Interview with Prof Paolo Feraboli, Director at Automobili Lamborghini Advanced Composite Structures

19 July 2011

Interview with Prof Paolo Feraboli, Director at Automobili Lamborghini Advanced Composite Structures Laboratory, University of Washington and a speaker at the upcoming GOCarbonFiber2011:

Q: Briefly outline your background in composites and your role at the ACSL.

The Advanced Composite Structures Laboratory (ACSL) was established in September 2007 and inaugurated in October 2009 on the University of Washington (UW) Campus in Seattle. The Lab works in close collaboration with the Advanced Composite Research Center (ACRC) in Sant'Agata Bolognese, Italy for the development of all carbon fiber components in the Lamborghini vehicle line-up. The lab was recently showcased for the development of the Sesto Elemento Technology Demonstrator unveiled at the 2010 Paris Autoshow, which utilizes Forged Composite® technology, developed in conjunction with Callaway Golf and Automobili Lamborghini. Mission of the lab is to provide short term support to existing Lamborghini programs, such as the Aventador, as well as long term research for technology innovation and concept development. It also acts as the technical liaison between Boeing and Lamborghini on joint collaborative research activities in several areas of composites technology. The ACSL is comprised of the Manufacturing & Characterization Facility, focused on Out-of-clave technologies, and the Impact Dynamics Research Facility, where both impact damage, full-scale crash tests, and simulated lightning strike events are performed to assess the limits of performance of the materials and structures. The lab has received nationwide and worldwide press coverage through newspapers, magazines and televion in several occasions.

I am Professor of Aircraft Structures and Materials in the Department of Aeronautics and Astronautics of the University of Washington and Director of the Automobili Lamborghini Advanced Composite Structures Laboratory (ACSL). I am particularly interested in out-of-autoclave materials and technologies, damage tolerance, lightning strike, repair technology, and crashworthiness.

Q: How is the use of composites changing in the automotive sector, and what are the long term prospects?

We'll see more and more use of carbon fiber for primary structures in automotive, particularly for electric and hybrid vehicles. What is also changing is the approach, which uses large, integrated CF single structures for the core of the carbon fiber (i.e. the monocoque) rather than stand-off pieces only (hood, floors) within a mosaic of hybrid metal/ CF chassis.

Q: Does the Aventador represent a permanent departure from traditional metal chassis construction for Lamborghini?

Lamborghini has established an industry-leading competence in CF technology, and will continue to invest and expand in the utilization of this material for their flagship vehicles. Once the new benchmark was established with the introduction of the Aventador, both for Lamborghini and the super-sports car industry as a whole, it wouldn't make sense to revert back to the past. So will see more and more CF introduced in Lamborghini's future models, and the strategy was clearly set when we unveiled the Sesto Elemento revolutionary technology demonstrator.

Q: Cost and time are not usually limiting factors when building prestige sports cars such as Lamborghini - what were the previous barriers to using composites on this scale?

Reducing final part cost and increasing production rate, while at the same time maintaining uncompromised performance has been the mission of Lamborghini's R&D since 2006. The vision of Mr. Winkelmann and Mr. Reggiani has enabled the engineers to explore radically innovative technologies for increasing automation and reducing manual labor. Through large R&D efforts over the last five years, aimed at developing proprietary and revolutionary processes for making CF production rate and cost effective, it was possible to introduce the Aventador. The collaboration with Boeing and the lessons learned from the 787 have also played a key factor in laying ouT the path for these breakthroughs. Lamborghini will continue to invest in R&D efforts to improve current processes and explore new ones to even further increase the use of CF in their future products.

Q: Can you see a future where all cars will be made from lightweight composites, or will steel structures always play a role?

There will always be a role for metals, whether steel or aluminium, in car construction. The best car is not a CF-only car, but the one that use the best material, processes, and designs for each of its components. So while we will see more CF-intensive vehicles, there will always be a component of metallic construction. With that said, CF technologies are revolutionizing the way we design and build cars today, and the future of automotive will be significantly affected by the introduction of such different technology. As the Boeing 787 shows, introduction of CF-intensive vehicles will change not only the details of the vehicle, but the entire business model (e.g. the supply chain), the support network (e.g. maintenance and repair) and the factory floors (e.g. assembly lines).

Q: We will run a site visit to your facility at the University of Washington before the conference - what can visitors expect to see there?

See my first answer for details of what you will see. You will see state-of-the art equipment, unique experimental facilities, and previously unseen examples of our products, such as the sesto elemento, aventador monocoques and susensions.

Q: Finally, what are you hoping to gain from your participation in the event, and is there anything in particular you are looking forward to?

Since 2007 we have been developing these revolutionary technologies that have led to the Aventador and the Sesto Elemento. Yet we could not talk about them at any cost. This is the first keynote presentation we will give since the unveiling of the two cars, so there is a lot to show about how we developed them. I hope other institutions will appreciate the technical novelty and contribution of our lab to Lamborghini's mission, and will benefit from it, as well as involve us in whatever challenging projects they are faced with.

You can hear Prof Paolo Feraboli's presentation at the upcoming GOCarbonFiber2011. Click here to find out more >>