

Rising stars
Changing the face of engineering

Starting out
Deciding which route to take

Back on track
The positive impacts of a career break

MEDIA PLANET

No. 1 / Nov '12

WOMEN IN ENGINEERING

BUILDING A BETTER FUTURE

'Every day is different with new challenges'
Kate Cooksey talks about why she loves her job as a senior tunnel design engineer

PHOTO: PROVIDED BY MORGAN SINDALL

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YOUNG WOMAN ENGINEER

Join us as **Gabby Logan** presents the IET Young Woman Engineer of the Year Award winner 2012 6th December 2012 ■ IET London: Savoy Place

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CHALLENGES

Although engineering has traditionally been, and remains, a male-dominated profession, **it is encouraging to note that there has been a gradual increase in the number of female entrants over the past 30 years**, says Jon Prichard, CEO of the Engineering Council.

Encouraging gender diversity in engineering

Looking at the annual registrant statistics produced by the Engineering Council at each year end, we can see that there were a total of 585 females professionally registered as engineering technicians, incorporated engineers or chartered engineers in 1984, a figure that rose to 9,228 at the end of 2011.

So the line on the graph continues to move in a positive direction, albeit slowly. Sadly, with only 8.7 per cent of professional engineers in the UK being female, we do still have the lowest proportion in Europe.

Untapped potential

→ I'm sure we all agree on the importance of maximising the recruitment and retention of more women in engineering. With the number of economically active



Jon Prichard,
CEO, Engineering Council

16 to 64-year-olds set to fall by 6 per cent between 2010 and 2035, and 23 per cent of the UK population over retirement age, we need to be creative in finding people to fill the void. Women are an obvious source of untapped potential.

Worrying statistics

→ The Engineering UK report for 2012 found, when looking at the primary activity of employers of

first degree qualifiers by gender, that there is a disappointing imbalance. Nearly two thirds of men (64.9 per cent) find employment with an engineering and technology company, whilst for women the figure is just 46.9 per cent.

Changes ahead

→ So there is still a lot of work to be done, both in ensuring a healthy pipeline of girls studying Science, Technology, Engineering and Maths (STEM) subjects, and in reducing the numbers of qualified women who choose not to work in the profession. Only by addressing these issues will we encourage more women to embrace the interesting and fulfilling careers provided by the engineering profession, which in turn will help to fill the anticipated skills gaps and deliver future economic prosperity.



WE RECOMMEND



Roma Agrawal,
Senior Structural
Engineer,
WSP Group

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'The most exciting part is seeing your ideas turn into a real, usable object that people admire everyday'

MEDIA PLANET

We make our readers succeed!

WOMEN IN ENGINEERING
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The roles and achievements of staff who have taken part in the scheme are testament to its success. Examples include one former trainee who has gone on to become facility manager of a major manufacturing facility. Another of our engineers who joined the company through the graduate scheme went on to become the youngest woman ever to be made a Fellow of the Institution of Mechanical Engineers. The number of successful female applicants has more than doubled in the last year.

"I have an aunt who works on site already, and I'd heard good things about AWE. Given the current economic climate, it made sense to get some skills that will be practically useful and stand me in good stead."

"The plan is to stay here after I qualify, and I think I'd be interested in pursuing the design and planning aspects associated with engineering."

"So far the course is going great, and my tutors are always on hand to answer questions. It's been everything and more that I would hope to get from an apprenticeship."

AWE's **Shan Martin**, Director Human Resources, said: *"I am proud to be part of a forward-thinking organisation where excellence and innovation are actively encouraged. We have some outstanding people at AWE who are great role models for women in engineering."*

We have many women on site who have jumped at the chance to take an engineering related career path at AWE. Here is what one of them has to say:

Samantha McRae (Mechanical Apprentice), 19, joined in 2011 and is in her second year of a mechanical maintenance apprenticeship.

"I chose engineering because well, my dad is an engineer and so was my grandad. I thought if they could do it so can I. I didn't know whether I'd like it when I first joined, but I've now found out that I love it. I love being able to tackle a job and be hands-on. It has helped me with things around my house and I have developed better people skills."

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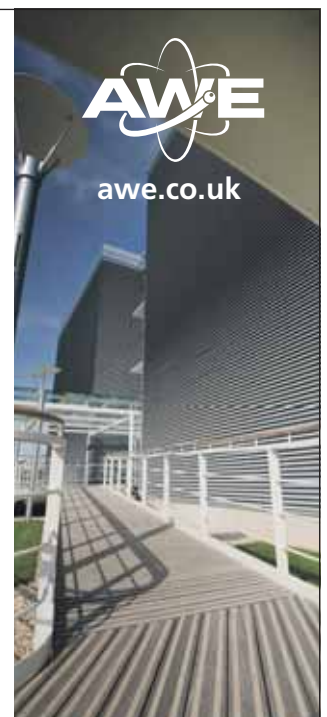
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NEWS

Question: Why do so many female engineering graduates not work as engineers?

Answer: Outdated stereotypes and a failure to sell the positive aspects of the profession hold them back.

COMPANIES MUST STRESS CREATIVITY AND SOCIAL USEFULNESS

■ Outdated stereotypes and dinosaur working practices are dissuading thousands of female engineering graduates from entering the profession.

Whilst 17 per cent of engineering students at UK universities were female in 2010-2011, research shows only 6 per cent of professional engineers are women. The problem is common to all science subjects, especially engineering. The UKRC, which campaigns for

gender equality in STEM subjects, says two thirds of female science graduates don't work in jobs requiring the qualification.

Helen Wollaston, UKRC director, said: "There's a problem attracting women for several reasons. First, the oily rag image is hopelessly outdated. Engineering jobs are far more technical now and companies need to emphasise their creativity and variety. For example, art and design can be combined with engineering in software engineering.

Rewarding and socially useful

"Another factor is that a lot of women want their work to be socially useful. To attract women, firms need to showcase how rewarding these jobs are. For example,

engineers tackle famine through irrigation, or battle climate change in the renewables sector."

Working environments at old-fashioned, male-dominated engineering companies can also repel some women. "There can be practical barriers, such as long hours and working away from home. Not enough companies offer part-time, or flexible working," she said.

Pursuing progressive policies

The good news is many engineering companies are pursuing a progressive approach. Engineering giant Arup, for one, has 10,000 staff across the world and 35 per cent are female. At leadership level, 15 per cent are women. "For business reasons they want to attract the best

from a small pool of female engineers. Their top-down approach shows what can be achieved with commitment from the top."

Meanwhile, the much smaller ground engineering firm Card Geotechnics (CGL) has been listed for a UKRC award for its female-friendly approach. It has 22 technical staff, nine of whom are women.

"Some small companies say they can't afford change but CGL proves that's not true. Their CEO has introduced policies such as flexible working. They are the first SME to achieve our SET Fair Standard and more companies should follow their lead."

DAVID SMITH

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Helen Wollaston,
Director, UKRC



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The hidden value of civil engineering

The great value of civil engineering to society is underestimated, argues tunnel engineer Kate Cooksey, because the work is largely unseen.

SHOWCASE

Senior tunnel design engineer Kate Cooksey from Morgan Sindall had a Eureka moment which brought home to her the great social benefits of civil engineering. It came beside the river Mersey in Liverpool where she was working on a flood relief scheme to remove properties.

“I was afraid residents would resent our presence but when I told one woman what we were doing she was overjoyed that she would no longer have to bucket out her neighbour’s water. I’ll never forget how happy it made her. People often think of construction as being negative, but it’s there to help society,” she said.

Taken for granted

Cooksey, 28, treasures the memory because she is aware that most people have no idea of the practical value of civil engineering. “When I talk to kids in schools,

they know engineers build roads that take them to school, but not that they can’t brush their teeth, or take a shower without infrastructure built by engineers. Civil engineering is unseen so people take it for granted.”

The unseen aspect is especially true of Cooksey’s area of expertise, tunnelling. “Take the London tube. People have no idea how it got there, but they know it makes life easier,” she said.

New challenges every day

Cooksey joined Morgan Sindall in 2002 as an undergraduate civil engineer. In 2008 she set up the British Tunnelling Society Young Members Committee, and has also helped set up the first MSc Tunnelling and Underground Space at Warwick University. She became a chartered engineer this year.

She is currently working on the designs for Crossrail projects with responsibility for £45 million of instrumentation and monitoring requirements. “I love it. I’m working with lots of multi-disciplinary teams. Every day is different with new challenges,” she said.

DAVD SMITH

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We are the Daphne Jackson Trust

We are the only UK organisation solely dedicated to returning Scientists, Engineers and Technologists to their careers

The trust arranges fellowships that are normally held for two years, part-time and are based at a university or industrial laboratory throughout the UK.

Fellows carry out a supervised research project and individually tailored retraining programme. The fellowships are offered to those wanting to return from a career break of two years or more. They are designed to significantly increase employability and remove the disadvantages associated with a career break. Please see the website for more detailed eligibility criteria.

For more detailed information on these opportunities please email djmft@surrey.ac.uk

We currently have the following sponsored fellowship opportunities:

- **University of Huddersfield – half sponsored fellowship in engineering**
- **University of Edinburgh – half sponsored fellowship in the College of Science and Engineering**

Daphne Jackson Trust



We welcome organisations wishing to be active in the diversity agenda by sponsoring or hosting Daphne Jackson Fellows

See our website www.daphnejackson.org or contact us on 01483 689166 to find out more information

INSIGHT

Poster of her favourite car inspires engineer's career



Kalpana Gosai,
Chartered Engineer,
Jaguar Land Rover

■ **Question:** How did Kalpana Gosai develop a love of engineering?

■ **Answer:** A poster of the Jaguar XJ220 showed her engineering could be beautiful.

Chartered engineer Kalpana Gosai's love of science and engineering was inspired by watching science-based TV shows like Tomorrow's World, Why Don't You and Doctor Who as a child. She vividly remembers an experiment with shrinking empty crisp packets. "The packets were made with biaxially oriented polypropylene. What a fantastic material!" she says.

Her love of fast cars came early, too: "I loved watching F1 and pretending that I could travel at speeds unheard of in everyday life." Other childhood influences include the gadget-laden cars of James Bond and Simon Templar.

But the defining moment was

seeing her brother's poster of the Jaguar XJ220: "It ended up on my bedroom wall. I was drawn to the car's beautiful lines — it was like art! So it's a happy coincidence I've ended up working for Jaguar Land Rover."

A huge variety of roles

Gosai works in Advanced Research Hybrids and Electrification. "I'm working on an exciting project to innovate in the area of plug-in and electric vehicle charging. Working in Research & Development allows me to be creative and inventive."

Her role involves more than engineering. She liaises with

specialist colleagues, academics, suppliers and global policymakers.

Gosai's journey from trainee to R&D demonstrates the huge variety of jobs available to engineering graduates.

As a trained materials engineer, she started in Product Development. She engineered leather, luxury fabrics and interior plastics materials to withstand a diverse range of global environments. These materials were integrated into luxury interior components and systems including console, seats and safety restraints.

Her next role was in Quality Strategy, carrying out internet surveys in several languages,

including Chinese and Russian, to evaluate what customers liked.

She developed strategies around marketing models including the 'Kano Model'. This is based on a theory developed by Professor Noriaki Kano, defining how product engineering leads to features that excite, satisfy and delight customers.

Throughout her time at Jaguar Land Rover, the company has supported Gosai's part-time study for an MSc in Engineering Business Management. Her journey continues.

DAVID SMITH

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Back on track after a long career break



Rebecca Ward,
Engineer

■ **Question:** Can women recommence engineering careers after long breaks?

■ **Answer:** Yes, but organisations like the Daphne Jackson Trust can make the return a lot easier.

Long career breaks can undermine the confidence of female engineers who feel they have been left behind in a fast-moving world, and Rebecca Ward was no exception.

Ward had built a successful 12-year career as an engineer with Atkins when she stopped work to look after her first child in 2002. Three more children followed and she could not envisage returning to work until nine years later, in 2011.

By that time, her confidence had diminished and she sent off speculative emails without much hope of success. She was surprised to be invited for inter-

view at Cambridge University, but she thought it was a waste of time going. "I didn't think they would be interested because I had been out of the field for so long," she said.

But the interview changed her life. Through the charitable Daphne Jackson Trust, which offers flexible, part-time, paid fellowships, she was offered a two-year role studying heat flow in the greenhouses in Kew Gardens.

Confidence returns

"You can lose yourself when you do the school run every day and I definitely needed a confidence boost. I'm two thirds of the way

through now and my confidence has totally returned," she said.

The Trust believes women who have had long breaks need to build up skills and self-belief. Fellowships include 100 hours of retraining each year ranging from seminars on technical skills, to Daphne Jackson workshops about presentations, to handling the media.

Different outlook after break

"I have changed engineering fields and I could not have achieved that without the Fellowship. The training has also given me the chance to meet other

Fellows in the same boat. It helps to see how others are coping."

Now 45, Ward realises she was fortunate to be granted a Fellowship. "Too many talented women are lost because they don't have the benefit of the Trust's work, or an understanding employer.

"Mature women have a lot to offer. Being a mother and having a career break has given me a greater understanding of what others go through. I'm a better employee than before my break. I am better at time management and my focus is greater."

DAVID SMITH

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COMMERCIAL FEATURE

AECOM careers challenge outmoded stereotypes

■ **Engineer Sasha Krstanovic is a regional director and Arts and Culture sector lead at global urban development and infrastructure consultants, AECOM. “My responsibility is the amount of energy buildings consume. Designing theatres, galleries as well as hospitals, homes, offices and stadia responsibly is a great opportunity to be kinder to our planet,” she said.**

When Krstanovic first worked in the industry 15 years ago, macho attitudes were prevalent. But it has changed out of all recognition.

“In the 1990s, some consultants still had posters of topless girls at their desks. This sounds quite unbelievable today. At AECOM, we

have a flexible, inclusive environment that tailors workload to lifestyle. We have maternity and paternity leaves, sabbaticals, part-time and remote working, sponsored absences for charitable work in developing countries and study leaves,” she said.

Krstanovic studied and worked in the UK and Serbia and is a Fellow of professional engineering institutions IMechE and CIBSE. “CIBSE now has a dedicated networking group for women — WIBSE. It is a place to share experiences and ideas.”

Krstanovic says a career with



Sasha Krstanovic,
Regional Director
and Arts and
Culture sector
lead, AECOM

AECOM is as flexible as a career in law or publishing. “It’s a steady job that allows you to plan your life and offers opportunities to travel around the world.”

But the popular perception of engineering has not caught up with the reality. “There are still not enough women,” she said. “The ‘macho’ attitude has diminished significantly. We design buildings and work with architects, town planners, landscapers, consultants and project managers, many of whom are women.”

Tim Rickard, Head of Talent Acquisition — Europe, said: “The diversity of our business is a huge asset and we are proud that we attract and retain the best talent. Our teams collaborate on projects of all scales and levels of complexity. We draw together the finest engineers,



Tim Rickard,
Head of Talent
Acquisition
Europe, AECOM

designers, planners, cost and project managers to create long-lasting, sustainable solutions. Our people are from a range of nationalities, ethnic, cultural and religious backgrounds. It’s powerful to create teams with different experiences and cultural richness so we learn from each other and grow together as a global team.”

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Find out more at www.edfenergy.com/careers



NEWS

Question: Why did Jenny Body love aerospace engineering so much?

Answer: It's inspiring to work on aircraft, which present huge technical complexities.

The career of a high-flying engineer

■ When retired aerospace engineer Jenny Body returned to her Bristol factory to see the new Airbus A400M, it was "one of the most moving sights" of her life.

Body, the first female President elect of the Royal Aeronautical Society, spent her entire engineering career with Airbus, which makes half of the world's jet airliners. The A400M was one of the aircraft she helped to create.

"Aircraft are wonderful to work on. With apologies to Zanussi, you get a lot more inspired designing the tiniest part of an aircraft than a washing machine," she said. "I've always loved

the fascinating technical complexities, and also working with people from all over the world."

Starting out

Now 59, Body joined Airbus from school as an undergraduate apprentice. But after damaging her knee, she had to drop out of an Imperial College degree. Instead, she completed an HND at Bristol Polytechnic. "In engineering, the qualification gets you through the door. After that, it's pretty irrelevant," she said.

When Body arrived at Airbus, she was the first female undergraduate and only woman in an open-plan office of 400 people. "It's a better ratio now, but a male-dominated workplace can still be challenging. I have found relatively little discriminatory behaviour from co-workers, though I've known discrimination in women getting passed over for jobs they deserved," she said.

There are advantages in being in the minority, however. "What's important

is not who you know, but who knows you. So you have a good chance as a woman of getting known, providing you do a good job. When people say they need someone, it's easier to stand out," she said.

A successful career

Body's career began in systems engineering, but she moved into research management roles. She was instrumental in winning Government funding for the £100 million Next Generation Composite Wing programme.

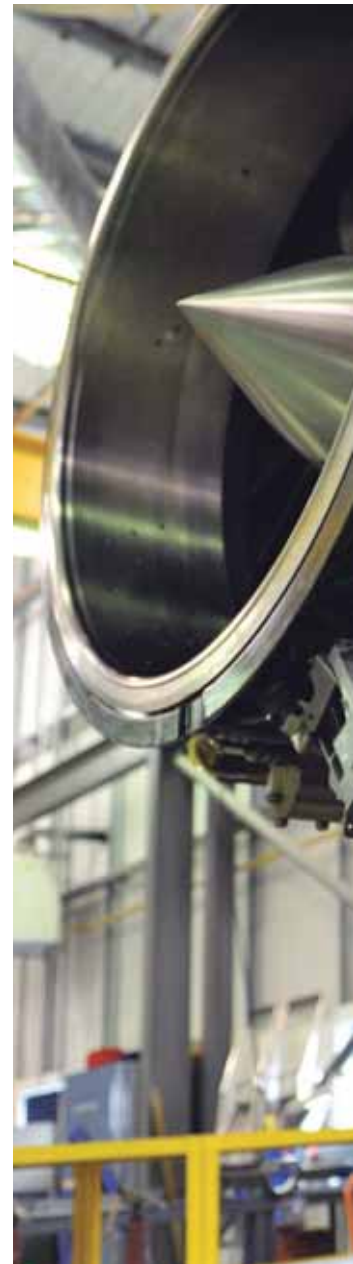
"I enjoyed team leading. I think women can be really good as they can be more collaborative, inclusive and consensual," she said. "But the truth is women can be good at all aspects of engineering. I've never come across anything they can't do as well as men."



Jenny Body,
Retired Aerospace
Engineer

DAVID SMITH

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APPRENTICESHIPS AIRBUS

Profile of **Devon Sumner**
'Undergraduate' Apprentice,
Broughton



Have you ever considered that you could do an Apprenticeship and get paid while you go to university and do a degree?

At Airbus, anything's possible!

Devon is a second year apprentice on the Airbus 'Undergraduate' Apprenticeship, which will lead to a Bachelor degree in Aeronautical Engineering.

What attracted you to the Airbus apprenticeship?

Inspired by a fascination with aircraft, I found out about the apprenticeships through an open day at Airbus. Everyone was really positive and enthusiastic about Airbus, as well as the opportunities available, so I decided to apply.

Why did you choose the 'Undergraduate' Apprenticeship?

It's a great way to be able to go to University and I'm getting paid at the same time! The advantage of studying for a degree coupled with relevant practical on-the-job training is something which employers value highly.

What do you enjoy most about your apprenticeship?

The course is quite broad and we pack a lot into the day, which is always interesting and challenging. We also get involved in community events and promoting Airbus and its apprenticeships to the wider community – it's never dull!



THE APPRENTICE
Cassie Leicester completed her apprenticeship with Rolls-Royce last year and is now a qualified mechanical engineer
PHOTO: PRIVATE

Apprenticeship offers 'best of both worlds'

Question: Was Cassie Leicester happy with her apprenticeship?

Answer: Yes, she could learn on the job while getting paid for it.



Cassie Leicester,
Engineer,
Rolls Royce

KNOW THE OPTIONS

Rolls-Royce engineer Cassie Leicester had a difficult choice to make in 2007 at the age of 18, between going to university and doing an apprenticeship. Now 24 and a fully qualified mechanical engineer, she has no regrets about taking the apprenticeship route.

"It offered the best of both worlds. I could learn on the job and get qualifications while being paid. It was a **win-win** situation. I would have come out of university with debts and no guarantee of a job," she said.

Leicester also believes she was temperamentally suited to an apprenticeship. "I'm practically minded and wanted to get into the nitty gritty of it," she said.

Only female on the shop floor

Leicester joined Rolls-Royce after A-levels and completed a three-and-a-half year apprenticeship last year. She studied theory at Filton College,

whilst learning on the job from experienced engineers.

"I was the only female on the shop floor, but I never had an issue with that. For me, it was about going in and doing it. Everyone takes you under their wing whether you're male or female. It's about having a bit of banter and integrating with the guys. I never felt singled out," she said.

Global Apprentice of the Year

Last year she was Rolls-Royce Global Apprentice of the Year and she has been selected for a Rolls-Royce scheme for future leaders which enables her to study for a Masters at Warwick University, funded by Rolls-Royce.

"It's great. I can relate what I am learning at Warwick to practical examples at work, which makes it easier to write assignments," she said.

DAVID SMITH

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Five things to know about an Airbus 'Undergraduate' Apprenticeship

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At Airbus West Factory,
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Saturday, 8 December 2012
between 1.30pm & 4pm

Information available on our website www.airbus.com/work

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Choose between a Craft, Higher Supply Chain Logistics or 'Undergraduate' Apprenticeship and apply online at: www.airbus.com/work



NEWS

TV presenter Gaby Logan will present a trophy and cheque for £2,500 to the winner of the **IET Young Woman Engineer of the Year Award** on December 6. Just as importantly, the award will highlight the talented young women working in the field. Here we meet five of the shortlisted candidates:



Yewande Akinola, 28,
Environmental Services Engineer,
Arup

■ **Akinola has a desire to improve lives in developing countries, as well as Western ones, by creating inspiring and sustainable built environments. Renewable energy and sustainable water are at the heart of her work in schools, stadia, commercial buildings, homes and hospitals.**

"I dream of bold, positive impacts on projects, whether it's a 60-storey building or a slum with bad sanitation. Using engineering skills to overcome challenges is very fulfilling."

Charlotte Tingley, 23,
Manufacturing Engineer,
BAE systems

■ **Tingley has a key role in the production team working on BAE's fighter pilot helmet, widely regarded as the world's best. Her highly technical job involves analysing data for corrective improvements.**

"I monitor anomalies occurring in manufacturing. They could have a massive impact on production, but by capturing them early I can suggest improvements. I really enjoy working on the world's most advanced fighter pilot helmet."

Philippa Riddoch, 25,
Manufacturing Engineer,
BAE Systems

■ **Riddoch works on the F-35 Lightning II aircraft as an Improvement Engineer looking at problems or defects that occur during production.**

"I am fully responsible for Corrective Action projects on a large portion of our assembly line. This involves a lot of independent self-management and running biweekly meetings with supervisors and engineers. The best thing is being close to the product at the beginning of the assembly process and also the amount of responsibility."

Jessica Leigh Jones, 18,
Astrophysics student,
Cardiff University

■ **The inventive Jones has designed a new fibre optic technology as a foetal contraction monitor. To protect her patent, she is setting up a company called Light Guide Systems Ltd.**

"It has combined engineering with entrepreneurship to design a solution, then create networks to take it to market. It's rewarding to see a project progress through its entire development. After graduating I'd like a career combining space study with electronic engineering," she said.

Roma Agrawal, 29,
Senior Structural Engineer,
WSP Group

■ **As a structural engineer, Agrawal turns abstract architectural concepts into practical bridges and buildings that won't fall down.**

"In the design phase, we run computer models to test designs. During construction, I visit sites regularly to solve problems as buildings take physical form. My job is always challenging, requiring quick thinking, communication and problem-solving. The most exciting part is seeing your ideas turn into a real, usable object that people admire everyday."



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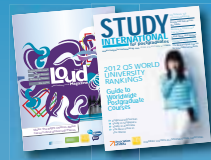


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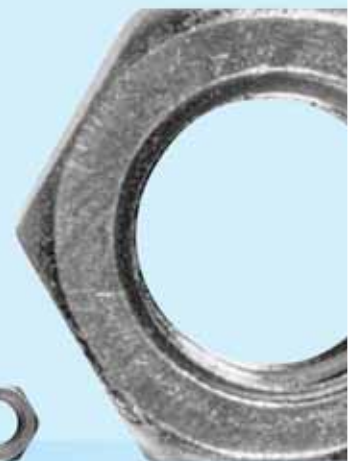
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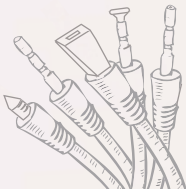


I DISCOVERED MY SEA LEGS 100 MILES WEST OF SHETLAND

My family and friends are still amazed that I work offshore. But there's no way I was going to pass up the chance to spend time out here in the Foinaven field. I suppose my interest in chemical engineering was sparked when I was a kid, watching the news and developments in the Middle East. It demonstrated the crucial role the oil industry has to play in society as a whole, and I knew I wanted to be part of that. Now I've found my feet out here on our floating production, storage and offloading (FPSO) vessel, it's true to say I couldn't be more directly involved.



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