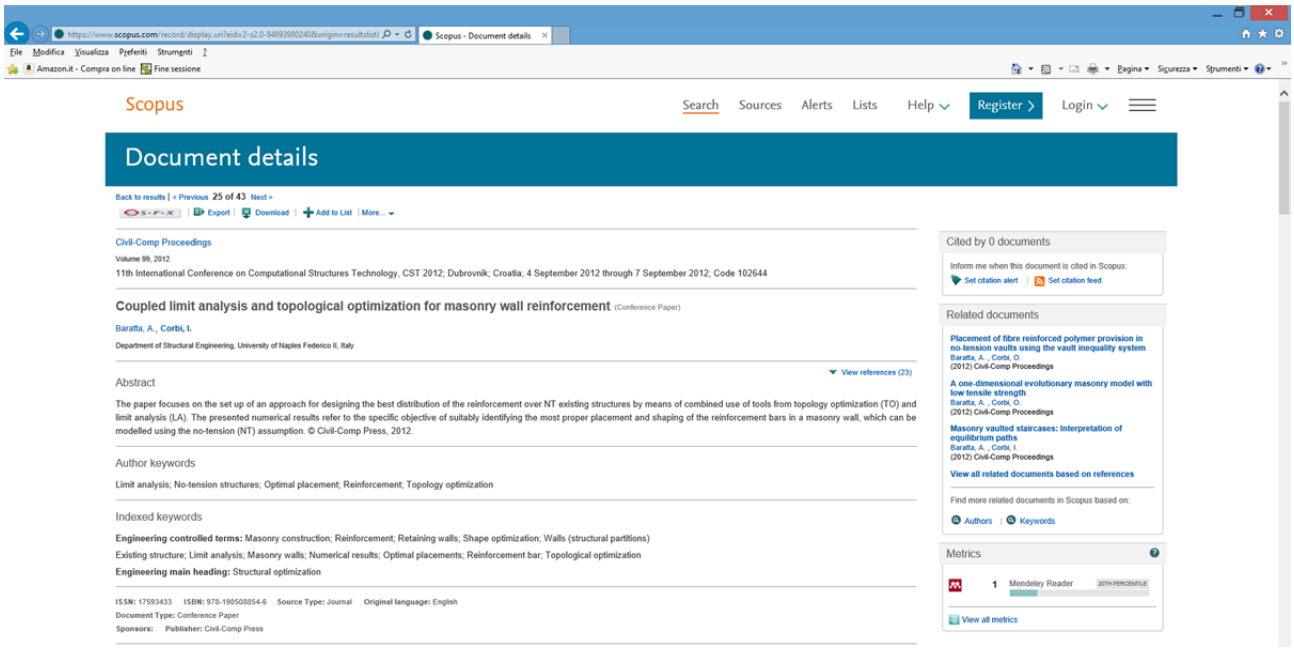

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Coupled limit analysis and topological optimization for masonry wall reinforcement (Conference Paper)

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Abstract

The paper focuses on the set up of an approach for designing the best distribution of the reinforcement over NT existing structures by means of combined use of tools from topology optimization (TO) and limit analysis (LA). The presented numerical results refer to the specific objective of suitably identifying the most proper placement and shaping of the reinforcement bars in a masonry wall, which can be modelled using the no-tension (NT) assumption. © Civil-Comp Press, 2012.

Author keywords

Limit analysis; No-tension structures; Optimal placement; Reinforcement; Topology optimization

Indexed keywords

Engineering controlled terms: Masonry construction; Reinforcement; Retaining walls; Shape optimization; Walls (structural partitions)

Existing structure; Limit analysis; Masonry walls; Numerical results; Optimal placements; Reinforcement bar; Topological optimization

Engineering main heading: Structural optimization

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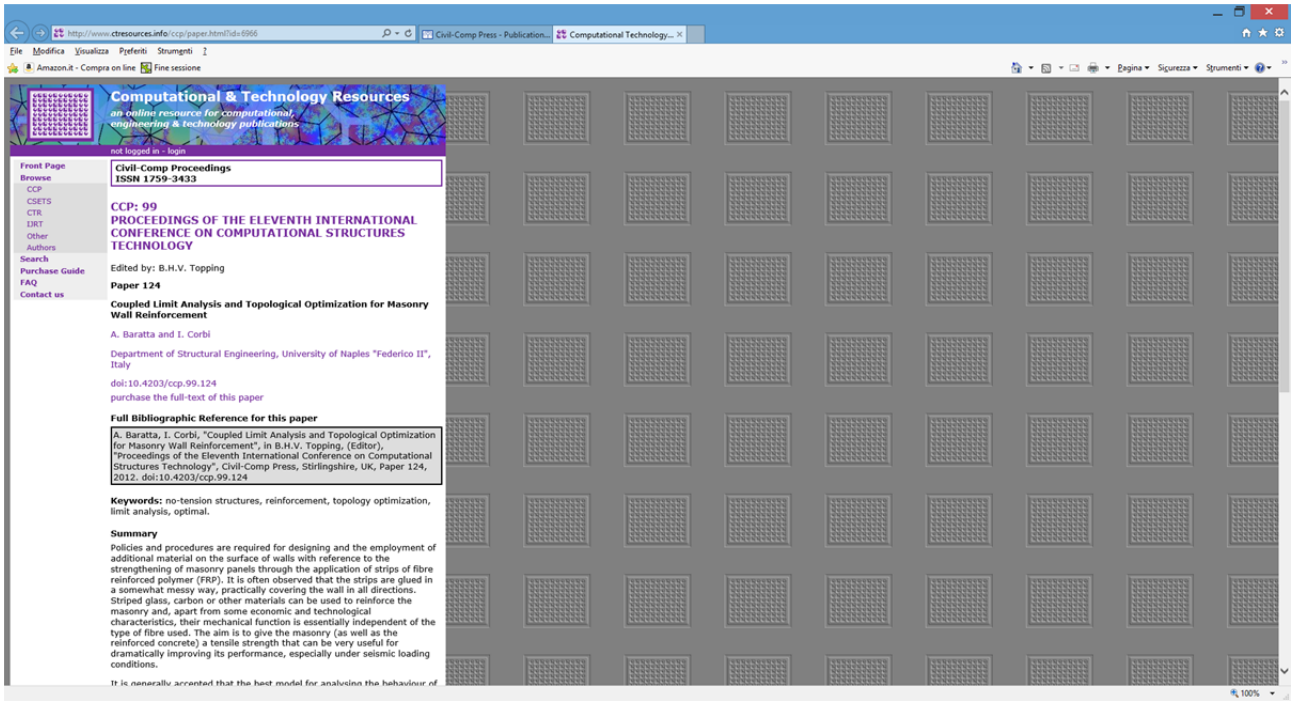

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Paper 124

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Keywords: no-tension structures, reinforcement, topology optimization, limit analysis, optimal.

Summary

Policies and procedures are required for designing and the employment of additional material on the surface of walls with reference to the strengthening of masonry panels through the application of strips of fibre reinforced polymer (FRP). It is often observed that the strips are glued in a somewhat messy way, practically covering the wall in all directions. Striped glass, carbon or other materials can be used to reinforce the masonry and, apart from some economic and technological characteristics, their mechanical function is essentially independent of the type of fibre used. The aim is to give the masonry (as well as the reinforced concrete) a tensile strength that can be very useful for dramatically improving its performance, especially under seismic loading conditions.

It is generally accepted that the best model for analysing the behaviour of