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Come together…

Technology transfer between automotive and the motorsport sector

Much is being made in the automotive media, as well as the wider press, about the validity of motorsport as a discipline in an increasingly environmentally-aware society. Indeed, there are those that predict that in as little as twenty years time, motorsport that utilises fossil fuels will be as socially acceptable as smoking is now.

However, the industry is moving proactively to play a key role in improving efficiency, as well as embracing and driving new technologies. It is this mindset that is driving the transfer of real technology from motorsport into the wider automotive arena. Here, Menard Competition Technologies' Charlie Bamber takes a specific look at how real life projects are driving greater efficiency for the benefit of vehicle manufacturers...

"Pragmatically, the need for engine efficiency is driving many of the automotive advances that are being made in terms of reductions in energy use. Until alternative fuels become the norm, it is imperative that fossil fuel engines are as efficient as possible. Often, racing engines are driving that process, as the automotive sector needs powerplants that are efficient, as well as powerful. Indeed, a number of organisations are utilising race engines and developing them for road applications, where that element of efficiency is so important.

"The assumption is often made in the automotive sector that racing engines are not efficient, yet in reality, many are both efficient and clean. People's perceptions are that engines and, specifically, cylinder heads are made for horsepower and that they therefore would not be efficient. Yet, performance and cleanliness are not incompatible.

"We can see this in the development of engine porting. Chasing performance leads the race engine designer to optimise every detail of the port and the resultant high flow port brings significant improvements in specific air consumption and efficiency. The same is true with manifolds, both exhaust and intake, as well as advances in cylinder linings, all of which aid the drive for a more efficient engine.

"Yet, it is not just from a technological perspective that motorsport is making a difference, every day. The motorsport sector can teach the wider industry a lot about how culture and attitude can help in making systems more efficient. For example, road car electronic systems have become evermore elaborate, with the calibration of a road engine now said to take in the region of 10 to 15 years!

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“Elaborate electronics systems have become so complex because so much of the complexity is a “sticking plaster”, there to mask a host of base engine design imperfections, built up over years of production iterations. Racing electronics systems are far less complex by definition but applied to an engine designed right, first time are incredibly effective. Indeed, it is a systems-led approach that defines the wider engineering picture, a systems approach that is invariably done in-house, rather than being sub-contracted out in an isolated manner by a vehicle manufacturer.

“The automotive tier one supplier will, inevitably, be working in isolation from other elements of the process not directly linked to what it is doing, meaning that there is little knowledge of the interaction of that part to a related component. So as component design is increasingly outsourced, the flexibility of interaction is lost.

“In contrast, the motorsport philosophy is one where consideration is given to all angles which will impact on a component, or system. Motorsport designs have to be optimised around specific constraints and the engineers inbuilt desire to win. However, this approach brings advantages in terms of efficiency. From a total engine design viewpoint, we take our approach back to basics and this is the most advantageous way in terms of maximising efficiency. With a vehicle manufacturer, it’s all about cost downs, reductions and compromises; this is emphatically not the way forward from an efficiency perspective.

“So the basics are vital, such as communication from department to department and in the vehicle manufacturer community, that is sometimes lacking. Despite some negatives, the motorsport industry is extremely strong at communication. Yes, there are differences between the automotive and motorsport sectors. Automotive has much to teach the motorsport industry in terms of the priority of fuel consumption, as opposed to chasing increases in power and torque. Yet, that is not the whole picture. The automotive sector is more conservative than the motorsport industry, which is why motorsport as a technical exercise is so important. It has much to bring to the efficiency debate within the wider industry – and this should not be forgotten.”

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