Hello
I wish to respond to a number of items within the terms of reference of this inquiry. I obtained the list of the terms of reference from the APESMA website and have copied a number of the areas that I wish to make a submission on below.

(a) the implications of the shortage for infrastructure delivery in terms of economic development, cost, efficiency, safety and disputation;

I would like to comment on cost, efficiency and safety related matters. I have outlined below reasons for trades and engineering shortages that I won't go into in this section, however as a result of engineering shortages, I see non-engineering trained personnel (trades and the like) being used in engineering roles. The external engineering service provider that our company currently utilises, employs a number of trades qualified persons and charges them out as engineers and senior engineers. It is not transparent to the client that these people are not qualified engineers. Additionally, there is not the depth of experience in the available qualified engineers to fully understand the requirements of some projects.

As an example - a project that I have been drawn into at a late stage (I represent the client) is stalling due to safety concerns. There simply was not the engineering expertise involved in the project delivery (both on the engineering service provider and client sides) to provide adequate oversight to ensure that the functional safety lifecycle process related to delivery of this plant was followed. The plant is now built and currently will not be started until the functional safety of the plant can be assured. Since the original safety lifecycle process has not been followed, it is now difficult to retrospectively define the safety requirements specification for approval post construction. Naturally one can start to imagine the cost, efficiency and safety implications involved with such a project. Fortunately in this case, safeguards in the clients processes have highlighted the problem post construction but pre-start-up. I am unaware of what the handover date to the client is despite the plant being fully constructed.

(c) options to address the skill shortage for engineers and related trades, and the effectiveness and efficiency of relevant policies, both past and present;

I started my working career as an apprentice electrician and studied electrical engineering at university via evening lectures, completing my degree full time after completing my apprenticeship. I wish to make a comparison between trades entry and engineering student entry and the take-up of engineering graduates.

My observation in the industries I have worked in (oil refining, iron ore mining and processing, aluminium smelting and alumina refining) is that there are usually more applicants for trades apprenticeships than there are positions available. Apprenticeships are usually paid positions and in my case (and in the case of my current employer), apprentices are well paid and well looked after. The shortage of actual qualified tradespersons in my opinion is to a large degree influenced by the ability or desire for business to offer apprenticeship positions. I don't believe there is any particular shortage of people wanting to complete apprenticeships (not with large organisations as far as I see), there is just a shortage of apprenticeships being offered. This is one salient problem to resolved on the trades shortage.

Engineering is completely different. Firstly, you have to attract high school students to complete relevant science and maths subjects and then select engineering as a chosen field of study. This is a well known problem and not the point I really wanted to dwell on. Business used to offer engineering cadetships. If engineering cadetships were offered in the same way as apprenticeships were offered (i.e. paid to work and study) I overwhelmingly believe the applications for cadetships will exceed the positions available just as in the case of trade apprenticeships. I doubt we'll see the re-introduction of widespread cadetships.

In both the trade apprenticeship and engineering cadetship there is a cost involved in training these personnel with no perceived return for the business during that period. Is this really the case? Let's look at the trades situation. In terms of the electrical trade which I am most familiar, electrical trades often work together as pair as a safety measure, or work with a trades assistant for the same reason. Trades jobs often require the use of manual labour to execute all but the simplest of tasks. Why do we gets tradespersons to work together and why do we even have trades assistants? Why can't these positions be filled with apprentices. Sure, you cannot let some 17 year old loose in a plant initially, but after one or two years, they can start to function in both the apprentice and trades assistant role. Let's face it, a trades assistant comes into his/her first a job with very few skills - no different to an apprentice. Taking apprentices on at a later age may resolve maturity issues. We wouldn't need so many tradespersons to work "back to back"

as I often hear if there were these lower level trades assistant/apprentices about. The other option is to make apprenticeships non-paid. By this I mean that all classroom trade training done at TAFE is executed similarly to what the engineering student would do. Workplace experience could be by work placement with different businesses throughout the apprenticeship period. These placements could be paid at a nominal rate for all apprentices. This is no different to what we expect of our engineering students. The degree qualification is funded by the student and work placement is paid by an employer. There is no requirement for an employer to commit to employing an engineering student after their placement, but business has the opportunity to look at students and try and recruit those that they see as valuable.

I am involved in recruiting engineers where I currently work. When we advertise for engineers we are inundated with applications. Very few applicants are suitable to interview. The last three electrical engineers I was involved in recruiting were already working for our organisation in our graduate program somewhere within Australia. They were relatively inexperienced but were the best applicants. In my opinion, any business that complains that they cannot attract engineers to work for them, is most likely part of the problem of not taking on graduate engineers or offering vacation work to engineering students. In this way, if you want engineers to work for you, you must take on graduates on some form of graduate program to start with. The company I worked for stopped taking on graduates for a time and we had to (until recently) recruit engineers from overseas to fill our positions. My experience is that the experienced overseas engineers did not stay in engineering roles for long, they moved quickly into Supervisor roles. I honestly believe taking on graduates would have been a cheaper overall option – which brings me to my next point about retention in point (e) below.

(e) effective strategies to develop and retain engineering talent in the private and public sectors through industry training and development, at enterprise, project and whole-of sector levels;

My observation is that to attract engineers, you must attract them early. It is more difficult to attract experienced engineers into your workforce for several reasons which I will highlight below.

When I applied for engineering positions in the early 1990's, one of the questions posed was "were do you see yourself in ten years". To be quite truthful, I hadn't thought beyond the engineering profession when I decided to take up engineering as a career. I answered "I would be an engineer". When I interview graduate engineers today, our recruiters ask a similar question though I think the timeframe mentioned is now 5 years – a sign of the times! I am amazed at the answers I get and how younger people have thought beyond engineering about their futures. They know about Superintendants, Supervisors, Engineering Managers, Operating Centre Managers, Plant Managers and are focussed on these positions. They have done double degrees or are already planning to do an MBA. Most have no intention of remaining engineers in an engineering role in the medium term (5-10 years). In my experience, to remain in an engineering role means to limit ones career and advancement potential. My experience is that engineering roles "peg out" at a certain job grade no matter how experienced you are. I know this is not the case in all sectors. Some businesses reward experience and I have a brother who works for one such business, but generally in the areas that I have worked, to remain in an engineering role, meant also limiting your position and financial reward.

In summary.

For the trades situation, the number of apprenticeships offered largely dictates the number of tradespersons produced. How to offer more apprenticeships is one main factor in developing and retaining trades personnel. Taking on more mature persons as apprentices would enable organisations to utilise the personnel they employ more effectively in being able to operate machinery, drive trucks, etc. Roles that trades assistants or lesser qualified persons would normally do. This gives a business a greater return on their apprenticeship investment. Older persons are often more interested in job stability than people straight out of school. I see plenty of young apprentices leave an employer after making a good wage over four years to go travelling. When I say older persons, I mean in say the 20 to 25 year old age group, a similar age group to engineering graduates.

In the case of engineering graduates, perhaps rather than offering a cadetship, organisations could pay the HECS debt of successful applicants. My experience is that engineering students are street savvy about their chosen role. They have a fairly good idea these days where they are going and what's on offer. If students know that an employer will cover their HECS debt, the profession will become more attractive to them at the ground level which is in my experience the

easier place for businesses to attract talent. It is certainly a cheaper option than recruiting overseas engineers. Sure, graduates are less experienced than perhaps overseas engineers, but a business can lock in a graduate for three years with the offer to pay the HECS debt (which a graduate would have to repay pro-rata if they leave before the end of the three years), or could agree to pay the annual HECS debt each year, enticing graduates to “stay on”.

Retention in engineering is just a function of where you “peg out” in engineering roles. I believe people leave engineering roles to further advance their careers. This appears to be the same for both Australian trained and overseas recruited engineers. In my opinion, the best way to attract engineers in the first place is to attract them early and make use of the time they remain in engineering to the fullest extent. If you want to retain more mature engineers, then the job grade ceiling needs to be removed and people rewarded for their engineering expertise, responsibility or accountability and not by how many people report to them. Utilising a mix of younger engineers and graduates, overseen technically by a smaller number of experienced engineers who are remunerated for their expertise to remain in an engineering role may be the answer. Often we promote engineers to senior engineers but they largely become people managers leaving the younger engineers reporting to them devoid of real engineering or technical oversight. I recall a time within the last 10 years where the company I work for promoted several engineers to senior engineers almost directly after their graduate program was completed as we couldn’t attract experienced senior engineers. They all left the organisation shortly after for various reasons, some of which were that their CV suddenly looked a whole lot better and they went elsewhere, or that they were overwhelmed by the role. I believe this approach was counter-productive. What you want to do is match roles to those people wanting to go into people management and match those people wanting to remain technically based within engineering roles to technically support the larger number of younger engineers still in engineering roles.

Thanks and regards

Rodney Ziegelaar