

## Supervisor's assessment

**MSc. Illia Tkalenko**

Ph.D. theses

Design composite steel and fibre-concrete columns at elevated temperature

Návrh ocelobetonových sloupů vyplněných drátkobetonem při zvýšených teplotách

Prague, May 22, 2022

The thesis deals with experimental and numerical modelling and design of thermal and mechanical behavior of circular hollow section columns with concrete infill reinforced with steel fibres exposed to fire. Data from experimental studies are summarized, a numerical model is validated, and numerical simulations of the problem are prepared to form the basis of an annex to the European standard for the design of steel-concrete composite structures exposed to fire prEN1994-1-2:202x. The experimental study includes six column specimens subjected to compressive loading when heated to elevated temperatures. The numerical model by the finite element method in the ATENA software of volume elements has been validated with in-house experiments and experiments from the literature. The objective of the numerical simulation is to prepare an analytical model of the fire resistance of a centrally and eccentrically loaded circular hollow section column with wireframe and plain concrete infill when subjected to fire. The analytical design model for the determination of the fire resistance of steel-concrete-wire-concrete coupled columns is prepared as an annex or supplementary technical document to the forthcoming European standard prEN1994-1-2:202x.

The colleague worked on the set task responsibly and independently. The work demonstrates the ability to apply theoretical foundations to the specific problem solved and a good level of knowledge of fire protection. The results show a good mastery of the problems of calculation and interpretation of the obtained results. Considering the quality, the creative ability to apply new knowledge, the level of the submitted thesis, the achieved results and the process of its processing, I would like to recommend to the defense.

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