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Study on The Pile Height Loss of Tunisian Handmade Carpets Under Dynamic Loading

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Abstract : Nine different Tunisian handmade carpets were used for the investigation. The raw material of the carpet pile yarns was wool. The influence of the different structure parameters (linear density and pile height) on the carpet compression was investigated. Carpets were tested under dynamic loading in order to evaluate and observe the thickness loss and carpet behavior under dynamic loads. To determine the loss of pile height under dynamic loading, the pile height carpets were measured. The test method was treated according to the Tunisian standard NT 12.165 (corresponds to the standard ISO 2094). The pile height measurements are taken and recorded at intervals up to 1000 impacts (measures of this study were made after 50, 100, 200, 500, and 1000 impacts). The loss of pile height is calculated using the variation between the initial height and those measured after the number of reported impacts. The experimental results were statistically evaluated using Design Expert Analysis of Variance (ANOVA) software. As regards the deformation, results showed that both of the structure parameters of the pile yarn and the pile height have an influence. The carpet with the higher pile and the less linear density of pile yarn showed the worst performance. Results of a polynomial regression analysis are highlighted. There is a good correlation between the loss of pile height and the impacts number of dynamic loads. These equations are in good agreement with measured data. Because the prediction is reasonably accurate for all samples, these equations can also be taken into account when calculating the theoretical loss of pile height for the considered carpet samples. Statistical evaluations of the experimen¬tal data showed that the pile material and number of impacts have a significant effect on mean thickness and thickness loss variations.

Keywords : Tunisian handmade carpet, loss of pile height, dynamic loads, performance
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