COORDINATOR

Textile Research Institute AITEX

AITEX is a Spanish non-profit making private association formed by textile and related companies. In the field of standardisation and quality, it has advanced testing laboratories: chemistry, physics and fire behaviour, that are authorised to award several certifications. AITEX participates in various EC initiatives, supporting the Spanish companies in the development of a growing number of diverse EU-funded projects.

AITEX has coordinated several LIFE projects such as:

- **LIFE03 ENV/E/000102 - "Water Purification Tertiary Treatment usingPhoto-oxidation at semi-industrial scale"**
- **LIFE05 ENV/ E/000285 - "Alternatives for waste volume reduction in the textile sector through the application of minimisation measures in the production process and in the consumption" awar-ded as "Best LIFE Environment 2008-2009 Pro-ject" by EC and "Best Environment European Project of Valencian Comunity 2008"**
- **LIFE07/ENV/E/000794 - TEXLEGIO - "Risk reduction to public health from environmental sources using biotechnology in the textile sector"**
- **LIFE10 ENV/ES/000431 – WETCOMP - "Wet-laid technology application for textile residues revalorization in composites industry"**
- **LIFE11/ENV/E/600— SEAMATTER- "Revalorization of coastal algae wastes in textile nonwoven industry with applications in building noise isolatio**
- **LIFE11 ENV/ES/552 – BIOMOMI - "BIO-Monitoring and Automatic Microbiological Con-tamination Control System of Industrial Hydraulic Circuits".**

THE CONSORTIUM

Textile Research Institute AITEX

www.aitex.es

Polytechnic University of Valencia, Acoustic Department (Spain)

www.upv.es

Association of Textil Entrepreneurs of the Valencian region (Spain)

www.ateval.com

PIEL, S.A. (Spain)

www.piel.es

Next Technology Tecnotessile Societá di Ricerca Tecnologica srl (Italy)

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Noisefreetex

"DEMONSTRATIVE SOLUTIONS TO REDUCE NOISE POLLUTION IN INDUSTRIAL AREAS USING FINISHING TECHNOLOGIES TEXTILE MATERIALS"

http://noisefreetex.aitex.net/

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 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 seem 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 havs been 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.

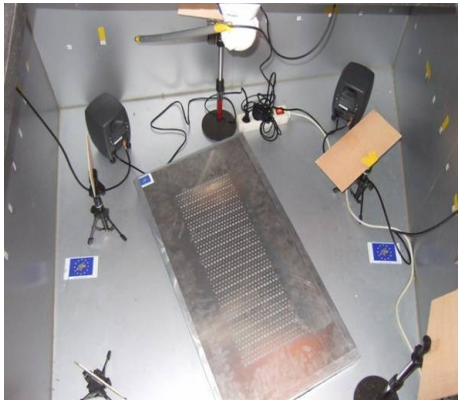
In action 4 **"Simulation and software development"** we have already developed the beta version of the software. With this software we could predict the results in Kundt tube and in reverberant chamber and also we are able to classify the barrier with the absorption coefficient.

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 We have organized 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.