9.1 Compendium Structural Design I&II – HS21/FS22 Transferring of Vertical Loads

A possible force flow that transfers the applied line load through the upper slab onto the lower one and from there into the two supports is to be found.

To solve such a system, the two slabs are considered as individual subsystems: The upper slab with the applied line load is the first subsystem (A), and the lower slab with the two supports is a second subsystem (B). Their point of contact is understood as the support of subsystem A and as the point of application of the reaction force of the upper subsystem on the lower subsystem.





Both subsystems are solved separately. A line load acts on the upper slab (subsystem A) and there is one support. For the given situation, the force flow is to be drawn as shown. The internal forces and the reaction force A are determined in the corresponding force diagram. Finally, the force flow is sketched qualitatively in the axonometric drawing.

If the lower slab (subsystem B) is now considered as a separate system, subsystem A acts as an external force on their point of contact. The magnitude of this force corresponds to the reaction force of subsystem A. When changing the system, however, the direction of the force must be reversed. The applied force is finally transferred to both supports via two compression elements. With the magnitude of the force A already found, the force diagram can be completed and the force flow can again be qualitatively transferred to the axonometric drawing.