

Scalextric4Schools Challenge 2012 – The Finals

To say that Scalextric4schools is going from strength to strength doesn't really do it justice. In 2012 it has introduced yet more innovation and is certainly breaking new ground in going International. 9 teams of students of 11 to 17 years of age, from all over England, Scotland and Russia!! competed in the 2012 scalextric4schools finals held on 24th June at the RAF Museum, Cosford, for the second year in succession.

Scalextric4schools is a partnership between PTC, Hornby Hobbies Ltd. and PTC reseller Root Solutions. The aim is to provide schools with a low cost, exciting design, make, race challenge to encourage more pupils to consider STEM (Science, Technology, Engineering and Mathematics) careers.

Teams had spent almost a year working on their designs which was clearly evident in the performance of the cars on the track. The judges all said how much they enjoyed meeting the teams and seeing their presentations, but they found it very difficult to mark such a variety of work.

The 2 teams from Russia, attending for the first time, had been helped by their reseller, IRISOFT, from St Petersburg. "They have done masterclasses in the use of PTC's Creo design software to get them started," says Tim Brotherhood, PTC's Curriculum Development Manager in the UK. "But because of limited manufacturing resources in house they had help from a school in Lancashire, Our Lady Queen of Peace Engineering College, who helped them with manufacturing. They also had cars rapid prototyped in North America and at a commercial service bureau for rapid prototyping in St Petersburg. They even had a masterclass in rendering by videoconferencing from Mark Fisher of PTC in Canada, so they really exploited every aspect of the PTC worldwide network."

In all 12 people travelled from Russia, three teachers, Olga Shartukova from IRISOFT and eight students in 2 teams of 4. There were teams from as far north as Angus in Scotland, Forfar Academy, and all over England.

Scalextric4schools continues to attract high calibre students to the engineering disciplines and almost as many girls are involved as boys, combining as it does the academic engineering aspects as well as the more craft oriented manufacturing side. This coupled with the element of fun, which is quintessentially 'Scalextric', and the competition between schools, continues surprise and delight the judges every year.

"This year there was more emphasis on simulation than previous years," says Brotherhood. "And we had members of the Russian teams writing Creo Apps to automate some of the geometry generation."

Three things stood out this year. "The quality of engineering in the cars had made a major leap forward and 2 of the Russian team members had explored aspects of Creo we had not seen from schools in previous years," says Brotherhood. "One had used the surfacing tools in Creo to create a very aerodynamic body shape inspired by Lamborghini, and the other had programmed a new command in "C" to auto-round parallel edges. I have never seen this level of work before from a school."

The judges also remarked on the innovative designs, quality of manufacture and clever use of Creo 3D parametric modelling software. Many people commented on the professionalism, cooperation and support offered within and in some cases between teams.

The racing was very close with skilled driving and clever tuning to extract the last ounce of performance from the cars.

The numbers were slightly down this year, but the quality was way up. According to Tim Brotherhood this was probably due to curriculum changes at government level and the lack of support for what government considers to be non-core subjects. Currently it looks like DT (Design Technology) will remain as part of the National Curriculum but things are far from certain at the moment. Because of these changes at government level, teachers are increasingly finding it difficult to get out of school to cover extra curricular activities.

Consequently most of the scalextric4schools activity is happening in the classroom during the normal school day, which tends to limit the time the students can spend developing their projects. Some schools in have managed to form after-school clubs, which gives them more flexibility.

“We still have the Scalextric F3 circuit, but this year Hornby has redesigned the layout. It is now fully landscaped and instead of a figure of eight in one plane, it is now a figure of eight with elevation and crossover,” continues Brotherhood. “This circuit came as a surprise to all the finalists as they had been designing and testing on the planer version of this circuit. There is also a high-speed straight line track with electronic timing to find the fastest entrant. The students can design separate cars for the circuit and the high speed track or have a single car capable of accommodating both layouts. The new F3 circuit is a bit more of a challenge for the car and the driver because of the elevation changes.”

The high-speed track is sponsored by the Bloodhound SSC project and involves land speed record attempts on a 40 m track. This was managed on the day by Chris Jarman and David Eyre – former teachers at Edgecliff school, Staffordshire, who came up with the idea of developing a slot car competition for schools and allowing PTC to develop their concept into what is scalextric4schools today.

“Some of the cars are approaching 30 miles an hour real speed which equates to somewhere in the region of 600 to 700 miles an hour, scale speed,” says Brotherhood. “There are Mathcad sheets available for the purpose of calculating the scale speed.”

Scale Speed is a tricky concept to grasp as there are various ways of calculating it. The Scalextric car is a one 32nd scale model so by multiplying the actual speed by 32 gives you scale speeds in the region of 700 - 900mph. But this simplistic approach does not allow for things that cannot be scaled like friction, air resistance and air pressure. A more realistic approach is to use Foulds constant in the calculation producing something like 400mph and if you go down the more complex Reynolds number route where air temperature, humidity and air pressure are measured it produces a more realistic 275mph. “The beauty of this is that the students are exposed to the details of calculating scale speed,” says Brotherhood. “It's not a simple multiplier and it also allows everybody to use the facilities offered by Mathcad to do the calculations. You can't scale the density of air so the variation in the calculation is quite revealing for the students.”

The speed is measured by using an overhead high intensity halogen lamp with a light sensor built into the track, so when a car cuts the beam over a measured distance it is easy to calculate the speed.

Each team as usual has to present their project to the judges. Tim brotherhood acts as the scrutineer to make sure all teams comply with all the rules and each team is assessed on

their performance in each section and marks are awarded for the various sections, so it's not just about making the fastest car.

As far as scrutineering is concerned all the teams passed with flying colours with the exceptional a few missing logos for the sponsors.

Every year the standard seems to get more professional for instance the team from Forfar Academy had a stand which could rival a CAD tradeshow exhibit rather than the pit garage/workshop it was intended to be.

"The Russian teams have done particularly well and they have learnt quite a lot in a very short time," says Adrian Norman, Scalextric, Promotions Manager. "This is their first exposure to this level of competition and their cars 'straight out of the box' were a little shaky, but after some practice and fine tuning they are as good as the others. They realised what was wrong very quickly, they made adjustments and then more tests and they are now running very well and they are posting good times."

"We decided to change the layout of the circuit for the final just to add an extra unknown element and to spice things up a little," continued Norman. "They have been testing on the standard scalextric4schools circuit and the first time they saw this one was when they walked through the door this morning. Introducing an unfamiliar circuit hopefully levels the playing field because, we know there are some teams that are more familiar with this competition than others. Requiring everybody to modify or tune their car for this new circuit has a very levelling effect and it also corresponds to what happens in normal motorsport practice"

"Every year the standard just goes up and up. Some teams are coming for a second or third time and every year they manage to improve the way they approach things," says Roger French of Root Solutions, "Some of the tools they are using is quite impressive too from CAD to manufacturing. Forfar Academy for instance has a laser cutter in school. They even produced a marketing flyer and a press release such is the level of sophistication with these teams today. The Russian teams are doing very well considering the length of time they've been working on the project and the way they cope with presenting in a foreign language is very inspiring. They are giving technical presentations in a foreign language. One of the team members even produced a Creo App 'bolt on' in C to automatically put rounds, on the geometry as it was entered. This is quite a task for a professional user, let alone a student. They also did some surface modelling of the car body, again very advanced for a student user. The car that they produced was by far the best body shell design and it would not look out of place in a retail outlet."

"The Russians have a very well engineered product and it's impressive that they made the commitment to enter the competition and also to come to the UK to compete," continues French. "They only started less than two months ago, so they've come very long way in a very short time. The students actually gave their design presentations without their teachers being present, which was impressive in its own right. They are also using the latest release of Creo, which was released more or less at the same time they started the project. The venue is incredible and they are very supportive -- they actually fielded a local representative on the judging panel."

"This is my first time here," says John Stuart, Senior VP, Global Education, PTC. "The venue is awesome, and seeing the enthusiasm of the students is very impressive, they are doing a great job in designing and manufacturing their own race cars. The Russian entry

just shows another level of commitment to the project and demonstrates that all over the world students are interested in science, technology and math.”

“To make this kind of program as successful as it is, requires significant commitment from all concerned, not just to students, but their families and the teachers,” continues Stuart. “You need academia, government and industry to support these kinds of programs otherwise they are not sustainable. We have exactly that in the UK with Hornby and Root Solutions supporting this program from the outset.”

Fittingly, the scalextric4schools circuit was positioned alongside the one-to-one scale model of a Supermarine Spitfire that James May and some local schoolchildren made for one of his TV programmes. James May is a fervent supporter of Scalextric and scalextric4schools.

“The highlight for me is having a consortium of teams from Russia, Scotland and all over England,” says Stuart. “And to see the students design and build world-class slot cars using PTC design and manufacturing technology and be able to compete on the world stage. “

“The entry from Forfar Academy is not only integrating CAD and CAM but they have also looked at marketing and communications,” says Stuart. “They are responding to real-world challenges, they learn conflict resolution and what it's like in the real world to design and make products in a short amount of time and it's fun too. And when they come together from all parts of the globe to compete they learn so much from each other.”

“We are always looking at ways to do this better and it would be really great to replicate the European experience across the world and have a truly global Scalextric4schools challenge,” says Stuart. “With Creo the software is a lot more accessible to the students. Much more Microsoft friendly and really intuitive to use. The students don't seem to have any ceiling to what they can learn. The ingenuity is quite amazing too they are always thinking of innovative ways to overcome the obstacles and because they are fresh enquiring minds and their solutions are only limited by their imagination.”

“The venue is a perfect, the kids are great, what's not to like about scalextric4schools. RAF Cosford has been a great host and the parents are incredibly supportive. All round a great day,” concludes Stuart.

The Winners

Category	Winner
Furthest travelled	Teams from #30 School, St Petersburg, Russia Wing Commander Niall Griffiths presented the school with a print of Spitfires signed by sponsors, partners and keynote speakers.
Best engineered	SKEM DM – Our Lady Queen of Peace Catholic Engineering College, Skelmersdale, Lancs
Best Presentation	PM Ladoga – School #30, St Petersburg, Russia
Fastest F3 car	WRC – Wootton Upper School,
Bloodhound SSC Land Speed Record	Leek & Potato Soup – Leek High School
Overall Winner	The Gauntlet – Forfar Academy

All winning teams were presented with a signed certificate and a Scalextric set donated by Hornby/Scalextric. All pupils taking part were presented with individual McLaren MP4-12C

Scalextric cars donated by Hornby/Scalextric. All teams who took part in the finals were also presented with a selection of gifts by the RAF Museum.

(2,315 words)

Editors Notes

About Hornby Hobbies Ltd

Hornby is a household name and is famous as the UK brand leader in the model railway hobby. It started as Meccano Ltd in 1907 making the world famous construction kits for children. Hornby introduced toy trains in 1920. Hornby Trains were powered by a high quality clockwork motor, made of metal pressings held together by Meccano nuts and bolts, and 'O' gauge in size. Hornby is owner of the Scalextric, Airfix, Humbrol and Corgi brands and has been a long time PTC user.

Hornby supply the standard parts for the cars including: motors, gears, pick-ups, wheels, tyres and axles. They also supply a track for testing. All these components are available at cost price, so that a complete car costs less than £5. Information downloads and links to purchase parts and track are available on: www.scalextric4schools.org

About Root Solutions

Root Solutions Ltd is the UK's leading Reseller for PTC products. Founded in 1992 and based in Cambridge, England, the company specialises in implementing PTC CAD/CAM/PDM systems in hundreds of companies across the UK and providing technical support for their design departments. Hornby is one such customer that uses PTC software to design its world renowned range of Hornby Railway, Scalextric and Airfix products.

About Creo Schools Edition

The functionality in the Creo Schools Edition will give students invaluable experience to prepare them for an engineering course in college or for a job in engineering straight out of school. This package is developed from Pro/ENGINEER Wildfire, which includes static and kinematic analysis software for the classroom and the students' home-use, training opportunities provided by PTC professionals, classroom-tested materials, and customer support. It is designed to be used as a curriculum aid in mathematics and science as well as in design and technology classes. Teachers can find out how to get the software at www.cadinschools.org

About PTC

PTC (Nasdaq: PMTC) provides discrete manufacturers with software and services to meet the globalization, time-to-market and operational efficiency objectives of product development. Using the company's CAD, and content and process management solutions, organizations in the Industrial, High-Tech, Aerospace and Defense, Automotive, Consumer and Medical industries are able to support key business objectives and create innovative products that meet both customer needs and comply with industry regulations. For more information on PTC, please visit <http://www.ptc.com>.

Other Supporting companies and schools

Boxford who provide help with manufacturing equipment.

C R Clarke who provide help with thermo forming and manufacturing equipment.

Data Harvest who provide the land speed record timing equipment.

Dimension and Bits from Bytes for rapid prototyping designs for schools.

Schools who manufacture components and cars for schools without their own equipment – Frankley CLC, Oakham School, Gateshead CLC, Haywood Engineering College. Our Lady, Queen of Peace Engineering College, Edge Hill College.