UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Behind the LMP2 - The African dream

By Buhle Zuma

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Tom Stevenson never thought his dream of designing supercars would be realised so early in his life, let alone giving input into Africa's first ever car to race at Le Mans in France.

At 23, Stevenson is part of the team that has contributed to the first true African race car designed, manufactured, tested and developed using South African technicians and drivers. Next year the Bailey LMP2 (Le Mans Prototype Class II) owned by Bailey Edwards Cars, will compete in the 24 Hours of Le Mans which is the world's oldest sports car race in endurance racing. The Le Mans is commonly known as the Grand Prix of Endurance and Efficiency and carries a lot of prestige.

The LMP2 is constructed using a Carbon Fibre/Aluminium Honeycomb composite for the chassis tub.

Before a car is allowed to compete at LeMans, it has to survive a number of stringent structural tests including a frontal impact and a 12 ton load on the roll hoop. Other Wits student contributors to the project have been Chris de Saxe, who performed a stress analysis of the composite tub, Bruno Correia who designed and tested an ingenious method for testing the energy absorbing Crash Box, and Rob Berman who is busy with an analysis of the suspension dynamics of the vehicle, as is Sashen Naidoo. Dr Frank KienhÅÂfer is supervising the dynamic analysis masters theses.

For Stevenson, the chance to work on the African dream came in 2009 when the Baileys offered students in the School of Mechanical, Industrial and Aeronautical Engineering a chance to work on different aspects of the car as part of their Honours project.

Stevenson was retained to work on the aerodynamics of the car – a vital factor in the overall performance of the car. Together with Greg Bailey, the chief visionary of the LMP2 and partner in the family owned Bailey Edwards Cars, he has produced a package that will hold its own in the competitive race.

"Essentially you need the car to suck itself down the road so that it can go around the corners as fast as possible. To do that, you need to break down each of the components on the car and analyse their best merits and how you can optimise them. That involves computational fluid dynamics (CFD); computer model of the car and analysing the airflow of the car in the computer," explains Stevenson.

This also involved many hours in the School laboratories running streamers and smoke in the wind tunnel in order to check air-flow pattern of the car's physical model which they had built to scale.

Seeing the project evolve from conceptualisation, the pieces coming together and finally a complete structure, has been an indescribable experience, says Stevenson. The two and a-half years invested in the project have been worth it as he has gained exposure to the industry and expanded his opportunities. The LMP2 is also the subject of his Masters' thesis.

Over the years Wits has produced some fine engineering talent which has been absorbed by the motoring industry. Wits alumnus *Rory Byrne,* Ferrari's Chief Designer first comes to mind, however more recent talent includes David Gentles who graduated from Wits in 2002 and cut his teeth on designing parts of the Airbus A380, has been a valuable source of know-how on the Carbon Fibre composite construction. Gentles is currently leading the design of the chassis of South Africa's first production Electric Car, the Joule; while Wits lecturer Dr Robert Reid has contributed his expertise to the production of the fully composite tub, the first time this has been attempted in South Africa.

Other Wits graduates who have made a name for themselves in the motor racing industry include Jonty Culwick, who is designing Rally Cars for ProDrive in the UK, Anthony Abbot, Development Team Leader at Red Bull Technology (Formula One) and principal software architect.

Giles Wood is Chief Engineer Simulation/Analysis at Red Bull Racing. In the past he has been Head of Simulation/Analysis at Red Bull Racing Simulation, Lead at McLaren Racing and Principal Software Engineer at The MathWorks.

Additional reporting by John Shires from the School of Mechanical, Industrial and Aeronautical Engineering.

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