PFI Germany

PFI Project Description

Non-destructive Testing of Sole Cementing

Laboratory testing of the strength of sole bonding, for example, often requires destruction of the shoes to be examined. That means that they can no longer be sold. Ultrasonic technology could offer the possibility of performing at least part of the necessary high-precision product testing in a non-destructive manner.

Status quo: According to the present state of the art, many of the laboratory tests performed on footwear require that the shoe to be tested should first be cut up or destroyed during testing.

In view of the fact that at least 0.3 percent of a production batch has to be tested to obtain reliable quality assessments, we estimate that some 90,000 pairs produced just by German manufacturers are no longer available for sale.

Aim of the project: Development of a non-destructive test method for adhesive bonding and recognition of excessive or missing components in finished shoes by an ultrasonic technique. This could permit 100 % testing of all shoes in production.

Approach adopted:

- Use of non-contact air-coupled ultrasonic technology because the use of coupling agents (oil or water) is precluded in shoes
- Recognition on the basis of ultrasonic images
- Interpretation of the resulting ultrasonic images
- Development of a framework for parameter determination
- Difficulties:
  - complex footwear geometries
  - widely differing materials
  - different kinds of bonds between materials
  - finding suitable ultrasonic parameters
- Concluding development of an apparatus for testing footwear

Project status: Ongoing project. Project partner: Forschungszentrum Ultraschall gGmbH, Halle (Saale)
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IGF Industrielle Gemeinschaftsforschung

Please address inquiries to:

Dipl.-Ing. Peter Schultheis
Head of Technical Development and Footwear Engineering
Tel.: +49-(0)6331–249040
E-Mail: peter.schultheis@pfi-germany.de