

OCCASIONAL ADDRESS

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Delivered at UTS graduation ceremony for graduates from
the Faculty of Engineering

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Deputy-Chancellor, Pro-Vice-Chancellor, Dean, Members of Council, staff, distinguished guests, graduates, families and friends....

There are dreamers and there are doers. Great engineers are both.

Many of the outstanding achievements in the history of civilisation were the work of Engineers. Archimedes, Da Vinci, Isambard Kingdom Brunel, the pioneers of Railways George and Robert Stephenson, Sir Frank Whittle the pioneer of the jet engine, Bill Hewlett and David Packard of Hewlett Packard fame. I have personally met Sir Frank Whittle and David Packard and therefore stand here as a generational link between you and two great engineers who have transformed our modern world.

These extraordinary people were visionaries who were restless with the status quo. They challenged the thinking of their day, but most importantly were able to translate seemingly impossible pipe-dreams into functional realities through intellectual rigour, formidable logic and enviable discipline.

They were never fearful of tackling problems across disciplines. Archimedes conceived the helicopter, Brunel went from bridge-building to ship-building, Da Vinci from architecture to anatomy, David Packard from electrics to micro-electronics.

Today you join a profession that continues to make a significant—at times profound—difference in the world in which we live. I join with your families and friends in congratulating and celebrating your achievement. Your Australian Education and training is valued and respected globally, so be sure to seize the wonderful world of opportunity that now lies before you.

The world that you are about to enter will require you to extend beyond the application of Technical Standards, complex formulas and textbook construction practices. It will challenge you to look outside the square, to make judgement calls based on sound principles of logic, and to test boundaries to achieve optimum project outcomes.

Having worked for 36 years in the business and exercised my craft in 15 countries, I can honestly say I have not regretted my career choice for one second. It has presented me with challenge, triumph, heartbreak and adventure. It certainly isn't for the faint-hearted.

The career choice I made all of a generation and a half ago has in recent years given me both the privilege and challenge of being part of one of Australia's most exciting infrastructure projects – the Alice Springs to Darwin railway.

150 years ago, Australians dreamed of linking the north and south of Australia. Six generations later, I am honoured to say I was part of a great team that turned a Nation's dream into a reality, despite cynicism and disbelief from detractors.

My company Barclay Mowlem was a joint venture partner in the construction, and an equity participant in the special company formed to own and operate the railway for 50 years. I was a founder member of the management board. Also, under a separate contract, a Barclay Mowlem subsidiary – Austrak - designed and manufactured the two million concrete sleepers for the track.

The enormity of what we had achieved was really brought home to me when my wife and I travelled on the inaugural train — the Ghan. Hundreds of well-wishers lined the track as we passed through many outback communities. The engineer in me was deeply moved when a young woman, born and bred in Darwin, said in an interview that the arrival of the Ghan was “A great day for her as she’d never seen a train before!”

The Alice Springs to Darwin Railway project was a prodigious feat, requiring us to overcome financial, social and physical hurdles. As builders, owners, operators and maintainers of this ambitious project, we had to make the project stack up **FINANCIALLY**, and convince three Governments, fourteen Banks and numerous Investors of its Feasibility.

We then had to **BUILD** it to our estimate, which had been based on some very big calls. To succeed, we had to **BELIEVE** in the viability of what we were doing and back our **JUDGEMENT**.

We had made quite an unusual decision to build the track from the “middle out” when conventional wisdom dictates you build railways from one end. We did this to overcome distance from base depots and difficult conditions in the North which required longer lead-time for bridges and earthworks. Our productivity goal was set at 2.14kms/day for each trackwork team, which had never before been achieved. It had to be achieved for the job to be profitable for us. It was not only achieved but exceeded.

Engineering innovation was another key factor in the successful construction of the railway. We questioned established design standards in track and embankment configuration to see if there was a better way of doing things...AND THERE WAS!
We also designed elegant, streamlined modular bridges, with an emphasis on ease of buildability in remote locations.

From project inception through to completion, we remained very conscious of the social impact of the work we were undertaking.

We worked with the traditional landowners to locate, mark and protect sacred sites. We also engaged local populations to ensure they benefited economically from the project. Local procurement plans were drawn up, employment and training offered, and there was the establishment of many sustainable enterprises as a result of this project.

We also had to manage incredible logistics and a large workforce spread over 1,400km of project. This included accommodating, feeding and transporting crews, ensuring their health, safety and wellbeing, as well as motivating and inspiring them to remain on task in most inhospitable conditions.

A big dream, yes! even bigger challenges, yes!but we achieved what many thought was the impossible! What do I personally take away, and everybody else at Barclay Mowlem - from the Receptionist to the Railway men - who all consider themselves part of the project?

Immense job satisfaction and personal pride that no money in the world could replace. So, as I come off a project that will remain a professional highlight experienced in the afternoon of my career, what advice can I give you as you sit here in the dawn of your career?

Firstly, I would have to say develop a **PASSION FOR YOUR WORK** and give the best that is in you. With enthusiasm comes energy and a can-do attitude – essential in overcoming the many challenges you will undoubtedly face. Learn from those challenges—embrace them—for they will form the basis of your experience.

Next you need to be a good engineer – a craftsman. Learn your craft, practice your craft; and in the shadow of the great engineers of old, do not be hesitant of working across disciplines. Challenge architects, engage with scientists, medics, material technicians and inventors. Learn from them.

I would also tell you to be guided by your learning, and the wisdom and advice of your peers, but do not be afraid to dream. Trust your own **INTUITION**, it is the greatest friend you have. Many innovations and work practices that we take for granted today were borne from gut feel – from a refusal to be satisfied with “That’s just the way we do it here!” Trust your guts but then depend on your engineering skill and strictly check your logic. We operate in a high-risk business, and the consequences of wrong decision-making can be severe!

Be **RESOURCEFUL**. Whilst technology might have developed dramatically over time, the imperative for efficiency in design, time management and budget has not. Competition is fierce, profit margins are low, resources are short, and maintaining a competitive edge is difficult. There is always opportunity for innovation. Always remember the skill of an engineer is to achieve optimum outcome with minimum resource. Necessity may have been the mother of invention: An Engineer is usually the father!

Finally, and most important, always remember that at the end of the day you are in the business of **PEOPLE**. I emphasise PEOPLE, not technology, not equipment, not materials. The beginning and end of the industry you are about to enter is PEOPLE.

Whilst the understanding of technology and theory is essential, so too is your ability to manage your working relationships, and to communicate with your colleagues, your clients, and your boss.

The historic giants of our profession from Archimedes to Sir Frank Whittle had one huge advantage over engineers today – they did not have e-mail! I believe it to be the worst invention of our time, as it has stopped people from talking. Great engineering achievements are the work of teams, and great ideas come from the interaction of motivated, well-managed, inspired people, talking to each other. Designers, should always be in close proximity, and on good talking terms, with manufacturers and the ultimate users and operators of the product!

To conclude....passion...craftsmanship...intuition...resourcefulness....people skills... all essential ingredients for a fulfilling career.

To those of you who have completed an engineering degree, but succumbed to the call of other professions...GOOD LUCK....your education has given you highly desirable and marketable skills and you are assured of doing well.

But for those of you who hanker for a great sense of achievement, for those of you who thrive on transforming ideas from concept to reality, for those of you who will relish designing and building tangible solutions that will endure for generations, and for those of you who want to make a difference and improve the quality of life for future mankind, I am pleased to confirm that you have made the perfect choice of career as Engineers.

Go make your mark!