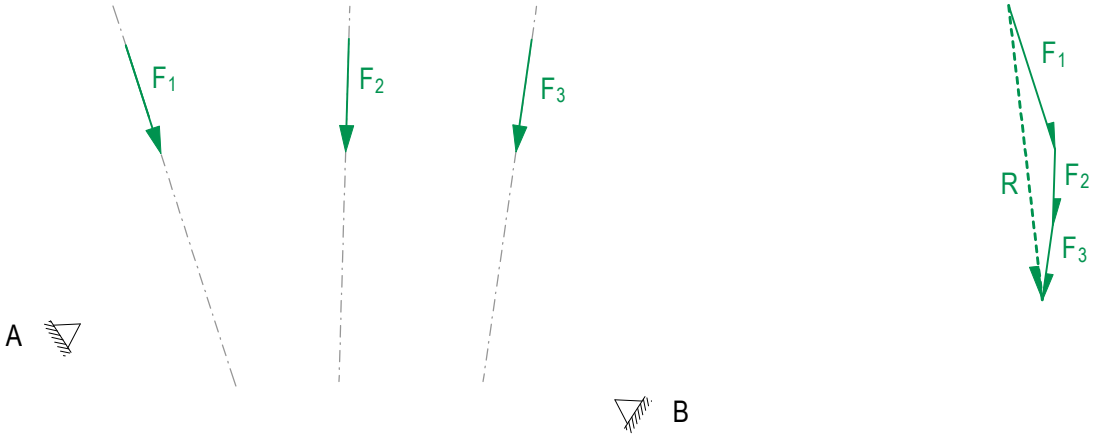
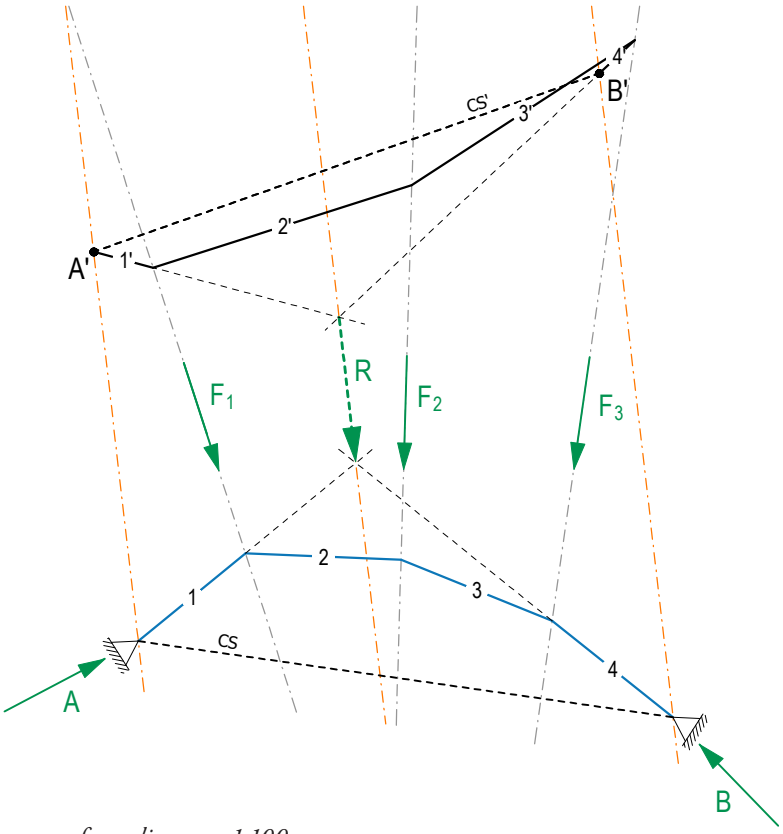
Point Load

There are three non-concurrent point loads and the two asymmetrically placed supports A and B. One of many possible supporting structures, in equilibrium under the given load, is sought.

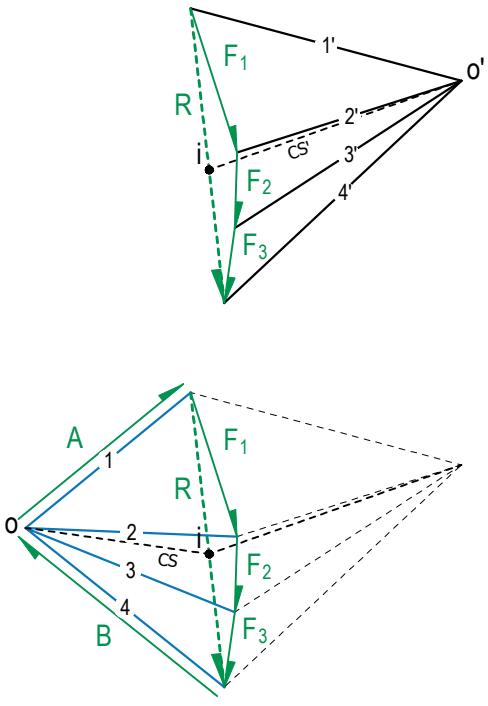


The inclination of the resultant found with the help of the load line is shifted in parallel through the two supports in the form diagram. Now the trial funicular is constructed starting from the line of action through support A and ending on the line of action through support B. The closing string CS‘ between points A‘ and B‘ is then moved parallel through the pole o‘ in the force diagram.

The intersection point i of CS‘ with the resultant in the force diagram is constant, independent of the shape of the trial funicular polygon. The point i is therefore also called the intersection point of closing strings.
Therefore, the closing string CS, i.e. the connection between A and B, is also shifted parallel through this point i. In the force diagram, any point on the closing string can now be selected as pole o, provided that no further conditions are given. The corresponding elements 1 to 4 are then transferred to the form diagram and result in a thrust line through the supports A and B.



form diagrams 1:100



force diagrams 1cm ≙ 10kN

4.1

Compendium Structural Design I&II

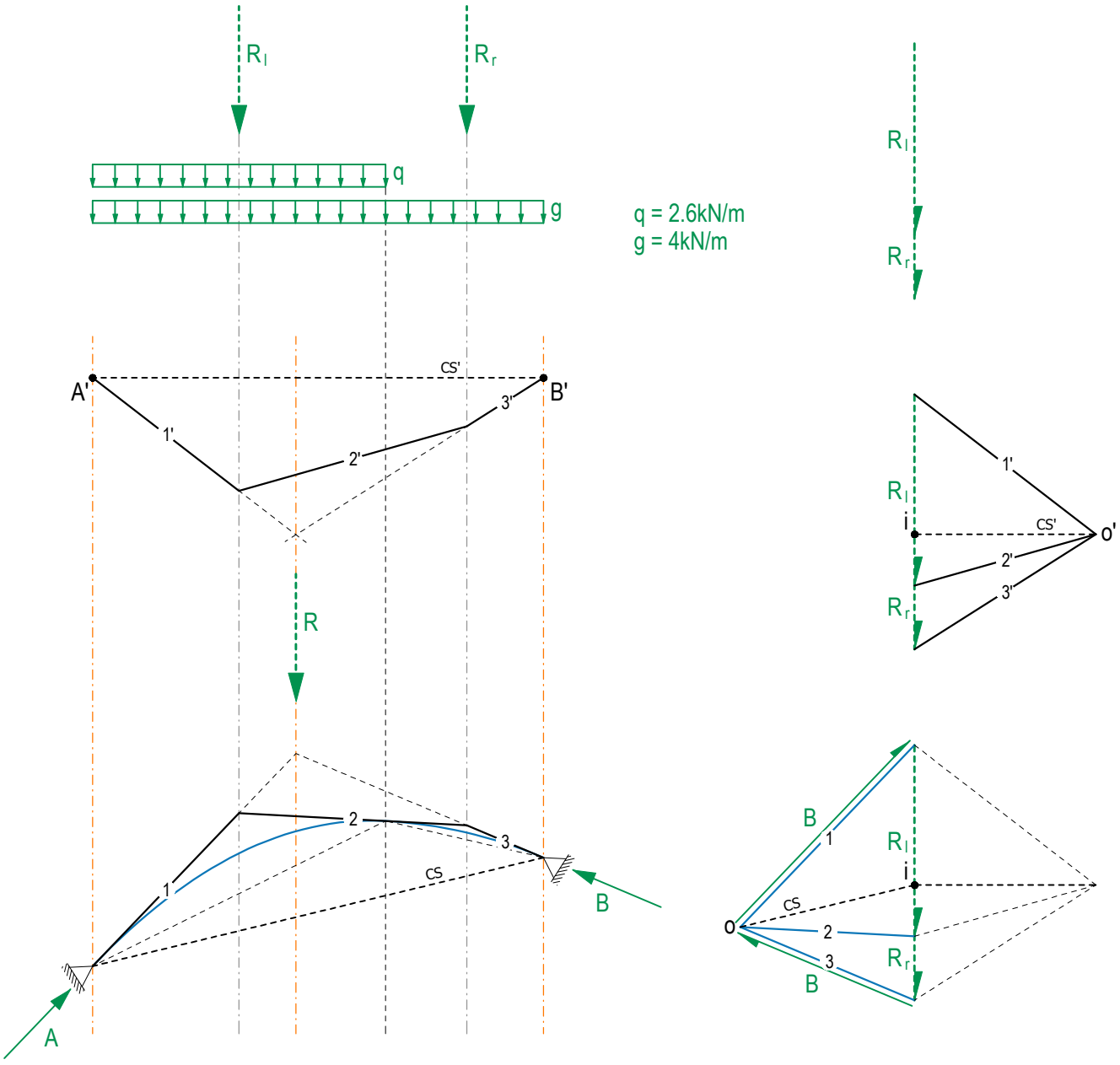
Thrust line: Trial funicular

Line Loads

There are two non-uniformly distributed loads and the two asymmetrically placed supports A and B. One of many possible supporting structures, in equilibrium under the given load, is sought.
First, the load is divided into a left and a right subsystem and the respective resultants are calculated.

The line of action of the resultant is shifted parallel through the two supports. Now, any pole o‘ can be selected in the force diagram in order to construct a trial funicular, starting from the line of action through support A. The closing string CS‘ between points A‘ and B‘ is shifted in parallel through pole o‘ into the force diagram.

Again, the closing string CS is shifted parallel through point i and a pole o is selected. The corresponding elements 1 to 3 can now be transferred to the form diagram. These result in a thrust line through the supports A and B, which takes up the resultants R_l and R_r. The rays are at the same time the tangents of the two curves. Thus, the parabola construction can be used to determine the exact shape in the left as well as in the right subsystem.



form diagrams 1:100

force diagrams 1cm ≙ 10kN