

CASE STUDY

University of Windsor
Ontario, Canada
Sound & Vibration Challenges

North America
Automotive

The University of Windsor's new Center for Engineering Innovation will become Canada's largest facility of its kind covering all aspects of automotive engineering including equipment for Noise, Vibration, Harshness (NVH), Sound Quality (SQ) and structural analysis from preferred supplier Brüel & Kjær.

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Fig. 1 The 4WD Chassis Dyno, Brüel & Kjær Engineering Services, is used to solve real world NVH problems



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University of Windsor Prepares for Future Sound and Vibration Challenges

University
of Windsor
thinking forward

The University of Windsor is located in the Canadian province of Ontario, where the Detroit River constitutes the border between Canada and the US city of Detroit. The area is dominated by the automotive industry and includes some of the world's biggest automakers, research and development centers, OEMs and sub-suppliers. This fact was key to the University of Windsor in the 90s when it set about developing Canada's first and best program for Automotive and Material Engineering.

The Program

The University of Windsor has always involved partners from the automotive industry, the OEMs and sub-suppliers for its research. “The industries from across the border have frequently approached the University for its NVH expertise to help them develop their products and solve their NVH problems,” explains Dr. Colin Novak, Assistant Professor at The University of Windsor. “In our program last year for Mechanical, Automotive and Material Engineering we had approximately 180 students from which 120 will become graduates and work as professional automotive engineers. I think that the reason for our success is partly due to the quality of the faculty and the core competencies we represent. However, the major contributor is our well-established cooperation with leading automotive companies ensuring the use of the latest research and providing our students with hands-on experience.”

Objectives – the Windsor Focus!

The University of Windsor’s long-term objective is to develop an Automotive Center of excellence with focus on helping not only local industry but also the automotive industry across Canada and across the border into North America. “We know that we are strong in the field of NVH and, in order to develop future business, we would like to move away from traditional automotive applications and diversify into areas such as testing safety systems,” explains Dr. Novak. One project that has recently brought attention to The University of Windsor is the development of safer and patented child restraints.

Sound Quality and acoustics are other areas where The University of Windsor hopes to diversify. As people are spending more and more time in their vehicles, for example, to and from work, The University would like to improve its understanding of in-vehicle comfort, which has become increasingly important for consumers. “Our ultimate goal, five to ten years from now, is to develop more expertise in the non-traditional aspects of automotive engineering,” explains Dr. Novak.

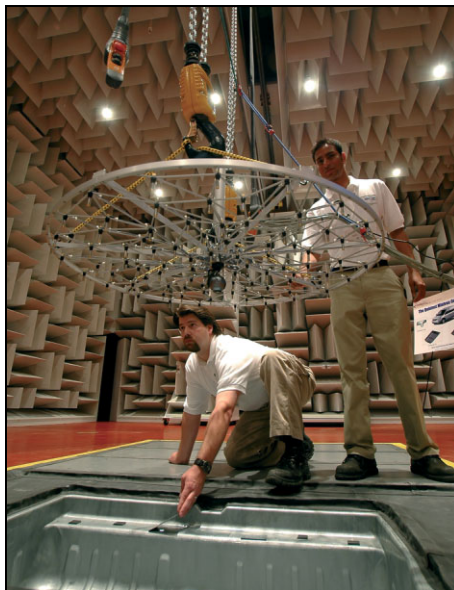
Mutual Benefits

The University of Windsor works closely with industrial partners to provide them with resources they wouldn’t have on a full time basis. “We have a full NVH program including a lot of application experience and theoretical knowledge,” explains Dr. Novak. “Companies and inventors have products they want to introduce to the market. They may have the concept but not the expertise to test product quality, nor the manpower or ability to get them launched and that’s where we come in,” says Dr. Novak. “And with Brüel & Kjær as our preferred supplier of sound and vibration applications we can provide our partners with accurate data and efficient service. So, for us, working with pioneers in the field of sound and vibration means that we are at the forefront of technology. In addition, Brüel & Kjær has one of the best NVH testing facilities just 45 minutes away – the unique ARC in Detroit. We enjoy using the facility together with our customers and it is also where we can learn new technologies that we can use to solve our customers’ NVH problems”, says Dr. Novak.

Dr. Colin Novak, Assistant Professor at The University of Windsor (right) with PhD candidate, Helen Ule at Brüel & Kjær’s NVH test facility in Detroit, USA



Brüel & Kjær staff use beamforming to find noise leaks in a floor panel of a mini van



The University of Windsor is also developing material testing expertise with focus on the acoustic properties of materials from all angles. "We are not just looking at the transmission loss and the absorption's characteristics – we want to see how different materials change the Sound Quality properties of products."

Sometimes you can only reduce a product's noise so much, or add so much damping before it becomes difficult to do more because of weight restrictions. So, instead of providing traditional attenuation, The University of Windsor changes the characteristics of damping material or the component so that it, at least, sounds better. The ultimate goal is to provide a better end product for consumers. "That's where NVH science is going with product engineering. And this is an area where we differentiate from other research facilities and traditional consultancy agencies," states Dr. Novak.

Industry Benefits

The University of Windsor assists both companies with vast knowledge of NVH issues and companies who know the issues but don't know how to deal with them. "It's a challenging market but our customers are just great. Some come to us because they need to reassure a big OEM of the product quality and others come to us to ensure competitive advantages for their product in a comparable test. We also have customers who cannot invest in their own test facility and others just come for a second opinion before pressing the green button for production start."

The Future

The University of Windsor is, with the help of \$40 million funding from the Ontario government, in the final stages of planning their new \$110 million Center for Engineering Innovation, a structure that will establish revolutionary design standards across Canada and beyond. "Our future labs will be partnered by some key players from the industry and the cost will be shared between us. This will allow partners to bring in their products, use the facility for testing and interact with University researchers. We see this as a huge benefit for the industries, the researchers and the undergraduates involved. The whole program will become much more target oriented and the industries will gain access to the latest technology and research programs."

Not even the momentary automotive slow down has changed The University of Windsor's optimism for the future! Every 10 to 12 years, there is a change in the automotive direction and this is where the research site will be able to show its true value to customers. The University of Windsor plans to strengthen its automotive program as well as take advantage of the ocean of opportunity the Center for Engineering Innovation will provide. "We are in a very strong position for future sound and vibration challenges," concludes Dr. Novak.

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