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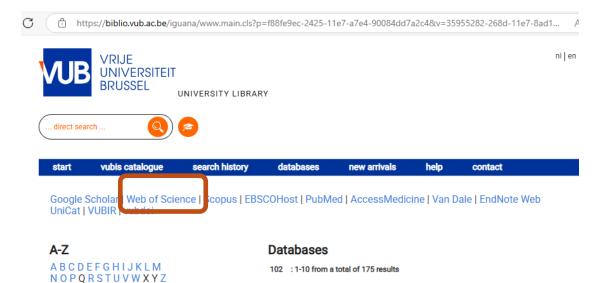
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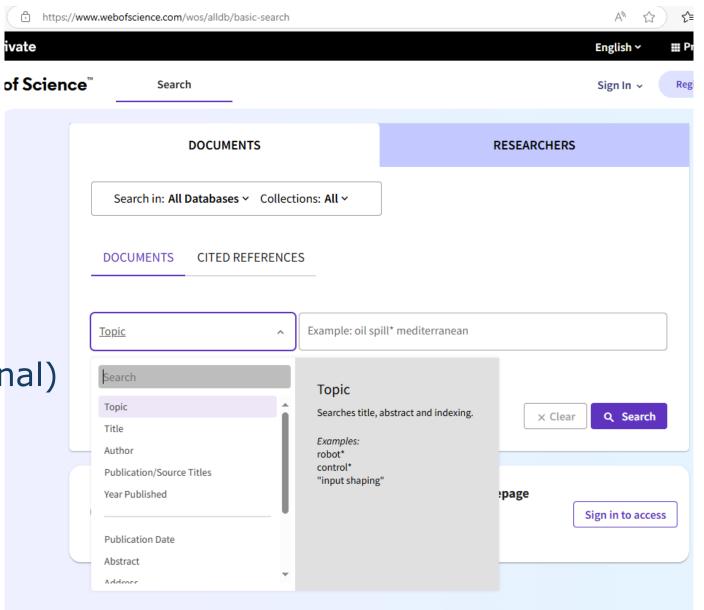
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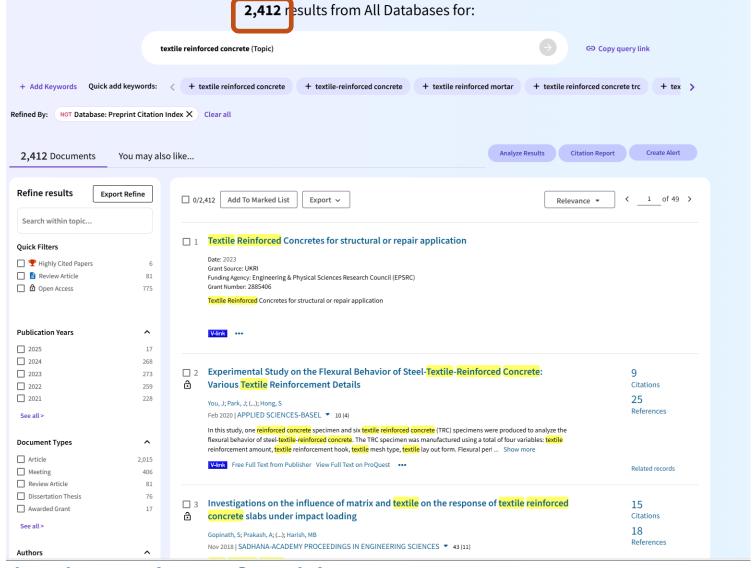
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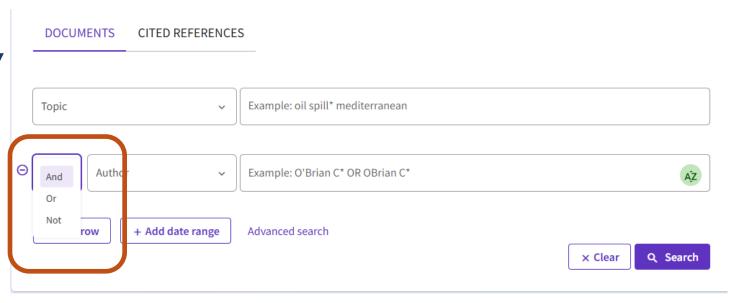


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Structural behavior of a lightweight, textile-reinforced concrete barrel vault shell

By Sharei, E. (Sharei, E.) [1]; Scholzen, A. (Scholzen, A.) [1]; Hegger, J. (Hegger, J.) [1]; Chudoba, R. (Chudoba, R.) [1]

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Volume: 171 Page: 505-514 DOI: 10.1016/j.compstruct.2017.03.069

Published JUL 1 2017

Indexed 2017-05-31

Document Type Article

Abstract Textile-reinforced concrete (TRC) as a novel composite material offers a wide range of capabilities and flexibility in

the manufacturing of thin-walled, lightweight structures. The application of textile reinforcement in fine aggregate high-performance concrete has enabled the dimensioning of structural concrete in very small thick. On the other possibility allows for the fabrication of thin-walled TRC shell structures with complex geometries. On the other hand, structural planning and construction require new modeling approaches to comprehend the structural behavior of such forms. In this paper, we present the fabrication procedure of a large-scale TRC vault shell, together with the performed experimental study. The shell structure was tested under a two-step loading scenario to study the load-bearing behavior. The particular focus of the paper is on the analysis of the structural behavior by means of an anisotropic strain-hardening material model specifically developed for the simulation of TRC shells. The prediction obtained using the nonlinear finite element simulation has been compared with the test results to validate the modeling approach. The performed studies are used to evaluate and discuss the structural redundancy included in the applied linear ultimate limit state assessment procedure. (C) 2017 Elsevier Ltd. All rights reserved.

Keywords Author Keywords: Textile reinforced concrete; Carbon concrete; Thin-walled shells; Cementitious composites;

Composite structures; Finite element analysis; Microplane damage model

Keywords Plus: DAMAGE MODEL; LOAD; SIMULATION

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- Start from a set of key publications, which closely represent topic
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- Look also at research groups with expertise, not only topics (ask your supervisor)
- # exhaustive search!
- = fast basis for (part of) the state of the art