509/E1

# Establishing a criterion to develop non-destructive testing methods for adhesively bonded textile structures using Fourier transforms

W.D.R. Fernando,[*1] D.A. Thanthrigoda,[2] D.R. Jayasundara,[1] and S.R.D. Rosa[1]

[1]*Department of Physics, University of Colombo, Colombo 03, Sri Lanka*
[2]*No.50 Wijerama lane, Gangodawila, Nugegoda, Sri Lanka*

Currently, there is a growing trend in the apparel industry to replace traditional stitching by pasting using heated adhesives. However, the quality of such apparel depends upon the bond strength of the adhesive to the fabric material. The bond strength of the seams is generally tested adopting destructive methods such as peel strength test, which results in wastage. The primary objective of this study is to formulate a non-destructive testing methodology that is compatible at the assembly line level involving the measurement of a certain parameter that can be correlated with the peel strength. Once the correlation is established this parameter can replace the need for destructive peel strength testing. It has been hypothesized that the strength of the bond depends on the surface temperature distribution at the time of thermosetting of the adhesive polymer. We use infrared thermography and Fourier transform techniques to determine the distribution of the temperature of the bonded segments. The peel strength of the bonded samples was measured according to the standard procedures recommended in the industry. A parameter is then defined based on the correlation between spatial homogeneity of the temperature distribution and peel strength values, and the minimum value of the parameter that ensures required peel strength was determined. Further tests carried with samples showed that this minimum value of the parameter is a reliable indicator of the expected peel strength of a bonded sample.

ruwandif@masholdings.com 0778244731