PRESS RELEASE – COST ACTION TU1105

The COST Action TU1105 presents a catalogue of techniques to analyse the noise, vibration and harshness (NVH) for the design and optimization of hybrid and electric vehicles

Recently it has concluded a European research project which objective has been to acquire, unify and coordinate knowledge about the new challenges posed by electric and hybrid vehicles with regards to their acoustical and vibrational behaviour, and also to propose and develop new analysis techniques and tools to be used during the design phase of such type of vehicles.

The project has been developed within the framework of the COST Action program of the European Union, and it has been titled COST Action TU1105 "NVH analysis techniques for design and optimization of hybrid and electric vehicles". The Action has been chaired by Dr. Nuria Campillo-Davo, from the Miguel Hernandez University UMH in Spain, whilst Dr. Bert Pluymers from the KU Leuven in Belgium has been its Vice-Chair, and Dr. Ahmed Rassili from the University of Liege in Belgium has been the Grant Holder representative of the Action. The TU1105 Action started its activities in April 2012, and during the four years of Action lifetime, it has become a large consortium in which 37 entities from 17 countries (including 3 entities from outside Europe) have participated, comprising members from the academia and research institutes, to enterprises from the automotive sector and affected collectives.

The work developed within the Action has resulted in the publication of a book that collects a catalogue of techniques to analyse the noise, vibration and harshness (NVH) for the design and optimization of hybrid and electric vehicles. In the book are also presented the challenges originating from the use of alternative powertrains, the potential solution technologies and new experimental and numerical techniques to apply for the design of electric and hybrid vehicles and for predicting and analyzing their NVH features. Besides, it has been defined the future research lines to develop in order that the automotive industry could provide new vehicles that meet a comfortable driveability from the user perspective together with an adequate security for the pedestrians and other road users.

The absence of an internal combustion engine (ICE) in the pure electric vehicles, or in the hybrid vehicles working on electric mode, implies that users and pedestrians have a very different perception of those vehicles in comparison with the traditional ones. On one hand, due to the low noise levels emitted, those vehicles are less perceived by pedestrians, cyclists and other users, what could cause dangerous situations. On the other hand, new sounds and vibrations are transmitted to the vehicle's cabin, and

together with the lack of noise coming from an ICE engine, entails that lower intensity noises could be now perceived as annoying for the driver and passengers. Hence, the noise emission and the vibrational features of these new vehicles change considerably from the traditional vehicles. Such fact involves that the NVH analysis techniques that are used for the design of ICE vehicles are not always adequate for the design of alternative vehicles, and then, there is the need to develop new techniques suitable for those vehicles.

The work developed within the project has been divided into different phases. One of the activities carried out was to know users' opinion and their expectations about the use and driveability of alternative vehicles. Later, the main work has been focused on studying the correlation between NVH techniques applied to traditional vehicles and requirements of new vehicles for applying those techniques. Finally, it has been analysed how useful those techniques are for the optimization of new vehicles design and for improving their detectability from a road user and pedestrian point of view.

The results of the COST Action TU1105 have been presented in an international conference celebrated on 6-7th April, organized by the Miguel Hernandez University UMH in Spain. The conference had the institutional support of the Spanish Acoustical Society SEA that during the event was represented by its President, Mr. Antonio Perez-Lopez. The conference has provided an excellent forum for technical discussion, and a starting point for future developments and projects. Different interested agents have participated in the conference, from researchers to authorities, independent consultants, representatives from industry and associations, from the automotive sector and other collectives. The project results have been collected in the book titled "*COST Action TU1105 - NVH Analysis techniques for design and optimization of hybrid and electric vehicles*", and an online version will be available soon in the website www.tu1105.ulg.ac.be