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2005 Progressing Well Monash Rolls!



Hello to everyone, much has happened since our last update, with plenty of action to talk about. Since the new team has formed, everybody has worked extremely well to finalise their NX CAD models of major components, including chassis, suspension, engine and driveline. The team's new operational procedures proving effective, with vehicle design taken care of, as planned. Additionally many of the new team members have been learning the necessary skills for construction, including regular attendance to TAFE, courtesy of Chisholm Frankston and Box Hill Institute. Skills such as machining, welding and composite construction are all examples of what the new team members have been learning about since their induction.

The Monash FSAE team.

2005 Design Finalisation

With the CAD model complete, the new layout features only a couple of major changes. New front shock placement, a new steering system and a rear mounted radiator being the most obvious. Extensive use of aircraft grade alloys, courtesy of J&R Aerospace, has enabled part design to be lightweight yet strong. The new car looking to be a very fast and reliable package. The testing of composite panels, as discussed in the next section, suggests the chassis will benefit from carbon fiber sandwich panel reinforcement.



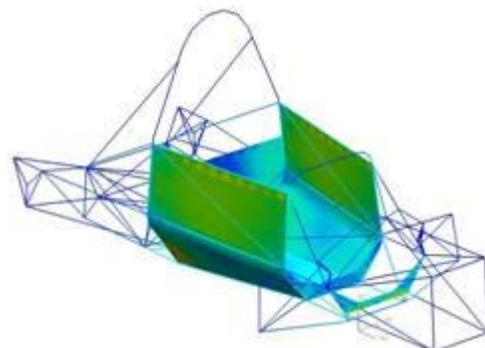
Chassis

Composite testing update

As mentioned in the previous newsletter, an investigation was to be undertaken to discover the effect of composites. Successful construction of composite structures has since taken place, with experimentation revealing the added stiffness. The following picture shows composite panels in their pre-bonding stage.



After the carbon / honey comb was glued to the steel sub frame, the above picture shows how the test piece was loaded and measured for deflection. Results of such tests were correlated to computer models to determine the overall chassis stiffness, being one of the most important specifications of the chassis.





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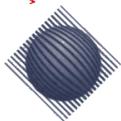


AWESOME DISCS

Topformance



Engineers Australia



Metal Treatment Services



Suspension

All suspension components have now been manufactured.

Special thanks go to the Mechanical Engineering workshop, who machined the aluminium front uprights, GDM Precision Engineering and JW Ford and Co, in a joint effort to machine the front hubs. Thanks also to Metal Treatment Services for heat treating of the fabricated Chrome_Moly wishbones, and Bernhart Springs who have made the springs for the car.



Powertrain

The rear driveline system is now almost complete, with only some spline cutting remaining to be done. The system will be an evolution of the twin chain setup introduced in 2004, and is proving beneficial in terms of rotating inertia and packaging.

The dyno testing has begun, with a number of tests being set up to determine the effects of a number of camshaft, intake and exhaust variations.

This testing will be the most complete and in depth tests we have ever done, and hopefully will provide a better understanding of the behaviour of the engine with the mandatory intake restrictor. The testing will also allow correlation to theoretical models and computer software, so that it may be better used as a predictive tool in the future.



Aerodynamics

Research is continuing on the aerodynamics package, with attention being paid to wing mount design, construction techniques, and improving our understanding of the front wing/ground interaction.

The wind tunnel symmetry rig testing was trialed, producing promising results, and we are planning some on track tests with the 2003 car to try and verify the data. The symmetry rig consisting of mounting the car up in the air, with a near identical car underneath it, as if the car were driving over a mirror. This more accurately represents the airflow under the wing in driving conditions than a stationary floor does.



Recent Events

Sponsor update night

On July 29th, the team held a sponsor information evening, to keep everyone up to date on our progress and allow more of our sponsors and team members an opportunity to meet. Those in attendance saw an impressive display of components, and were given a presentation outlining the work we have done so far, including design, testing and team development.



MoTeC / Claude Rouelle Vehicle Dynamics Seminar

Once again this year, MoTeC and world renowned suspension dynamics expert Claude Rouelle presented a seminar for Formula SAE teams, discussing the dynamics of a race car, and how to understand and interpret the behaviour of the car using data logging.

Monash was the best represented team by far, with 10 students attending, all coming back with a far greater understanding, and a real desire to better understand the behaviour of the car.

Following the final day of the seminar, Claude and the other teams were invited back to Monash for a BBQ, and a quick tour of our facilities.



plm NX3 CAD training

As part of their ongoing support, plm have again provided training in NX3 design software, with twenty students recently attending intensive two day courses, and learning how to utilise more of the functions and modeling power of the software.



2003 car driver training

We recently took the refurbished 2003 car out for testing, with its new superlite wheels fitted, following some durability problems with the original wheels. This gave some of the new team members an opportunity to see and drive a FSAE car, and get a better understanding of the requirements. We plan to make this a more regular event in future.

Part Focus – Steering rack

The nature of FSAE tracks, with tight twisty corners, and constant direction changes, means that the steering is critical part of the car, and can have a significant impact on the cars performance. The assembly must be rigid enough to withstand the forces applied without deflecting, and provide feedback to the driver. On top of all of this weight is a big factor, as the car must be as light as possible enhance overall performance.

After carefully looking at the available steering racks, none suited our combination of geometry, mounting requirements, weight requirements or budget, so a custom unit has been designed and manufactured. The casing was machined by J&R Aerospace, and the rack and pinion teeth have been cut by Gear Cutting & Manufacturing. We will be experimenting with aluminium rack and pinion gears, in an attempt to further reduce weight.

<http://www.gearcutting.com.au>

<http://www.jnr-aerospace.com.au>



MONASH MOTORSPORT

FEATURED SPONSORS

Box Hill Institute/Chisholm TAFE

The ability to manufacture to parts for the car is absolutely essential, and is only possible thanks to the support of Chisholm Institute (Frankston), and Box Hill Institute.

All of our team members attend weekly sessions, where we learn skills in CNC machining, and welding manual machining, and general manufacturing practices. The process of completing a part from clean sheet design right through to manufacturing and fitting to the car provides invaluable skills to team members, and gives a much better understanding of the procedures involved, so making for better designs in the future.



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