

# Profile



**Roma Agrawal** is using her rarity as a young, female engineer to front campaigns on television, in the papers and on billboards that raise the profile of an engineering career. More professionals should do the same, she tells Jackie Whitelaw.

Last month, WSP structural engineer **Roma Agrawal** was on TV and in the newspapers through her involvement as a board member with the Yourlife campaign to encourage more young people, especially girls, to study physics and maths. She was also representing WSP in a BBC documentary, as well as appearing with singer Annie Lennox and actress Emma Thompson in the Marks & Spencer 'Leading Ladies' advertising campaign, photographed by Annie Liebovitz no less, which meant she was in magazines and disconcertingly for her, on 4m high billboards just about everywhere.

This could all make Agrawal, 30, sound like a woman focused on media exposure. But that is not the case at all. She is a warm, highly intelligent person with great charm and an enthusiasm for structural engineering that she wants to share. When opportunities come up to do that "I say Yes, not No," she says.

"I realise I am a young woman, I am from a minority [Agrawal is Indian] and I tick a lot of boxes. The opportunities may sometimes come to me for those reasons which is OK, but things develop and people come back to me because I say something interesting.

"Standing up, being noticed, writing a blog - none of that is natural to me. I am nine years into my career and have been doing this for just the last three. But I am getting used to it and can see the difference it can make in terms of the awareness of our profession."

Agrawal started to get noticed through her work on the Shard. It was a high profile project, that generated significant attention from the press. Agrawal was roped in to showing them around. "Suddenly it was all 'oh there's a woman engineer on the Shard, she's young, she's got something to say'. I went with it. It's scary and it's hard. There can be hiccups when you feel you've been misinterpreted. But the amount of good

that comes out of publicity outweighs any negativity about tone or mistakes," she says.

"I was on television in a documentary about the Shard for about 30 seconds but people still remember. A lady came up to me recently to say 'my niece saw that and she would like your job'.

"Regardless of whether you are a man or a woman, I believe engineers need to stick their heads above the parapet. The public needs to know what engineers do - there is a huge shortage of people with our skills and we need to encourage more into the profession. For women especially, it is good to be a role model, for parents

of girls to see women succeeding in the engineering field."

The point of the Yourlife campaign which was launched by the Chancellor, George Osborne, is to help young girls and boys understand the possibilities that studying maths and physics opens up to them as they grow up. The project aims to show them the careers they can have and the rewards they can earn - people with maths A-level earn 10% more on average than those that don't, for instance.

Agrawal grew up in India, where enthusiasm for maths and physics is the norm. "We tend to do well and be taught well in the STEM subjects. I was at a mixed



NICOLA EVANS, WSP



MARTIN AVERY

Figure 1  
Northumbria  
University footbridge

school, I didn't think I was in a minority as a person who likes physics and maths."

That enjoyment continued when she came to the UK to do her A-levels. Her parents (her father studied electrical engineering while her mother holds a science degree and was a computer programmer in the 1980s) wanted Agrawal to have exposure to other cultures. The family had already been living in the US before returning to India when she was seven.

She lighted on a school in the UK where her teachers in her chosen physics and maths A-levels were hugely encouraging. "In my class about two thirds of us went on to do a physics related degree," she says. In Agrawal's case she studied at Oxford University which was marvellous "but I had no idea what to do after that."

"I'd go to careers fairs and the only people there were bankers, lawyers and accountants. I was uninspired and was left thinking are these my only options? In hindsight, you have to ask, where were the engineering businesses?"

Engineering until then had not occurred to Agrawal. Her father had not been practising as an engineer for years so there was little direct familial influence. "But I got some work experience with mechanical engineers who were involved in designing the particle accelerator for CERN, real cutting edge work, and that was when it hit me that engineering was mid way between architecture and physics and was for me."

Imperial College London, not put off at all by her lack of an undergraduate engineering degree, offered her a place on

a structural engineering Masters course.

"They were very encouraging. If we told all maths and physics students there was a chance of an engineering career, we would open up a more diverse pot of entrants to the profession."

Then, when she went to specific engineering careers fairs, Agrawal could see all the opportunities open to her.

When you ask her now what structure she wished she had designed, it is Hungerford Bridge – the beautiful footbridge hung from Charing Cross railway bridge over the Thames in London. The designer was John Parker of WSP and that was drew her to joining the consultancy. That and the realisation that WSP is also WSP Cantor Seinuk, specialists in skyscrapers "and the grail for most structural engineers."

John Parker interviewed her and Agrawal was hooked. She joined the firm in 2002 as part of Parker's team and started on her first project, "my baby bridge", which was a cable stayed footbridge at Northumbria University (Figure 1). "It was just me and John working on it and I was allowed to do a lot. John suggested we work on a Fourier series for the dynamics – for someone with a physics degree that was so exciting.

"Then John got the Shard. That was an amazing opportunity. At peak there were just seven structural engineers on the job and I was there right from the beginning, from the enabling works through to the detailed design."

Like John Viise (*The Structural Engineer*, April) Agrawal is another tall buildings engineer who doesn't like heights. So ascending London's tallest structure was a

challenge. "I was determined not to be 'that woman who cried on site'. My first time up the scaffolding was scary though and I was dragging myself up by my arms because my legs had gone. But I did it and I got better as time went on."

Agrawal spent six years on the project and is enjoying the opportunities it has brought her in terms of promoting the industry. But she is an engineer and she is excited by her new engineering projects just as much. These include a residential scheme over a railway – "it's very disconcerting knowing your core is resting on a plastic pad so as to isolate vibrations" and the refurbishment of a Georgian House. "It was built in the 1700s and modified in the 1800s, 1920s and 1960s; we are unearthing stuff about the structure all the time. You have to understand what you have got before you can change it. I'm discovering this is a skill that can't be taught. You learn what feels right; it's not such an exact science."

Agrawal is on the Institution of Engineering & Technology's knowledge management board and is also a member of the Construction Industry Council's diversity panel which has a three year plan to make a difference to the current (non diverse) mix across the UK construction industry.

It is something she is very eloquent about. "Women are the obvious gap," she says. "A lot of people in the industry don't think it is a problem, they don't think there are barriers for women. But when I started work it was often just me and 20 men in a room. I am fine with that now but when I was younger it was very intimidating. I explained it to a skeptical engineer by saying 'imagine you are in a meeting with 20 Indian women' and it was a lightbulb moment for him."

What about the future? "I am an engineer because I love engineering. At the same time I have realised I do have a voice, I can make a difference to the future of engineering and I would love to be in a position of some influence. But I want to do both. You have to be an engineer if you are telling people to be an engineer!"

You can read more about Roma's engagement work at: [www.romatheengineer.com](http://www.romatheengineer.com) and follow her on twitter @RomaTheEngineer