3rd Project Newsletter: June 2013

NOISEFREETEX

NOISEFREETEX began on the 1st January, 2011 to find demonstrative solutions to reduce noise pollution in industrial areas by using finishing technologies on textile materials. (LIFE+09 ENV/ES/461). The project is coordinated by AITEX and project partners are PIEL, S.A. (Spain), NTT Tecnotessile (Italy), The Valencia Polytechnic University (Gandía campus) (Spain) and the Association of Valencian Textile Manufacturers ATEVAL (Spain). The project will finish on the 31st December 2013.

Progress

Regarding action 2 **"Finishing processes"** NTT has applied and optimized electrospinning process to coat previous selected textile materials with nanofiber webs. Also, they have applied and optimized plasma surface treatments to functionalise and improve previous selected textile materials. Coating processes have been applied and optimized. Finally, a qualitative analysis of the processed samples, mainly the homogeneity and the durability of the coatings and surface treatments has been performed.

According to literature and previous experiences nonwoven materials seems the most suitable one because they have small specific gravity induced by the open structure, high thickness and also a high amount of fine fibres can be used. Textiles provided by PIEL have been used. Afterwards, NTT has produced a nanosized web onto woven and nonwoven substrates. We have used PA6 nanofibres and Recycled PET nanofibres (from food industry), Nylon 6/PEO nanofibres (virgin nylon and PVA). High troughput has been achieved by using the NANOspider device. An homegeneous and dense nanofibrous layer have be produced.
Plasma treatments induce surface oxidation of natural fiber and synthetic fiber surfaces. Mechanical properties are unaffected but the treatment is not lasting. Quick decay of the properties induced by oxidised species re-orientation. Unfortunately we have not achieved good adhesion properties and we had to look for other alternatives. A sandwich structure seems to be the most promising.

Also, coating is applied to the surface. In many cases coatings are applied to improve surface properties of the substrate, such as appearance, adhesion, wetability, corrosion resistance, wear resistance, and scratch resistance. Three approaches have been tested: kiss roll machine, spraying and transfer coating.

The main purpose was:

- To produce dense material - increase of sound absorption value in the middle and higher frequency as the density of the sample increased
- To increase the porosity of the medium to allow sound dissipation by friction, the sound wave has to enter the porous material.
- To produce highly tortuose materials. Tortuosity is a measure of the elongation of the passage way through the pores

Regarding action 3 "**Validation"** we have been working on the effect of the kind of drilling on the sound absorption coefficient: percentage of the drilled area (%) and diameter of the holes.

The main conclusions were:

- The influence (%) of the drilling in the sound absorption coefficient depends on the frequency. Within medium and low range of frequencies, the sound absorption values are slightly greater in the case of lower percentage of drilled area. Within medium and high range of frequencies, the sound absorption increases according to an increase of the percentage of drilled area.
- The distribution of hole diameters has higher sound absorption values in broader frequency spectrum is the combination of diameter 3mm, 4mm, 5mm, and 6mm.

Moreover, the effect that produces on the **category** and on the sound reduction index has been also studied. :

- We are going to obtain a higher category when we increase the percentage of drilled area.
- Distribution and diameters of the holes **don't produce any influence** on the category of the barrier.

In action 4 **"Simulation and software development"** we have already developed the beta version of the software. With this software we could predict the results in Kundt tube and in reverberant chamber and also we are able to classify the barrier with the absorption coefficient.

We have used various models already existing and also models with experimental base.
First of all, the user chooses the structure to be used (several possibilities available). With this structure we could predict the results in Kundt tube and in reverberant chamber and also we are able to classify the barrier with the absorption coefficient.
From the isolation point of view, we need to predict the transmission loss and the transmission coefficient. We could also classify it with the B classification.

The implemented tool allows any simulation of the materials which were tested within NOISEFREETEX project, both, sound absorption simulations and airborne sound insulation. It generates a report containing all the information of the simulation and also classifies acoustic barriers according to European Standards.

Regarding Action 6 **"Communication and Dissemination of the results"** We are organizing the final event in Tecniacústica Congress. Valladolid, 2nd to 4th October where NOISEFREETEX results will be presented and also the project will have a booth.

http://noisefreetex.aitex.net

AITEX
Emilio Sala Square, 1
ES-03801 Alcoy-Spain
Technical Coordinator. Mr. Bruno Marco bmarco@aitex.es
Project Coordinator Mrs. Korinna Mollá kmolla@aitex.es

Project financed by the EC within the LIFE+ programme.