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Crushing Analysis of Foam-Filled Thin-Walled Aluminum Profiles Subjected to Axial Loading

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Abstract : As the automotive industry develops, passive safety is becoming an increasingly important aspect when designing motor vehicles. A commonly used solution is energy absorption by thin-walled construction. One such structure is a closed thin-walled profile fixed to the vehicle stringers. The article presents numerical tests of conical thin-walled profiles filled with aluminum foam. The columns were loaded axially with constant energy. On the basis of the results obtained, efficiency indicators were calculated. The efficiency of the foam filling was evaluated. Artificial neural networks were used for data analysis. The application of regression analysis was used as a tool to study the relationship between the quantities characteristic of the dynamic crush.

Keywords : aluminium foam, crashworthiness, neural networks, thin-walled structure
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