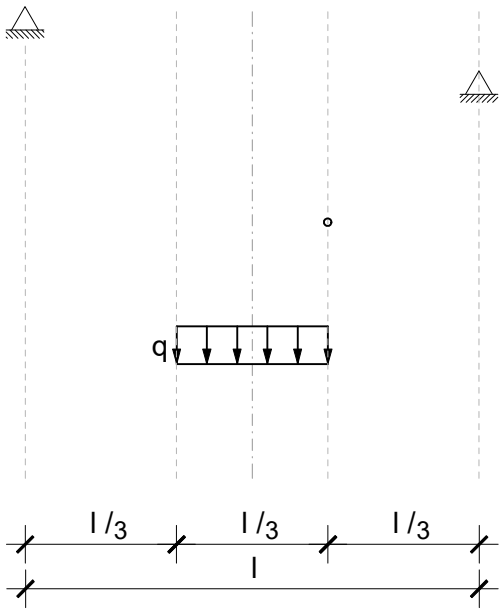
Task 1 Funicular form

For scenarios a) to d), find the funicular form through the given point and draw it in the respective form diagram. Draw the direction of the reaction force in the form diagram.

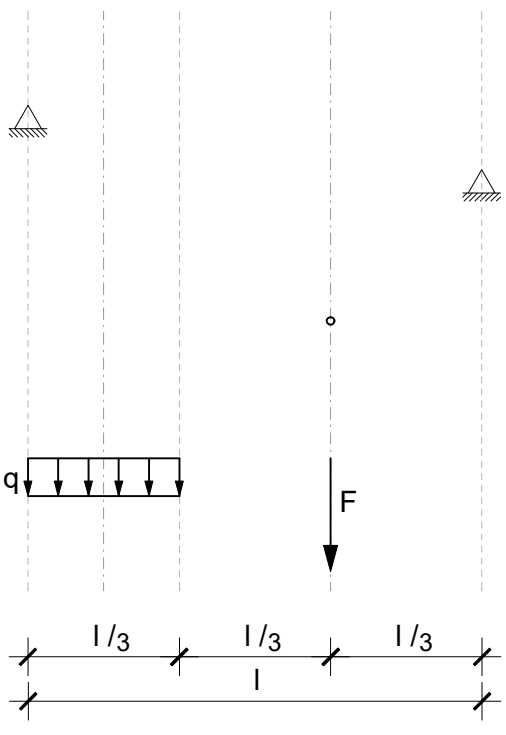
a)



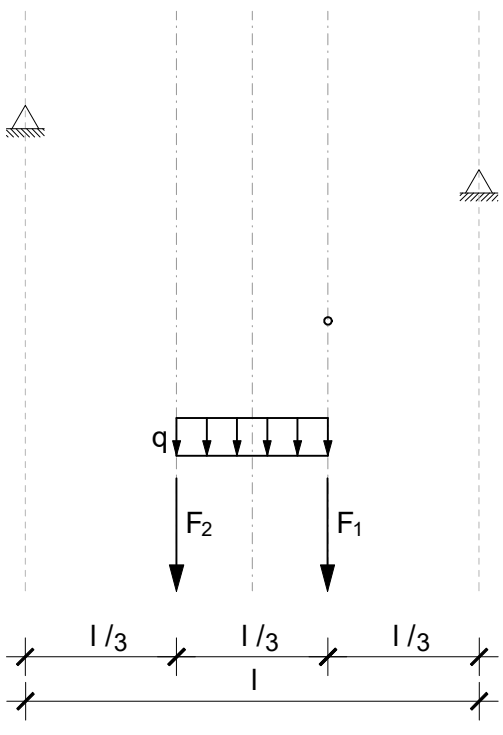
b)

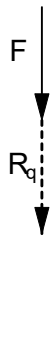


c)

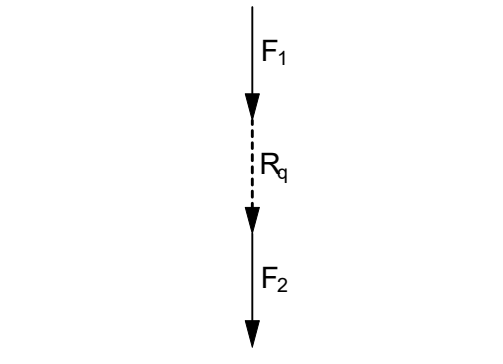


d)





trial funicular



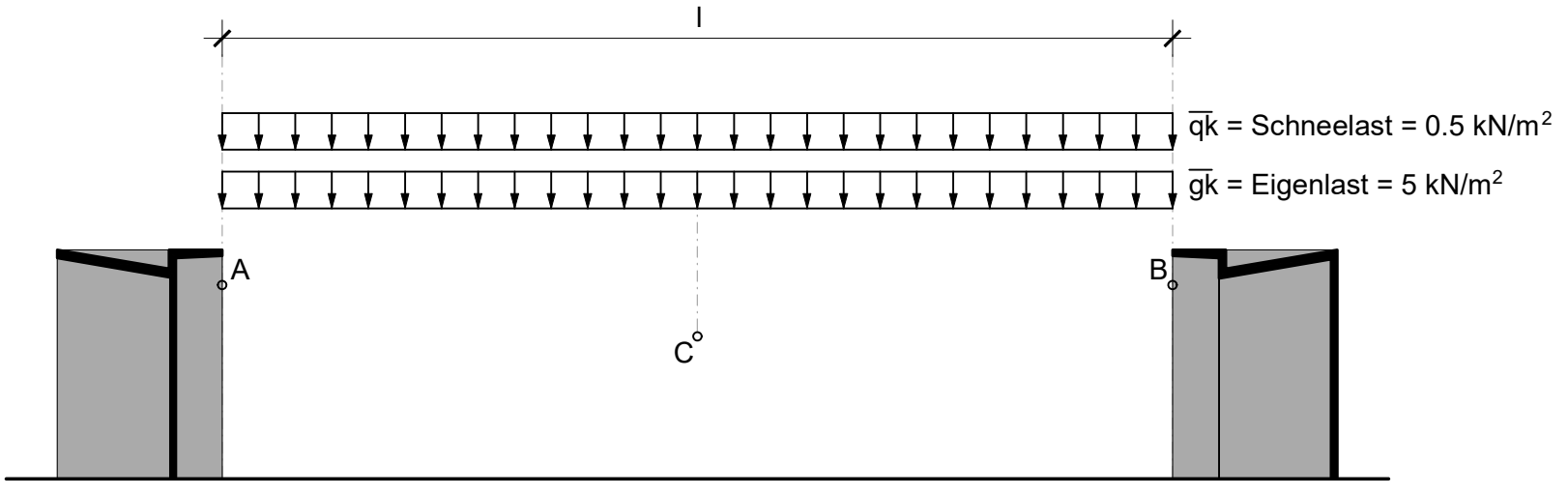
force diagram

Task 2.1 Calculate Loads

a) Find the designed area load $\overline{s}_d$ [kN/m2] according to the example below.
b) Find the designed line load s_d [kN/m]. The suport walls have a distance from 5m.
c) Calculate the point load (Resultant).

Task 2.2 Designing and Detailing a Suspended Roof

a) Find the roof form (cable) through points A, B and C and the maximum inner forces for the hanging roof.
Draw the related form and force diagrams. Draw the direction and determine the magnitude of the reaction force. Indicate tension forces with red and compression forces with blue.
b) How do the stresses in the cable change for the same form but the duplicate load? Draw the new force diagram and indicate the stresses.



Form Diagram 1:500

Wall every 5 m

a)

Force Diagram 1cm ≙ 500kN

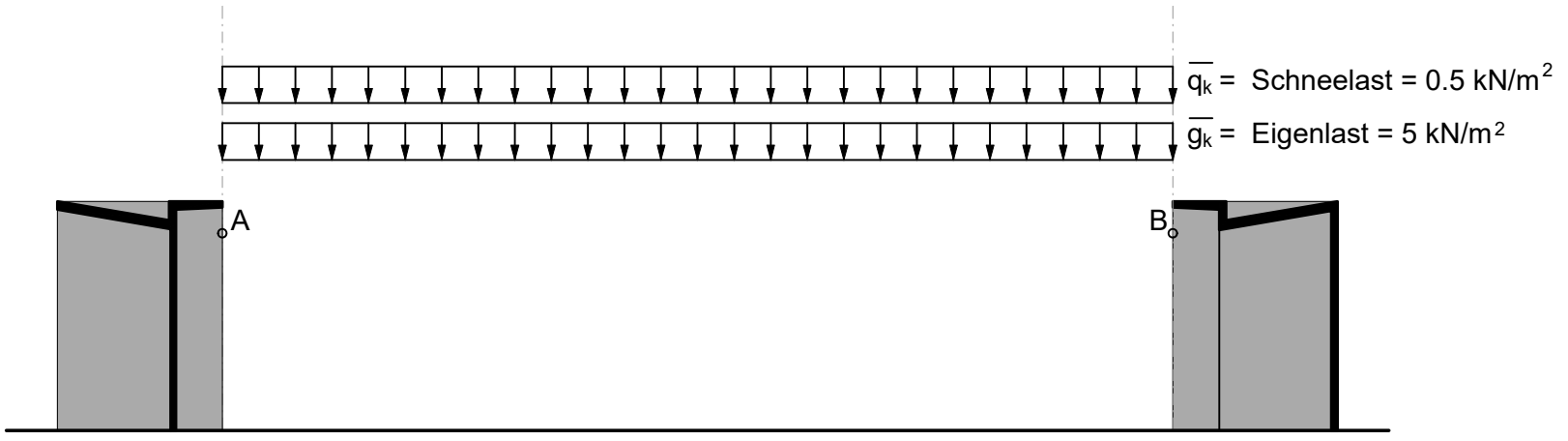
b)

Force Diagram 1cm ≙ 500kN

Task 2.3 Designing and Detailing a Suspended Roof by means of the Maximum Stress in the Structure

a) How does the form from 2.2 a) change if the maximum cable force is $N_{d,max}$ = 3000 kN ? Draw the corresponding form and force diagrams. Draw the direction and determine the magnitude of the reaction force. Indicate tension forces with red and compression forces with blue.

b) Calculate the rope diameter due to the maximum cable force made of steel S235.



Form Diagram 1:500

Force Diagram 1cm ≙ 250kN

b)