

# THE SKILLS SHORTAGE – LONG TERM AND SHORT TERM SOLUTIONS

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## Abstract

The skills shortage has impacted on all of Australia, especially in regional areas where there has not been the necessary influx of young graduate engineers to replace those who have retired or left the industry.

This paper discusses long term and short term solutions to overcome the engineering skills shortage in local government.

To solve the problem in the long term, we need to promote a more glamorous and exciting image of engineers in the community, educate kids about the important role engineers play, and overcome the “boring” image we have, so that more school leavers choose engineering as their preferred career.

The most effective way to communicate with young people is through TV. Engineers can use TV to raise their profile in the same way that doctors and lawyers have done so successfully.

Imagine coming home to find your kids watching their favourite TV drama where the hero is an engineer who uses his skills to solve everyday problems and goes about his job making the world a better place for everyone. Imagine at the same time another network is airing the latest reality show called “Change the World”, where contestants come on and explain their ideas on how to solve the problems of the world to a panel of expert engineers.

This paper explains that there is a small group of engineers already working on scripts and pitching their ideas to people in the TV industry, in order to get this idea off the ground as a long term solution to the skills shortage.

In the short term, councils which are unable to attract high quality engineering staff are turning to outsourcing.

This paper discusses the advantages of engineering services contracts to those councils needing to engage outsourced consultants to overcome their short term skills shortage.

**Key Words:** Skills shortage, engineering careers, image, television, engineering services contracts.

## Introduction

In spite of the economic crisis, there is still a serious skills shortage in Australia.

The long term solution is to turn around our “boring” image and attract potential engineering students, through education and awareness of the personal benefits, rewards, satisfaction, and the fun and excitement of a career in engineering.

Consider this:-

100% of Australian children have used Lego at some stage. 30% just use the completed models as toys and for make-believe. Those 30% plus another 50% follow the Lego instruction plans. Then there is a remaining 20% who additionally create their own models specifically to fulfil some useful and strategic play purpose. These are the potential engineers. However, when they enter high school, they mature and don't “play” with toys anymore. Other than electronics kits, there

are almost no opportunities for young adults to “construct” things. This is the point at which we lose potential engineers.



It's the young engineers we need to inspire.

## Using TV to improve our image

Doctors, lawyers, forensic scientists and even veterinary scientists have used popular TV shows very successfully to promote their image. They don't need to attend school talks or careers days. And they don't need to participate in work experience programmes.

Everyone knows what they do and respects their professional standing in the community and the workings of these professions are reinforced by the TV shows.

We too can use TV to promote our professionalism, and capture future engineers using TV.

There are two different styles of program we can use – drama, and reality.

### TV drama

A drama series could portray an engineer “solving problems” and thus being the hero. The majority of teenagers would watch this program for the drama – while other characters might run around screaming “the sky is falling, the sky is falling”, the engineer calmly works out a creative solution and announces it, to the great relief of the other characters. Some of the viewing teenagers will say “Wow, I want to be that guy – plugging away in the background, keeping out of everyone’s way, but ultimately delivering a solution – that’s me!”

### Reality series

Imagine a show featuring an expert panel of engineers solving problems. True there are “Myth busters” and “Prototype This”, although these have been variously described as “fun” or “silly” but they aren’t career-inspiring. At the other end of the scale, we have the “New Inventors”, and while it is interesting, the inventions are all small. A new show called “Change the World” would feature experienced engineers solving large-scale problems before a live audience. The potential engineers amongst the viewers would say “That’s what I want to do – I want to solve problems, I want to debunk ideas put forward by wishful thinkers by using data and analysis – I can do what those engineers are doing!”

Note that while there are documentaries featuring engineering projects, people who watch them say almost apologetically “Oh that was an interesting show”. But you never hear a young person say “Wow, that’s what I want to do!”

There are already two styles of TV programme about problem-solvers. The lawyers and detectives and forensic and police shows begin with a result, and then the professionals work *backwards* to determine the cause. Doctor/nurse/hospital/emergency

shows begin with a case involving a single patient (usually), and they try to apply existing remedies. So what’s different about engineering which should make for compulsive viewing? Well, engineers are presented with a large-scale problem or opportunity for which they have to design or create a solution and then draw on a team of several hundred contractors or suppliers to work together to a plan. And think about this – none of those other professions are given \$100mill with which to play!!! “Wow - I want to do that as a career!”

### What can we do about it?

At least two engineers in NSW are already working on scripts and pitching their ideas to people in the TV industry.

### Robert Watson

Robert Watson is a “semi-retired” chemical engineer from Jesmond NSW. Robert is a keen advocate of using television to “inspire and excite” Australian teenagers to choose engineering as their profession. Robert says: *“there is clearly an opportunity for the production of a gripping television series of contemporary problems which challenge the engineer/hero to “save the day” by applying logic, method and technical knowledge.”*

Here is a sample script that Robert has worked on and is currently pitching to people in the television industry as a possible drama series:-



Our hero Benjamin Winn saves the day

### “Winn Wins”

Description: Highway Builder Benjamin Winn clashes with local communities, but uses creative engineering solutions to be the Hero.

Series Overview: Australian Scripted Drama  
Community conflict looms around every turn of this freeway project. Winn is totally focussed on pushing forward, and brushes off

all calls to re-route the road since that would delay the completion and raise the costs. Seemingly not caring about the People, Winn works over alternatives until he finds an engineering solution. The Community thinks they can beat him, but Winn is just doing what engineers do - *solve problems*.

**Benjamin ‘Benj’ Winn:** 50yo, tall, ‘weathered’ but attractive, determined, very experienced, but focussed on completing the road on time, in budget. *“These whingers will be using my road daily for the next 30 years of their lives - without whinging.”*

**Emma,** Community Liaison Officer: 30yo, ex-social worker, not savvy in engineering, but is nevertheless responsible for the project being successful *“If you can make the so-called ‘whingers’ happy now, they will be happy every day they drive on your road!”*

**Brad,** Junior Engineer: 22yo, young hunk, gung-ho, technical whizz, zero empathy. *“People should be like machines – it would be fine if you could bolt them down to concrete and connect them up to the power.”*

**Chris,** TV Reporter: 24yo, always searching for newsy conflict, so her loyalty flip-flops between pro-community and pro-progress. Tries to get close to Brad, as a source of insider information; also tries to stir up the community. *“Don’t be surprised if they put a toll on this bleak streak across the land”*

**Lewis “Lew”,** Port-a-Loo contractor: injects humour, but also offers the Voice of Common Sense in each episode. *“The locals will only grizzle for six months, but then 10 thousand people every day for the next 50 years will cheer when this road saves them 2 minutes of travelling time – hey, that’s an extra 4 minutes a day they can spend reading on the loo.”*

**Shay-nie,** Politician: occasional character, 50yo, seems to be a slimy character but no-one can ever nail anything on her. Desperately wants television coverage, but it always seems to go wrong. Demonstrates mastery of dodging issues.

**Ashley,** environmental white knight: occasional character, 35yo, stereotypical

greenie. *“You engineers think you are masters at providing solutions, but can’t you see that you are the ones who created the problems in the first place?”*

**Old Jack,** Union Rep: occasional character with divided loyalties. Wants the jobs, but also wants to look after the community.

Episode: “Blast Them!”  
Construction requires a deep cutting adjacent to an old people’s home. Use of explosives brings back war-time memories amongst the residents. The Engineering Solution is to use expanding grout to ‘crack’ the rock in an operation which is largely silent.

Episode-by-Episode:

- **“Dreamtime”:** Aboriginal bones are discovered in the path of the road. The Engineering Solution is to raise the road onto 2metre high concrete columns in such a way that the road becomes a permanent shelter for the Sacred Site.
- **“Tainted”:** soil contaminated with asbestos is found which will be expensive to remove and treat. The Engineering Solution is to utilise the material for the road construction by encasing it in the concrete road-base. The asbestos doesn’t need to be transported through the community.
- **“Bat on”:** a small colony of bats lives under a rock ledge. The Engineering Solution is to install culverts beneath the road, using slabs of rock as the roof. These shelters will house an even larger population of bats and they will be a little further away from the residents’ homes.
- **“Sabotage”:** machinery is being sabotaged at night, by a greenie wanting to save trees. One night he is caught by Winn, who then engages the greenie to identify 100 trees up to 4m high which Winn will dig up and relocate to a park.
- **“Old Forest”:** the easiest way through the Old Growth Forest is straight through, with a corridor 80metres wide. The Engineering Solution is to build the lanes one above the other “bridge style”,

bringing the easement down to 20metres. The added bonus is that travellers in both directions get to see this otherwise inaccessible forest.

- **"Marginal"**: the road goes into a marginal electorate with two politicians fighting over whether the road does, or doesn't go ahead. The Engineering Solution is that the Construction Site camp gets handed over as a site for a Pre-school (and an office for the successful politician).

Timeslot: 7:30pm Target Audience: 20s-30s

### **Rob Shaw**

I am also working on a script of my own, but this one is a possible TV reality series called "Change the World", where contestants come on and explain their ideas on how to solve the problems of the world to a panel of expert engineers. How many times have you heard ordinary people call talk-back radio programmes with impossible ideas to change our continent from a desert to a fertile oasis by dragging icebergs from Antarctica, or using divining sticks to find an underground sea, or collecting flood water from northern Queensland and piping to the water-poor areas of southern Queensland? Contestants will come in with ideas about how to control climate change, and how to solve world poverty, how to feed the starving, stop wars, or find alternatives to fossil fuels. The panel explains why the idea won't work, or in the case of a feasible idea, arranges a grant or sponsored prize large enough to allow detailed investigation, with possible fame and fortune for the idea man, and more importantly, an opportunity to change the world for future generations.

Imagine the lead-up promotion possibilities:-

"This week on Change the World, see the woman explain her foolproof solution to menopause, and the man with the idea of collecting bovine methane gas to heat our homes."

The show would need a high profile sponsor who would fund a decent prize each week, and a high profile compere like Dr Karl Kruszelnicki (who is a qualified engineer by the way), but from our point of view the focus needs to be on the panel of engineers. They need to be carefully chosen from the ranks of

Aussie engineers, because they are what it is all about for us. They need to be charismatic, intelligent and bright interesting characters because they will become household personalities, and the face of engineering in Australia. Maybe different experts can be brought in each week depending on the topics. But I think the idea would be to keep the same faces and allow them to become the main feature of the show - highlighting the skills of the engineer, and allowing them to become popular in the eyes of the viewing public.



A panel of bright, charismatic engineers finding solutions to everyday problems on "Change the World"

### **Underlying purpose**

To be successful, TV shows need to be dramatic and fast moving with popular themes.

But from our point of view, the underlying purpose is to promote and improve the image of engineers in the community, and to educate teenagers about what engineers do. Unfortunately, we are not very good script writers and could use some help. So we encourage anyone who has an interest in this idea to contact us (see contact details at the end of this paper).

### **Short term solutions**

In the present local government climate, many councils are finding that they do not have the staff to complete investigation and design work on time.

All councils would like to have designs for all major projects completed at least twelve months ahead of construction, to permit proper planning and budgeting ahead of time. In order to achieve this aim, councils really only have two alternatives:- either build up their own design team, or outsource the work. Building up an experienced design team is difficult due to the current skills shortage, and offering higher salaries might not solve the problem, and may just upset the balance or relativity of the council's salary system.

The problems with outsourcing are:-

1. How to go about engaging consultants in accordance with the Local Government tendering and quoting regulations
2. Preparing detailed briefs and administering design contracts can require a lot of work and time by staff
3. A clear understanding of the scope and requirements is necessary on both sides.

As a consequence of this, some councils are opting to engage consultants under engineering services contracts.

The purpose of an engineering services contract is to set down the rules under which a council (the "Client") engages a consulting engineering firm (the "Consultant") to carry out investigation, design, or project management services.

The procedure is that the council calls for Expressions of Interest ("EOI") for engineering services for a 2-3 year period. Consultants nominate their areas of expertise and hourly rates, and the council assesses and evaluates the EOIs once only.

The council then selects either a single consultant or a short list of suitable consultants to provide the services for the term of the contract

The advantages of an engineering services contract are:-

1. Encourages the building of a long term relationship of trust between the council and the consultant
2. Better understanding of standards and the needs of both parties
3. Better outcomes through improved communication
4. Fixed rates and charges
5. Cost savings to Council because of the removal of profit margins and allowances for contingencies
6. Quick process after the initial evaluation of EOIs, with no need for continued reporting of tenders to Council
7. Overcomes the problems associated with the skills shortage in Australia
8. Satisfies the Local Government tendering regulations
9. Allows the council to have designs prepared well in advance of construction.

Standard contract documents have been developed and are available free of charge from the author.

## **Conclusion**

For years we've been debating how we can improve the professional image of engineers and how we need to attract more young school leavers to engineering as an exciting and rewarding career.

At the highest levels of IPWEA and IEAust there is concern about the skills shortage and the falling number of students choosing engineering as a career.

Many young people think engineers are "boring" and a large percentage don't know what we do.

On the other hand, everyone knows about the exciting careers of doctors and lawyers through the many TV shows that dramatise these professions. Consider this : since CSI hit the screens, the profession of forensic science has been overwhelmed with student applications.

Robert Watson has a plan to use TV to dramatise excitement in the life of working engineers. He and I are working on possible TV scripts in which the central character or hero is an engineer, solving problems on the run, and saving the day for mankind. A bit dramatic perhaps? Like Batman or maybe like the 1980s series MacGyver? But we recognise that to be successful, the stories will have to be fast pace with a tight script and lots of tension and drama. After all, the aim is to portray the excitement of engineering.

Personally, I think this idea is exciting, with the potential to completely turn around public perceptions of engineering, and portray engineers in a positive light. Teenagers watch TV. When they learn what engineers do, and see the engineer as a hero in the community, maybe we will lure back the better students from other professions, and solve the skills drain.

If you would like to contribute a story line from your own experiences, or if you would like to comment on the idea of promoting our profession in this way, you can contact Robert direct at [rgw2005@optusnet.com.au](mailto:rgw2005@optusnet.com.au), or contact me at [rob@legs.com.au](mailto:rob@legs.com.au).

This paper also addresses short term solutions to the skills shortage, and suggests that if councils need to engage consultants to

help them with design work or project work, then they should consider using engineering services contracts, which have many benefits to the council. For further information and a copy of standard contract documents free of charge, contact Rob Shaw by email [rob@legs.com.au](mailto:rob@legs.com.au).

### **Author Biography & Photograph**

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In the last 18 years, Local Government Engineering Services Pty Ltd has completed projects for 50 different councils in NSW and interstate, and now employs up to 18 people at three locations (Port Macquarie, Inverell and Maitland).

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