

**Topic of the Speech:**

Development of Human Body Dummy for Measuring Clothing Pressure Derived from Dynamic Deformation of Pants

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Professor Hiroyuki Kanai is Associate Professor of Faculty of Textile Science and Technology, Shinshu University, Japan. Kanai received Bachelor's and Master's degrees from Shinshu University in *KANSEI* Engineering Course and his Ph.D. from Shinshu University in Textile Engineering. He is interested in the comfort assessment of textile products, especially the monitoring of psychophysiological response when the persons use some textile products, and suggesting the novel textile testing, the optimizing the specification of textile product for satisfaction of consumer's demands.

His recent research activities include the development of sportswear activating muscle activity and promoting exercise effect; and the development of sleeping thermal comfort assessment system. He is a recipient of Society Academic Award by The Textile Machinery Society of Japan, and Outstanding Research Papers Competition by Textile Bioengineering and Informatics Society 2012. Kanai currently serves for Director of The Textile Machinery Society of Japan, and serves on the Vice Editor-in-Chief for Journal of Textile Engineering.

-For invited speaker only

Development of Human Body Dummy for Measuring Clothing Pressure Derived from Dynamic Deformation of Pants

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ABSTRACT (NO MORE THAN 500 WORDS:)

Testing method of clothing comfort has been depended on a human subjective evaluation. Many patterners and designers often face to embarrassed at understanding unclarity of the results. This situation is mainly delivered from the lack of accuracy and reliability on the results caused by 'individual differences of evaluators such as body shape, evaluation criteria, scatter of motions', or 'adaptation, declining of motivation, fatigue, to the testing'. Thus, this study aimed to suggest a testing methodology for evaluating clothing comfort on pants through measuring clothing pressure with an original human lower body dummy.

The original dummy was consisted with stainless-steel props set at thigh part, and at lower leg part, and, with joints at knee, and at ankle. And dummy shape was formed by soft polyurethane resin. The right leg of the dummy was set on uniaxial motorized stage, and realized the motion of right foot elevation. The rotation angle of knee joint and the velocity of elevation was realized to arbitrary controllable.

For investigation of availability on the testing method with the original dummy, we attempted to measure a clothing pressure with eight air-pack sensors set on surface of the dummy skin, with men's formal pants made by 6 different grades of stretching woven fabrics.

In comparison the results by the original dummy with that by human body at same points, the clothing pressure value of the original dummy was correlated to that of human body with much less error bars. Especially, the clothing pressure observed at 4 points in thigh (front-side, back-side, knee-side, upper-side) were highly correlated. In other words, it was confirmed that not only the higher accuracy was delivered from measuring with the original dummy, but also the dynamic deformation of pants occurred in human body motion was replicable with the original dummy.

From the results, the availability of testing methodology with the original dummy for evaluation of clothing comfort on pants was suggested.