

Engineering Update

March 2010

This term's newsletter focuses on our industrial links. These have taken a variety of forms ranging from industrial visits, visiting speakers, link engineers, Science and Engineering Ambassadors and placements for student work shadowing.

These links enable students to develop their understanding of the engineering industry, whether it be a company's organisational structure, career paths they can follow, typical working environments or specific technical practices. Such experiences are invaluable and place the students' studies for the diploma, GCSE, Key Stage 3 or extra-curricular, within a true applied engineering context.

We would like to renew our thanks to all our supporters. Special thanks go to London Biggin Hill Airport, Renault Orpington and Coca-Cola Enterprises Edmonton who have supported us for the first time this year.

Jenny Wright: Head of Engineering

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HIGH FLIERS AT
BIGGIN HILL



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WISE EVENT



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AND MORE...

BIGGIN HILL AIRPORT WELCOMES DIPLOMA STUDENTS

Diploma students were recently given the opportunity to visit London Biggin Hill Airport thanks to airport staff and the Bromley Education Development Centre (EDC).

The visit was designed to tie in with the engineering maintenance unit of the Higher Engineering Diploma, providing students with a first-hand view of the facilities involved in the ground maintenance of both jet aircraft and smaller piston-engined planes.



Serving both the business and general aviation sectors, the airport is a major employer in the Bromley area, and a tour of the airport revealed a fascinating history as well as a diverse range of supporting facilities.



Students visit a jet aircraft
maintenance facility

With passenger services at the airport limited to air taxis, corporate shuttles, private charters, VIP and government missions, the visit provided a fascinating insight into the travel habits of the rich and famous.

More information on the airport and its facilities can be found at www.bigginhillairport.com.

YEAR 10 WOMEN IN SCIENCE AND ENGINEERING (WISE) EVENT

Thank you to Georgie Luff and Helen Hoang in 10G for being our reporters for the day and preparing this page for the newsletter.

During enrichment week this term year 10 students took part and engaged in activities to boost their knowledge of the women's role in science and engineering industries. This included several well known companies coming in to share their experience and expertise with the girls.

challenges that had been set out by the companies and many were surprised by how engineering really is.

The day was a great success thanks to Miss Turley's organisation and planning. It would not have been the same without the cooperation of all the companies that kindly gave their time to us.

The students thoroughly enjoyed taking part in hands on

The Day

Smallpeice Trust

We were lucky enough for Thea Hill from the Smallpeice Trust to visit the school to take part in the women in science and engineering day. She set us with the task of building a model wind turbine from a limited supply of cardboard, gears, glue, scissors and wooden sticks.



Although the task was extremely challenging, many of the girls were surprised with how fun it turned out to be.

We were given a real taste of an engineering vocation, as some members of the teams were given the responsibility to take care of the financial side of the project, whilst others were involved in the building and the rest were either designing or altering the turbine.

Doosan Babcock

Doosan Babcock is a global energy company that deals mainly in building power stations.

Their challenge for us was to plan out a programme of energy supply to meet the demands of UK consumers in the future. This plan included scheduling the building of new power stations, wind farms etc. It made us realise how difficult it was to consider both the financial and environmental costs of producing energy needed to supply our lifestyles.

The aim of their visit was to encourage young women into considering an engineering future, and by setting us such a compelling and thought provoking assignment we are sure that they have inspired some of us.

"Aeroplanes to zombies (with a detour around gekkos)"

This year we were extremely fortunate for Dr Kathryn Harkup from the University of Surrey to give us a stimulating lecture on the widely varied aspects of engineering. I am sure that although the girls were looking forward to it, no one expected it to be as interesting and unusual as it was. Many of the girls were quite astonished at how diverse the topics that engineering and science can cover. (In fact some were quite strange and unexpected, e.g. gecko gloves and zombies!)

"My favourite part of the day was the lecture at the end; it definitely opened my eyes to engineering and made me laugh!"
Elena Glynn

"It gives you a great sense of achievement to design and build a product completely independently."
Alice Stell

Rocket Workshop

This workshop delivered by Kathryn Harkup provided the students with the challenge of designing a balloon rocket. The rocket, constructed from a single balloon, paper and sellotape, was required to travel as far as possible upward along a wire connected between the wall and the ceiling of the classroom.

Newton's laws of motion and aerodynamics were some of the principles discussed before design commenced. Following launch the performance of the rockets was evaluated. Issues discussed included the compromise between the need for reduced weight to increase speed and distance and the requirement of fins for rocket stability.



Buildings Made Of Everyday Objects

Spaghetti-Marshmallow Towers

Ramboll set us the challenge of making a freestanding tower with the specification that it must be made from spaghetti and marshmallows only. The tower also had to withstand the weight of a pack of cards.



It sounded simple at first but we soon found out just how vital the planning was.

Straw and Pin Cheese Grater Building

Our session with Bovis gave us a greater understanding of how important planning and estimating is in the construction industry.

We were told to estimate how many straws and pins we would need to replicate the Cheese Grater Building before we made it, and the team that estimated the closest won.



Work shadowing shows the way for future Engineers

Work shadowing is an activity whereby year 12 students spend a week shadowing the activities of an employee at their chosen company. Organised by the students themselves, this activity took place in mid-March as part of Enrichment Week. The following accounts are written by three members of the school's Engineering Society.

Lily Webb: Mott MacDonald



Mott MacDonald Group is a management, engineering and development consultancy spanning 120 countries with a male to female employee ratio of 70:30.

I was based in the Oil, Gas and Petrochemicals Division and shadowed a Chartered Civil and Environmental Engineer. This sector has worked on many projects (most of which are based overseas), including the Cawthorne Channel Gas Gathering, the Itai Gas storage project and Petroleum products storage in the UAE. One of the most interesting meetings I attended was a teleconference with employees of Mott MacDonald from various locations around the UK, Hatch Mott MacDonald, (Mott MacDonald's American Counterpart) and their client, Exxon-Mobil (an international oil and gas company) discussing work on a gas storage project in Iraq.

I learnt a lot about the structure of projects, Front End Engineering Design (FEED) and bidding for work. I was also introduced to many of the safety aspects that affect each project, and the overall systems that make sure that projects stay to budget and on time.

Working at Mott MacDonald has definitely strengthened my interest in Engineering, and I was made to feel very welcome during my week, however I am unsure whether I will pursue an engineering career in the Oil, Gas and Petrochemicals sector.



Supriya Gopinath: Davy Process Technology



For my work shadowing, I went to Davy Process Technology, a chemical engineering company based in Paddington. Chemical engineering involves taking small reactions that happen in the lab and converting them into large-scale plants that generate millions of tonnes of products.

The engineers I worked with created the basic design of chemical plants, helped license new technologies, develop new process routes and commissioned their plants. Since a lot of their work is based overseas in places such as China, Saudi Arabia, USA, Alaska and Indonesia (just to name a few!), it was obvious to see that there were many opportunities to spend anything from a few weeks to a couple of months abroad, commissioning a plant.

My experience was really stimulating as I was lucky enough to be taught a lot of theory and information that I would typically learn in the first year of my degree and I could then use this to simulate small situations that reflected their day-to-day work.

The atmosphere was so accommodating and the people were very friendly; the week really helped to clarify my career decision as I could easily visualise myself in the industry after university.



Liz On: Ramboll



During my work shadowing week, I shadowed a structural engineer at Ramboll. The company originally specialised in structural engineering, however the company now specialises in infrastructure & transport, environment & nature, energy & climate and oil & gas.

Some of the projects the company has been involved in include Lloyds TSB Headquarters, Emporio Armani refurbishment and parts of Greenwich Millennium Village.

Typical qualifications to get into structural engineering are: GCSEs -> A levels/B-tech -> BEng/MEng -> MSc/DIC/MPhil. Prospects for women entering this type of work are equivalent to men, however during my work shadowing, it was mainly dominated by men.

Throughout my work shadowing, I was kindly invited to a construction site to see the new Louis Vuitton store at New Bond Street, which was to be completed by May. My mentor then required me to produce a model of the building by reading from an engineering plan. This consumed most of my time, but it was worth seeing the end-product of the model I produced. I also produced sketches of buildings in general and produced a PDF Heritage Profile document for the English Nature.

My whole week was thoroughly enjoyable, because I learned some skills valuable to a structural engineer, such as how to read an engineering plan. I highly recommend anyone who is interested in structural engineering or sustainable engineering to apply to Ramboll. The workers there can also provide guidance on how to enter the engineering workplace, as they have been through the process to get to where they are now!



'COKE IS IT' FOR NEWSTEAD STUDENTS

In February this year, a group of twenty year 10 and 11 students studying either the Engineering Diploma or GCSE Systems and Control visited the Coca-Cola factory in Edmonton, North London.

The visit commenced with a presentation on the wide range of soft drinks produced by the Coca-Cola organisation, along with the logistics of producing and distributing these products nationwide. A tour of the factory followed, allowing students to view several highly automated production lines.

As well as the traditional glass Coke® bottle, PET bottles are extensively used and during the tour we were able to see the complete production process from the manufacture of the PET plastic bottles from a pre-form, their filling, labelling and final packaging.

The tour concluded with a brief visit to the factory's warehouse facility in which the storage and retrieval of palletised bottles is completely automated. Apart from its enormous size, the facility was strikingly cold and dark – made possible by the total absence of human operators.



Our thanks go to Coca-Cola for making this visit possible.

Coca-Cola Welcomes Systems & Control and Diploma Students

STUDENTS RISE TO THE RAPID RESPONSE CHALLENGE

In Enrichment Week, year 9 students discovered what it is like for a Civil Engineer involved in providing relief to a natural disaster. The theme was the Haiti earthquake. The morning was spent in looking at the multitude of problems that need to be solved quickly, such as how to get fresh water, food and medical supplies to where they are needed. The girls worked in teams of 6 or 7 to plan and present how they would set up an emergency camp.



Students plan and execute their disaster response

In the afternoon, we moved outside to build shelters and watercourses from a limited supply of materials. Both were tested rigorously. The standard was very high, although a slight dampness of some shelters at the end of the day suggested that not all shelters were as watertight as might have been hoped!

The event was enlivened by a group of Civil Engineers from Northern Ireland, who joined in the activities and talked about their own experiences. As one of them pointed out, Civil Engineering is an exciting career, in which no two days are the same. There is room both for those who prefer to plan behind the scenes and for those who like to be on site in a hard hat.

The challenge was a great success, despite the cold, with girls working with enthusiasm and determination. We would like to thank Ravi Azad who led the activity, along with his teams, for making these events possible.

IN BRIEF

Venice Engineering Trip

Students from Newstead Wood will join those from four other specialist engineering schools for a Venice Engineering Trip taking place at the end of March. The aim of the trip is to provide an opportunity for students to learn about engineering solutions to climate change and experience cutting edge technologies. The trip will include visits to Telecom Italia National Centre, the Guggenheim museum, the Mose Flood Defence System and the Murano Glass Factory. The students will also be given the opportunity to learn about Venice's history and culture through a boat tour of the city.

Engineering Education Scheme

December last year saw two teams of five Newstead students attend the three-day workshop held at University of Kent, Canterbury as part of the Engineering Education Scheme (EES). Working under the guidance of engineers from Defence Science and Technology Laboratories (DSTL) the teams worked on their projects for this year, which are "an environmentally and user-friendly lighting system" and "an extendable lift with an overweight warning". Teams are currently working towards the Celebration and Assessment Day which is to take place at Canterbury on 22nd April. Once again, our thanks go to DSTL for their support.

Visit to Renault Workshop

In February year 11 diploma students visited the Renault service centre on Station Road. Here they gained an insight into the world of maintenance and the systems that Renault have in place to ensure customer satisfaction. The students also observed how computers were used as a diagnostic tool and how their introduction has impacted on the work patterns in the service department.

The Diploma- Sharing experiences

Newstead students continue to fulfil the role of ambassadors for the diploma qualification. As well as speaking about their experiences at the SSAT Engineering Conference in February, Sorcha Stokvis and Jessica Salisbury visited Rugby High School to talk to year 9 students and parents who were being introduced to the higher level qualification for the first time. Newstead continues to host visits to share experiences of the qualification. These have included visitors from Westminster LEA, The Independent newspaper and St. Saviour's & St. Olave's school, Southwark, to name a few.

Shell Eco-Marathon

The Shell Eco-marathon team are still on schedule to enter the competition in June. The chassis is now complete and materials have been procured to enable manufacture of the running gear. We would like to thank Peter Fagg, our Science and Engineering Ambassador, for his invaluable support with this project.