Linear Regression Estimation of Tactile Comfort for Denim Fabrics Based on In-Plane Shear Behavior

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Abstract : Tactile comfort of a textile product is an essential property and a major concern when it comes to customer perceptions and preferences. The subjective nature of comfort and the difficulties regarding the simulation of human hand sensory feelings make it hard to establish a well-accepted link between tactile comfort and objective evaluations. On the other hand, shear behavior of a fabric is a mechanical parameter which can be measured by various objective test methods. The principal aim of this study is to determine the tactile comfort of commercially available denim fabrics by subjective measurements, create a tactile score database for denim fabrics and investigate the relations between tactile comfort and shear behavior. In-plane shear behaviors of 17 different commercially available denim fabrics with a variety of raw material and weave structure were measured by a custom design shear frame and conventional bias extension method in two corresponding diagonal directions. Tactile comfort of denim fabrics was determined via subjective customer evaluations as well. Aforesaid relations were statistically investigated and introduced as regression equations. The analyses regarding the relations between tactile comfort and shear behavior showed that there are considerably high correlation coefficients. The suggested regression equations were likewise found out to be statistically significant. Accordingly, it was concluded that the tactile comfort of denim fabrics can be estimated with a high precision, based on the results of in-plane shear behavior measurements.

Keywords : denim fabrics, in-plane shear behavior, linear regression estimation, tactile comfort
Conference Title : ICTITE 2017 : International Conference on Textile Industrial Technology and Engineering
Conference Location : Berlin, Germany
Conference Dates : May 21-22, 2017