

The Red Line

Volume 3 Issue 2



QUALISYS



The Road To Bruntingthorpe

by Gareth Knox



CR03

With the Formula Student UK event quickly approaching, the Cardiff Racing team are working harder than ever to finish the car and test it before the competition. Many of the students have now finished exams and have got straight back into working on the car.

The month leading up to the event is often one of concentrated effort by many team members. The main tasks of fabrication and testing are backed up by efficient organisation and co-ordination. By working together we should achieve the main goal – producing a competitive

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racing car.

The main task was the completion of the aluminium honeycomb monocoque chassis. The chassis, designed by Team Leader Phil Box, needed to be completed early, as it would provide the platform for all other components to be mounted. The main jobs were marking areas for inserts, preparing areas for welding and smooth-

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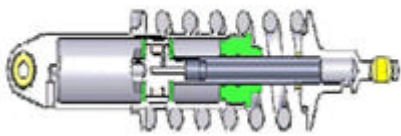
CR03 under construction

With thanks to Z-EX and Lewis Motors

MR Technology on CR03

by Rich Elliott

CR03 features in-house designed and manufactured active magneto-rheological dampers that are used to control handling balance during manoeuvres typical of the auto-cross and endurance events of Formula Student. The system has undergone many months of testing and development by Rich Elliott on CR02 and the hydraulic damper dyno, where back to back tests demonstrated the advantages over



FEA of one of the MR dampers on CR03

passive dampers in several respects. The control strategy monitors the balance of the vehicle during a turn and will control the roll damping distribution to effect the distribution of corner patch loads to correct for under-steer and over-steer. This has translated to a car that is more consistent and easier to drive at the limit which in testing has led to an average lap time reduction of 3% and has reduced the likelihood of cone penalties. The MR dampers are also 20% lighter than the Nitron racing dampers they replace and the damping range is greater, while the static breakout friction of the seals is 50% less. The method by which the MR damper operates means that the level of damping is

continuously variable within its range with a response time of less than 6 milliseconds. Therefore, the shape of the damper curves can be controlled electronically and changed instantly.

The data acquisition and damper control is handled via real time reconfigurable hardware from National Instruments (www.ni.com) with all of the required code written by the team using the dataflow language of LabView. The output is a data file with 49 channels of calculated and raw data and the 4 control signals to each damper. The system has enough memory to record several endurance runs.

Cardiff Racing Goes International

by Dave Payne

Cardiff Racing is not only going to the UK event in July but we are also going to the Formula Student Germany event at the start of August. At least fifteen team members and CR03 will be heading to Hockenheim to compete against thirty nine other teams from all over Germany and the rest of the world. Coming around a month after the UK event, this should be a good test of the team and the car.

The German event is organised by Verein Deutscher Ingenieure (VDI) and 2006 is the first year it has been run as a full event. We are one of only seven UK teams and one of the two Welsh teams attending. For those team members that will have already graduated (two days after the UK event) the trip to Germany will be a fantastic finale to their time at Cardiff. For those who are not graduating, it is a really valuable first step in the international ventures of Cardiff



Formula Student Germany

Racing, in terms of the preparation, organisation and the sheer experience of travelling as part of a leading team, not to mention a brilliant chance to brush up on language skills! If the trip is successful then hopefully there will be more to come in the future.

This trip is costing the team a lot of money, but we are determined to make the most of this opportunity. If you would like to help the team with the costs of the event, please see the back page for how to get in contact with us.

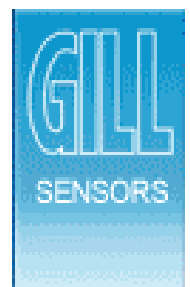
More information on the event can be found at

www.formulastudent.de.

Gill Sensors Sponsorship

by Llyr Smallwood

Gill Sensors has kindly given us extensive discount on a liquid level sensor for use on our fuel tank. Gill Sensors design and manufacture a wide range of sensors for many applications including F1, F3000, WRC, NASCAR and GP1. The sensor itself is designed as a solid state unit with no moving parts, using differences in dielectric properties between fuel and free air to calculate the level. It is an extremely robust design which will be very useful at the event in July. We are extremely grateful to Gill Sensors for agreeing to make this sensor, and for their customer support over the past few weeks. Please visit their website at www.gillsensors.co.uk.



Gill Sensors

(Continued from page 1)

ing areas of the chassis in preparation for painting. The final task of welding the roll hoops and supporting structures were completed early on, after a very long day in the lab!

Another task was the final testing of the active magneto-rheological dampers, using CR02. This was important, as not only are the dampers a key item on CR03, but also because some components on CR02 were required for the com-

“...the new Ferrari 599 GTB has similar active magneto-rheological dampers...”

pletion of CR03! MR dampers are becoming highly desirable products, as the new Ferrari 599 GTB has similar active magneto-rheological dampers co-developed by Ferrari and Delphi.

With completion of the new carbon-fibre side-entry plenum, the final engine maps were completed using the university's in-house Ricardo engine test-bed facility. This would give the team several maps which can be changed easily depending on what was required of the car.

Then there was the hard work completed by everyone in the workshops, especially Alastair Clarke and James Thorp whose continuous dedication and many late nights allowed all the components to be made to specification and on time. The technicians at



The team work on CR03 in the lab

Cardiff have given their expert guidance and support throughout the build, especially Lee Treherne.

The team believe we have a strong entry this year, so look forward to not only the UK event, but also the German event in August!

Cardiff Racing gets a Royal visit

By Karen Holford

The Cardiff School of Engineering was pleased to welcome HRH Prince Michael GCVO on Thursday 1st June to visit Mechanical Engineering, and in particular, the School's Formula Student Car Laboratories.

Professor Paul Tasker and Professor Karen Holford welcomed Prince Michael to the School and showed him the work being undertaken on the Formula Student Car. He also met with students who are involved with the car as part of their studies in Mechanical Engineering, and was told about the racing successes achieved over the last two years. Prince Michael is the Patron of the Institute of Motor Industries and he was extremely interested in the students and their work on the Formula Student car. When asked about his impressions of Cardiff University and of the School of Engineering he said:

“I think one of the impressive

things for me was being able to visit two areas really, one is your MBA for students and I met post-graduates from many different countries which just shows the international flavour you have here, and then to come here to the automotive side and to meet the team building this amazing Cardiff racing car about which I knew nothing until I came; and here you have a group of people who are hugely enthusiastic and right at the sharp end of the technological scene

“...a group of people who are hugely enthusiastic and right at the sharp end of the technological scene and of research...”



HRH Prince Michael GCVO meets some of the team

and of research presumably, and who make all the bits for the car and this is no side-line, this is something very, very serious. And they were saying that the Formula One people are showing an interest in some of the things they are doing, and it is a very impressive thing; and it is always useful on two sides, first of all to draw links with what goes on outside in the world; and building up a network of people to draw on in different countries in various areas of expertise; and also to see what the students are up to, so it has been very enlightening morning for me, and very exciting.”

New Sponsor?

Cardiff Racing cannot survive without the support from our sponsors.

There are many ways that you can help, including financial backing, donation or discount on automotive parts or materials, donation or access to tools and machining equipment. You can also purchase advertising space on our new car, clothing and equipment and provide management assistance, technical backup and services.

If you are interested in becoming part of the Cardiff Racing Team through sponsorship please get in touch via the contact details below. Alternatively, log on to our new website which contains all the information about sponsorship opportunities at the address below:



Comment

Well, another set of exams is finally over and the team can get back to working on the car. We have the biggest team we have ever had for the UK event and we are all committed to working until the car is at a winning level. We now have a limited amount of time to do a lot of work, but we will get there.

There are a large number of fourth year MEng students who are specialising in specific areas of the car that they designed and volunteers who are there to help out with anything from making the side pods to designing the website.

On behalf of the whole team, I would like to thank all of our sponsors who have supported the team this year especially Amicus, SWIE and Qualisys who have donated money to the team recently. Without your help, we could not have progressed so well with the design.

The team would also like me to pass on their thanks to the technicians, secretaries and other staff at Cardiff School of Engineering for all the support they have given us this year.

And finally, the team would like to say congratulations to our faculty advisor Professor Karen Holford in achieving her promotion to Professor.

David Payne - Editor



Cardiff Racing 2006



Website Evolution

by Dave Payne

Over the past few months, the website has been evolving. Our resident html guru Yo has been working hard improving the technical side of the site. The site has rocketed up through the search engine page ranks and we can now analyse information about who is using the site. One of the major additions to the site is the blog. This is being used by the team to regularly update pictures and information about the build. At the events, the team can use this to quickly and easily update the site about our progress, hopefully with pictures and videos (connectivity permitting).

The improvements do not stop there. We are looking at adding an RSS feed to the site, changing the look of the site slightly so it

looks even more professional and improving the search engine rankings further.

Please have a look at www.cardiffracing.co.uk to see more of the work that Yo is doing and to keep up to date with the team via the blog.

Our thanks go to Small Business Websites (www.small-business-websites.co.uk) for their continued support.



The blog

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