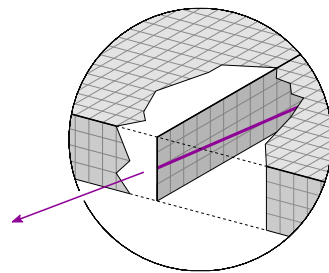
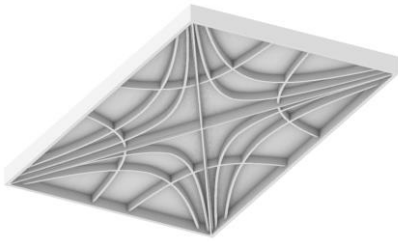


Student assistant position (HiWi 40 h/month)

Adaptive rib-stiffened slab



Floor systems are typically designed to satisfy tight deflection limits under strong out-of-plane loading. While the use of flat slabs is common due to the ease of construction, the load-bearing performance is poor since the material is not optimally distributed within the cross-section to take the bending caused by external loads. This typically results in significant oversizing.

Recent work has shown that rib-stiffened slabs offer significant potential for material savings compared to prismatic slabs. This work investigates the feasibility of adaptive rib-stiffened slabs equipped with a variable post-tensioning system. The post-tensioning system comprises high-strength cables embedded within the concrete rib through a duct that enables varying the cable tension as required. The cables are positioned following a profile so that the tension force is applied eccentrically to the neutral axis of the slab-ribs assembly. The resulting system of forces causes a bending moment and an uplift that counteracts the effect of the external load.

Within the framework of Collaborative Research Centre (CRC) 1244, a full-scale 6 × 10 m prototype of adaptive rib-stiffened slab will be built to validate numerical findings. A student assistant (HiWi) is therefore sought to support in: **(1)** design and modelling of small- and full-scale prototypes; **(2)** fabrication of 3D-printed formwork; **(3)** concrete casting as well as installation of reinforcements and post-tensioning system; **(4)** communication with suppliers and technical collaborators.

Note that the primary working language is English.

Key requirements:

- Bachelor's or Master's degree in civil engineering.
- Good knowledge of finite element modelling (FEM). Fluency in visual programming (Grasshopper) is an advantage.
- Good knowledge in concrete design according to applicable code (e.g., Eurocode EN1992-1-1).
- Practical experience in concrete mix design and casting is an advantage.
- Good knowledge of English and German.

Remuneration:

500.80 €/month for Bachelor's degree holder
680.40 €/month for Master's degree holder

Contact:

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Earliest starting date:

15.09.2022