ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE

Fakulta stavební

Thákurova 7, 166 29 Praha 6

Diplomová práce: Development of a nonlinear macro element for URM walls

Jméno studenta: Julian Richter

Datum odevzdání práce: zimní semestr 2019/20

Magisterský studijní program: Civil Engineering

Student Julian Richter absolvoval studium na Fakultě stavební ČVUT v Praze souběžně se studiem na univerzitě Rheinisch-Westfälische Technische Hochschule (RWTH) Aachen v rámci double degree studia na základě smlouvy uzavřené mezi oběma univerzitami. V souladu s touto smlouvou proběhlo na RWTH Aachen v rámci double degree studia zpracování diplomové práce zapsané na Fakultě stavební ČVUT a následně dne 26. 8. 2019 i obhajoba diplomové práce.

Abstrakt diplomové práce:
Masonry is a widespread method of construction to this day and has proven particularly successful in the construction of office and residential buildings. This is mainly due to the fact that masonry has physical advantages over reinforced concrete. With the currently used linear calculation methods, it is not possible to exploit the load bearing capacity of a masonry wall. Therefore non-linear static calculation methods are developed, which should make this possible. In the present work, several of these calculation methods are presented and compared. A macro model, based on the work of Jin Park, will be further developed and generally implemented in the OpenSees software environment to make the model easy to use and shorten the calculation times. Then, in this software environment, calculations are performed on the macro model to verify its effectiveness. With the element it is possible to show the stress state over the wall height, in every joint. This macro model consists of a series of rigid body spring elements, which are connected by springs connected in series. These springs serve to depict the axial, shear and rotational behavior of a masonry wall. Each of these springs is described with its own spring law. These spring laws not only make it possible to determine the stiffness, but also the load capacity and ductility.

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