

**Royal Academy of Engineering Ingenious Project Report
of Sheffield Region's Crowd Wise event findings**

“I Can't be an Engineer. I'm a girl!”

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Appendix A I'M GONNA BE AN ENGINEER (Words & Music by Peggy Seeger)

Acknowledgements

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Grateful thanks to Anne Wilson for full support to promote our manufacturing event, her invaluable guidance on this report prior to publication. I am as appreciative of feedback from Tony Mullin who helped me see things in a different light. It goes without saying any remaining omissions are mine.

Any remaining omissions or oversights are mine.
Wendy Stern, 10 August 2012

Executive Summary: “I Can’t be an Engineer. I’m a girl!”

Our primary observation in terms of attracting people in to engineering is that our industrial, commercial and professional leaders must make themselves far more accessible to lay people. This is paramount for our Region to attract young people in to the sector and safeguard our succession planning for the future.

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The key issue to come out of this entire series of Crowd Wise events were in email exchanges regarding our Manufacturing event, both emailed to me by a Homework Club leader before our manufacturing event in March 2012.

"I can't be an engineer: I'm a girl!"

With the reference to Peggy Seeger’s¹ 20th Century song from the 1970’s:

I’m gonna be an engineer,

What relevance has this to 21st Century Britain? It is unsettling to realise that the central message to Peggy Seeger song lyrics were written 40 years ago:

The boss he says "We pay you as a lady,
You only got the job because I can't afford a man,
With you I keep the profits high as may be,
You're just a cheaper pair of hands."

Although I like to think we have moved on to an extent in relation to women and non-traditional career choices, unfortunately this suggests residual issues exist.

Low turnout of young people, ethnic minorities and females infers that engineering seems to be an unattractive career path for people in these groups. Our event on housing appeared to buck this trend with a near equal ratio of women to men and nearly 80 people due to removing the word “engineering” from all event publicity.

One lay person at our manufacturing event was surprised they had anything to say and people listened to what they had to say poses an interesting theory which leads us to think lay people are deterred from attending seemingly technical events in the belief they are unable to contribute or add value.

We all appear to suffer from a misperception that manufacturing and engineering are the same. One event participant felt this so passionately that they reiterated several times in feedback that “manufacturing ≠ engineering”.

¹ See Appendix A for the words of Peggy Seeger’s song “I Wanna Be An Engineer” and a Youtube link.

About the Royal Academy of Engineering (RAE) Ingenious Project

The RAE Ingenious project aims to:

- a. inspire creative public engagement with engineering projects
- b. stimulate engineers to share their stories, passion and expertise in innovative ways with wider audiences
- c. develop engineers' communication and engagement skills
- d. create debate between engineers and people of all ages to raise awareness of the diversity, nature and impact of engineering.

To date Ingenious has funded over 90 projects giving over 1,000 engineers the opportunity to take part in thought-provoking activities, gain communications skills and to bring engineering to the heart of society.

About Crowd Wise and how we used it

Developed by Perry Walker, former Head of Democracy & Participation at the New Economics Foundation (nef), Crowd Wise (<http://neweconomics.org/projects/crowd-wise>) is a deliberative and highly participative approach to reach agreement.

Crowd Wise combines consensus voting and constructive dialogue to enable participants overcome differences, find common ground and reach more productive outcomes during their decision-making.

A tested and highly participative format, we used Crowd Wise to identify sustainable engineering issues affecting all of us.

Our local Steering Group were engineers and leading academics in Sheffield Region from Sheffield City Council, Sheffield Hallam University, Sheffield Renewables, Stradia Ltd and the University of Sheffield. A stimulating and vibrant steering group conversation identified four key engineering themes:

- water;
- transport;
- housing;
- manufacturing.

Our engineering professionals in these disciplines ranged from Partners, Directors and Professors to graduate engineers working in public bodies, consultancies, academia and privately owned companies.

Observations

All our engineers had exciting, innovative ideas to transform our lives with immense implications for our region and opened everyone's eyes to the power of technology, the value of their engineering work and manufacturing process which one event participant reiterated several times in their feedback are mutually exclusive.

We received excellent feedback from experts and participants alike.

Anne Wilson, a Freeman of Sheffield and Managing Director of Numill Ltd considers far more must be done to ensure succession planning in engineering and manufacturing. Anne also considers we need to ensure our experts are approachable and accessible to lay people by whatever means possible.

My main observations from our experts, participants and other contacts are:

1. Senior management need to make time to share their knowledge and expertise with young people to secure succession planning and safeguard our Region's industry.
2. Tony Cornah, Homework Club Leader for the Broomhall Homework Group, who inspired my title for this report, works closely with ethnic minorities; he is keen to break down attitudes to gender and related prejudices to engineering said they found the girls refused to join the boys in an engineering talk but after those boys had gone, the girls seemed more interested. Tony reported that one of these girls had said:

"I can't be an engineer: I'm a girl!"

His colleague, Sharon Gill, Centre Manager & Development Manager, added that parents saw engineering as totally unsuitable for their children. She went on to say that people in their client groups saw no relevance in engineering to their life or as a viable career path.

3. It appeared that people in wider society seemed oblivious to the importance of engineering in water, transport, housing and manufacturing with misperceptions, unfounded beliefs to engineers who have made life in the 21st Century possible.
4. One event participant - a lay person anxious about attending our manufacturing event, for example, was surprised to find they enjoyed it, pleased to find they had things to say and could contribute in unexpected ways.

5. Strategic event marketing plan resulted in deleting “engineering” from event publicity for two events had a strong impact on turnout; a marketing contact agreed is a reasonable tactic when promoting technical topics to lay people.
 - a. Event turnout for most topics were lower than expected most evident with the transport events we had organised and delivered during the year.
 - b. Housing event participants generated a mixed response with a number of participants very impressed by the high calibre of technical information while others were as dismayed by such content.
 - c. Manufacturing participants were well informed and turnout was average for this series of events.
 - d. Turnout for people in disadvantaged communities, young people, ethnic minorities and girls/women were lower than usual.

Strategies to promote manufacturing event

Accessing information and the contacts to ensure our RAE Ingenious awareness-raising events were on the radar of those involved in events such as the Global Manufacturing Festival strategic planning board to work together.

Some setbacks were:

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1. Industrial and commercial leaders, who exclaim over lack of talent, could invest more time to develop talent by, for example, making it easier for graduates inspired by specific presenters to have a short, post-event conversation.
2. Manufacturing event scheduled for Global Manufacturing Festival (GMF) and National Science & Engineering Week only to be advised that:
 - a. We had to reschedule our event after GMF;
 - b. GMF exhibitors, impressed by our internationally acclaimed experts, were unable to attend due to event scheduling and professional commitments.
 - c. It would have been nice could we have said Global Manufacturing Festival had generated participants for our activities.
3. Overall event turnout implies that the emphasis on engineering may have been a deterrent.

Conclusion and latest developments

In our report to the Royal Academy of Engineering Ingenious we identified key issues, namely that:

- a. Need for industrial, professional and commercial leaders to commit to, and invest, professional time in our Region's young people by visible and continuing personal involvement.
- b. Poor image of engineering exists in Sheffield especially among:
 - i. people from disadvantaged communities
 - ii. young people,
 - iii. ethnic minorities
 - iv. girls and women

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Although we understand many people are investing significant time and resources to remedy these issues, engineer feedback may suggest efforts and related activities need much higher visibility. The lack of profile could also lead others to believe such efforts need far greater investment and co-ordination.

Given the serious nature of these issues, we are keen to submit a further bid to tackle the issues. In this regard the RAE Ingenious Grant Programme has invited us to apply for a further grant of up to £30,000 for creative engagement that could help engineers communicate their expertise and passion of engineering to a wider audience via public engagement training and opportunities.

Events to address the needs of people from disadvantaged backgrounds, ethnicity, age and gender include:

1. pop-up events (see scienceonthestreet.wordpress.com) using methods developed by nef to reach young people, people from disadvantaged backgrounds, women and ethnic minorities.
2. World Café (see www.theworldcafe.com) use methods developed as a freely available resource to widen participation, involvement and shared understanding
3. Semi-structured participative workshop to engage engineers with young people during 5-a-side football
4. Participative workshop to look at increasing personal involvement of industrial, professional and commercial leaders to commit to, and invest, professional time in our Region's young people by personal involvement.

And topics such as:

1. Computers, mobile phones and sound
2. make up, fashion, shoes and clothes
3. sports and racing cars
4. computer and fantasy games

Facilitated events, possibly using Crowd Wise aimed at Industry, professional and commercial leaders to explore ways to increase access to young people and others interested in engineering.

Appendix A

I'M GONNA BE AN ENGINEER

Words and music by Peggy Seeger, c 1970 Stormking Music Inc, www.peteseeger/imgonnabe.htm
www.youtube.com/watch?v=CCRRe72mwwY

When I was a little girl I wished I was a boy
I tagged along behind the gang and wore my corduroys.
Everybody said I only did it to annoy
But I was gonna be an engineer.

Mamma said, "Why can't you be a lady?
Your duty is to make me the mother of a pearl
Wait until you're older, dear
And maybe you'll be glad that you're a girl.

Dainty as a Dresden statue, gentle as a Jersey cow,
Smooth as silk, gives cream and milk
Learn to coo, learn to moo
That's what you do to be a lady, now.

When I went to school I learned to write and how to read
History, geography and home economy
And typing is a skill that every girl is sure to need
To while away the extra time until the time to breed
And then they had the nerve to ask, what would I like to be?
I says, "I'm gonna be an engineer!"

"No, you only need to learn to be a lady
The duty isn't yours, for to try to run the world
An engineer could never have a baby
Remember, dear, that you're a girl"

She's smart --- for a woman.
I wonder how she got that way?
You get no choice, you get no voice
Just stay mum, pretend you're dumb.
That's how you come to be a lady, today.

Well, I started as a typist but I studied on the sly
Working out the day and night so I could qualify
And every time the boss came in, he pinched me on the thigh
Said, "I've never had an engineer!"
"You owe it to the job to be a lady
The duty of the staff is to give the boss a whirl
The wages that you get are crummy, maybe
But it's all you get, 'cause you're a girl"

Then Jimmy came along and we set up a conjugation
We were busy every night with loving recreation
I spent my days at work so he could get an education
And now he's an engineer!

He said: "I know you'll always be a lady
The duty of my darling is to love me all her life
Could an engineer look after or obey me?
Remember, dear, that you're my wife!"

As soon as Jimmy got a job, I studied hard again
Then busy at me turret-lathe a year or two, and then
The morning that the twins were born, Jimmy says to them
"Your mother was an engineer!"
"You owe it to the kids to be a lady
Dainty as a dish-rag, faithful as a chow
Stay at home, you got to mind the baby
Remember you're a mother now!"

Every time I turn around there's something else to do
Cook a meal or mend a sock or sweep a floor or two
Listening to Jimmy Young - it makes me want to spew
I was gonna be an engineer.

I only wish that I could be a lady
I'd do the lovely things that a lady's s'posed to do
I wouldn't even mind if only they would pay me
Then I could be a person too.

What price for a woman?
You can buy her for a ring of gold,
To love and obey, without any pay,
You get a cook and a nurse for better or worse
You don't need a purse when a lady is sold.

Oh, but now the times are harder and me Jimmy's got the sack;
I went down to Vicker's, they were glad to have me back.
But I'm a third-class citizen, my wages tell me that
But I'm a first-class engineer!

The boss he says "We pay you as a lady,
You only got the job because I can't afford a man,
With you I keep the profits high as may be,
You're just a cheaper pair of hands."

You got one fault, you're a woman;
You're not worth the equal pay.
A bitch or a tart, you're nothing but heart,
Shallow and vain, you've got no brain,

Well, I listened to my mother and I joined a typing pool
Listened to my lover and I put him through his school
If I listen to the boss, I'm just a bloody fool
And an underpaid engineer
I been a sucker ever since I was a baby
As a daughter, as a mother, as a lover, as a dear
But I'll fight them as a woman, not a lady
I'll fight them as an engineer!