

# 論文要旨

## Summary of Dissertation

令和 2024年 09月 02日

Date (YYYY-MM-DD):

専攻 Department	Urban Innovation
氏名 Name	ZAZIREJ Stanislav
論文題目 Title	Computational study of gas pressure impact on blast-induced fracture in reinforced concrete.
和訳または英訳 Translation (J->E, or E->J)	衝撃的なガス圧による鉄筋コンクリートの爆破解析

This doctoral dissertation deals with a poromechanical approach to the numerical analysis of blast-induced dynamic fracture in concrete and aims to enhance understanding and prediction capabilities related to this complex phenomena. The motivation behind this study stems from the need to improve the ability to assess structures and maintain safety of the remaining infrastructure when using explosives during partial demolition.

The methodology involves developing constitutive models for the solid skeleton and compressible pore substance, enabling a comprehensive representation of the material behavior under dynamic loading conditions. The organization of the dissertation includes a literature review on the crushing system using electric discharge impulses to induce deflagration of liquid explosive (nitromethane), the detonation theory, the concept of effective stress of a saturated porous medium and constitutive modeling of concrete with multi-directional cracks.

Verification of developed finite element model is performed by comparing obtained numerical analysis data and observations, where the significance of considering the coupled effects of gas migration is highlighted.

Through qualitative verification and sensitivity analyses, the dissertation demonstrates the influence of various input parameters on pore pressure rise and crack propagation behavior.

In conclusion, the dissertation advances the understanding of dynamic fracture in concrete induced by the deflagration of liquid explosive. The findings obtained from this study have the potential to inform practical strategies for mitigating the impact of explosion events on infrastructure and ensure the safety.

4,000字以内 Must not exceed 4,000 Japanese characters or 1,600 words.

英語の論文タイトルについては、センテンスケース（題目の文頭の単語の頭文字のみを大文字にする）とすること。日本語本語（全角文字）で125文字以内、英語（半角文字）で250文字以内とすること。特殊文字（ウムラウトやアクセント記号など）は使用不可。

The English title of the dissertation should be written in sentence case, where only the first letter of the first word is capitalized. It should not exceed 250 characters in English (single-byte characters) and 125 characters in Japanese (double-byte characters). Special characters such as umlauts or accent marks are not permitted.