DESIGN OPTIMIZATION OF A COMPOSITE BEAM WITH A HOLLOW SQUARE PROFILE FOR THE BRAZILLIAN ACADEMIC CHALLENGE IN COMPOSITES (SAMPE)

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Abstract: The Academic Challenge in Composites SAMPE Brasil, organized by the Society for the Advancement of Materials and Process Engineering, and launched in Brazil in 2014, has been an important link between universities in Brazil and composite materials supplies companies. This challenge is a high level technological competition that involves different engineering skills and articulates interdisciplinary pedagogical practices. In addition to involving different engineering skills, this challenge is also very focused on the area of Materials Engineering, specifically for the sub-area of composite materials. For participate of the challenge, a study was carried out to optimize the design of a beam with a square profile. The present study presents the beam optimization project so that it can offer a better specific resistance / weight ratio for the criteria defined in the competition. This optimization was performed using general materials resistance relations, composites macromechanics and by finite element analysis.

Keywords: Composites; mechanical properties; SAMPE; macromechanics