

TECHNICAL PRACTICES TOWARDS SUSTAINABLE STEEL- CONCRETE COMPOSITE STRUCTURAL SYSTEMS

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ABSTRACT

The demountable and reusable steel-concrete composite structures contribute immensely at the sustainable development in construction. The main technical practice which allows for demountability and reusability is the use of demountable shear connectors in their floor systems. These demountable shear connectors (see Figure 1a) can satisfy the need for composite interaction of the steel-concrete composite floor system during its service life and in parallel the need for large nominal hole clearances during execution through oversized holes in the beam flange which facilitate the (dis)assembly process of the floor system [1]. The developed demountable shear connector consists of (i) a bolt and coupler embedded in the floor, (ii) an external injection bolt through the beam flange and (iii) an injection material in the bolt-hole clearance (see Figure 1a). This injection material is the steel-reinforced resin (SRR) which consists of spherical steel particles embedded in a resin (see Figure 1b). The SRR proved to have several benefits and applications to steel-to-steel, steel-to-concrete, and steel-to-FRP connections. The main benefits focused on the increase of the stiffness and strength of the connection and the decrease of its creep deformation when compared to injected connections with conventional epoxy resin. This presentation will focus on experimental and numerical studies of the most recent technical innovations for demountable shear connectors studied at the Delft University of Technology along with their benefits on material, connection and structural application levels.

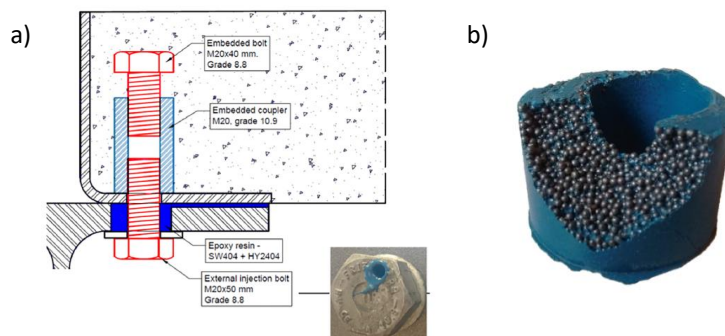


Figure 1. a) Demountable shear connector for composite floor systems [2], b) Cross-section of SRR [3].

References

- [1] I.A. Gîrbacea, M.P. Nijgh, and M. Veljkovic, *Proof of concept of a demountable steel-concrete flooring system*, *Proceedings of Nordic Steel 2019*, 571, 2019.
- [2] M.P. Nijgh, M. Veljkovic, *Requirements for oversized holes for reusable steel-concrete composite floor systems*, *Structures*, 24, 489, 2020.
- [3] M.P. Nijgh, *New Materials for Injected Bolted Connections-A feasibility study for demountable connections*, MSc Thesis, Delft University of Technology, 2017.