

## عنوان مقاله:

Effect of Perforation Area and Arrangement Pattern on Structural Behaviour of Nature Inspired Perforated Hollow Structure

## محل انتشار:

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## خلاصه مقاله:

The Cholla cactus skeleton has been the inspiration source for this study, in our effort to search for light and more structural effective structures. This woody skeleton of Cholla with oval shaped perforations arranged in spiral pattern is found strong enough to support the cactus self weight. This research has been carried out to investigate the effects of percentage of perforations and perforations arrangements on structural behaviour of cylindrical hollow section. A total of eleven models consisting of one cylindrical hollow section without perforation as the control model and ten simplified perforated cylindrical hollow sections have been constructed using a finite element method software. The perforated models have been assigned with 10 to 50 percent of perforations area by fixing the number of perforations to twenty and altering the perforation size to achieve the percentage variable. Computational analyses have been carried out for three loading conditions: compressive, flexural and torsional. Findings have shown that the increment in percentage of perforations produces higher stresses to the cylindrical hollow section. This has effects on the structural capacity of the cylindrical hollow section. Array arrangement of the perforations shows better structural performance in compression and flexural loading conditions while spiral arrangement exhibits better structural performance under torsional loading condition

## کلمات کلیدی:

Light-weight structure Biomimicry Sustainability Perforated hollow section Cholla skeleton

## لینک ثابت مقاله در پایگاه سیویلیکا:

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