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Analytical investigations and fuzzy logic-based modeling of the impact resistance of aluminum-epoxy laminated composites. (English) [Zbl 1239.74101](#)
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Summary: The Charpy impact resistance of aluminum-epoxy laminated composites in both crack divider and crack arrester configurations has been investigated. In both configurations, an analytical investigation has been carried out to evaluate the effects of layers thickness on impact resistance of the specimens. A model based on fuzzy logic for predicting impact resistance of the specimens has been presented. For purpose of building the model, training and testing using experimental results from 126 specimens produced from two basic composites were conducted. The data used for the input data in fuzzy logic models are arranged in a format of 7 input parameters that cover the thickness of layers, the number of layers, the adhesive type, the crack tip configuration, the content of SiC particles, the content of methacrylated butadiene-styrene particles and the number of test trial. According to these input parameters, in the fuzzy logic model, the impact resistance of each specimen was predicted. The training and testing results in the fuzzy logic model have shown a strong potential for predicting impact resistance of aluminum-epoxy laminated composites.

MSC:

- 74S30 Other numerical methods in solid mechanics (MSC2010)
- 74E30 Composite and mixture properties
- 74M20 Impact in solid mechanics
- 93C42 Fuzzy control/observation systems

Keywords:

aluminum-epoxy laminated composite; Charpy impact resistance; analytical investigation; fuzzy logic; crack divider; crack arrester

Software:

Uncertainty Machine

Full Text: [DOI](#)

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