



Greenpower

INSPIRING ENGINEERS

St Paul's Racers "On a mission"

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St Paul's Racers at the Southampton University RJ Mitchell Wind Tunnel

Following the Greenpower Final last year, one of our cars Zytec Aero, which finished 11th won the University of Southampton's Aerodynamics Innovation Award with the prize of a day in their full scale wind tunnel set for 10th March.

The RJ Mitchell wind tunnel is a closed recirculating type and has a large 3.6m x 2.5m working section with a maximum speed of 50m/s. The control room provides very sophisticated control over the 1000hp fan along with sensors on the car to measure both drag and side force.

We arrived with nine of the St Paul's Racers team around 10.00am and set the car up in the wind tunnel ready for the first test run. Measurements were taken at four different wind speeds of 10, 15, 20 and 22 m/s equating to 22, 33, 44 and 50mph to ascertain the forces acting on the car with a driver installed. The measurements included drag forces which when combined with the air density, wind speed and frontal area of the car produce the drag coefficient.

Having ascertained the drag coefficient for the car we then set about introducing a range of ideas we thought may lower the drag. Each was introduced in turn to see the effect for better or for worse. This resulted in over 12 different test runs being carried out through the course of the day. Some of our ideas which instinctively looked like they should lower the drag coefficient actually made it worse so they were quickly discarded! Other ideas made a significant improvement over the "standard" car as did the driver's position both in terms of height and relationship to the cars bodywork. This has now led us to put in place further changes to the cars design after which the car will probably hit it optimum performance in terms of drag coefficient.

We were very pleased to find out that the design of the car had very little turbulent flow around any of it notably at the rear end where often turbulent flow will cause additional drag. Our previous modifications including the new windscreen visor and cowls over the steering mechanisms on the front wheels that are outside the bodywork really had made a positive difference to the drag and again removed much turbulent flow. Over the course of the day we managed to reduce our drag coefficient by some 14.5%.

Having learnt much about how air acts around the car across a range of wind speeds we are now thinking about a possible new design that would take us to the next level of lowering drag and still complying with the Greenpower F24 rules.

At the end of the testing session in which all the drivers got a turn in sitting in the car during the test runs, we all got the chance to stand in the wind tunnel whilst the wind speed was increased up to 33mph. Many of us were doing excellent impressions of Michelin Men whilst still remaining on our feet!

We would like to say a big thanks Dave and Mike who run and operate the wind tunnel at Southampton University for a great day which has proved so informative to us all.

To any other Greenpower Teams, if you win the Aerodynamics Innovation Award, get yourself down to Southampton, it will be worth your while!

Some photos taken on the day are on the next pages.



