

THE CONCRETE YACHT ATHENA

On 21st March 2015, SA Members and partners assembled at the Royal South Australian Yacht Squadron for a viewing of member Michael Rossiter's steel silica composite yacht, Athena.

In 1975, the writer was privileged to attend a barbecue for SA Panel Members at Michael's residence, then in Salisbury, South Australia. In his adjacent paddock stood the steel skeletal frame of a yacht which he had commenced building.

Not too much attention was paid to the project at the time by those barbecuing, especially as Michael's property boasted a well-stocked wine cellar. But, as the years rolled by, whenever our paths crossed,



Michael apprised us of the yacht's progress; his enthusiasm for this life's work waned not one iota.

The basic building process consisted of a steel skeleton which was covered in steel mesh and longitudinal reinforcing rods. The longitudinal rods were sandwiched between 4 layers of

galvanised square mesh of 17 gauge steel having a half inch pitch (517 mesh). A layer of a finer gauge mesh was stretched over the outside of the layup to assist in fairing the hull prior to cementing. Many thousands of wire ties were used to tie the 'armature' together and make it rigid ready for cementing.



Athena in skeletal form, with some mesh and longitudinal reinforcing.

The concrete mix used for the hull was two parts of graded sand, with maximum grain size 3mm, to one part of cement. The nominal hull thickness is 20mm, and care was taken to ensure that a minimum cover of mortar was placed on either side of the shell. The mortar contained additives to ensure workability and watertight integrity after 30 days of curing under plastic.

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IMECHE YOUNG MEMBERS BREWDAY ENGTRAVAGANZA

The first of March this year brought the start of autumn and the third the annual national Young Member (YM) event; EngTravaganza2015. This year the event was hosted by the Victoria YM Rep, Khalid Abdulla. The theme ... Brew day.

The day started at Allpress Espresso in Collingwood. Founded in 1986, Michael Allpress is focussed on the flavour of his coffee which is why he uses the in-house designed fluidised hot air roasting system, ART, for his products around the world. The team in Melbourne were so enthusiastic about their coffee and gave the YMs a tour of the roastery as well as a look at the internal workings of an espresso machine.

The ART system uses Fluidised Hot Air to heat the beans as opposed to a flame on a barrel. This gives a much more controlled heating method and consistent product. A gas boiler is used to heat the air, which is cycled

three times around the system to save energy, which bakes the beans in the large tumbler. There are sensors throughout the system to ensure that the air is at the optimal temperature for the quantity of coffee being made. A control panel gives the ability to monitor the temperature sensors located throughout the ART and even shows the calculated bean temperature.

This state of the art (get it!) system takes approximately 10 minutes to roast 30kg of coffee. So while the roaster was busy we investigated the workings of your common espresso machine.

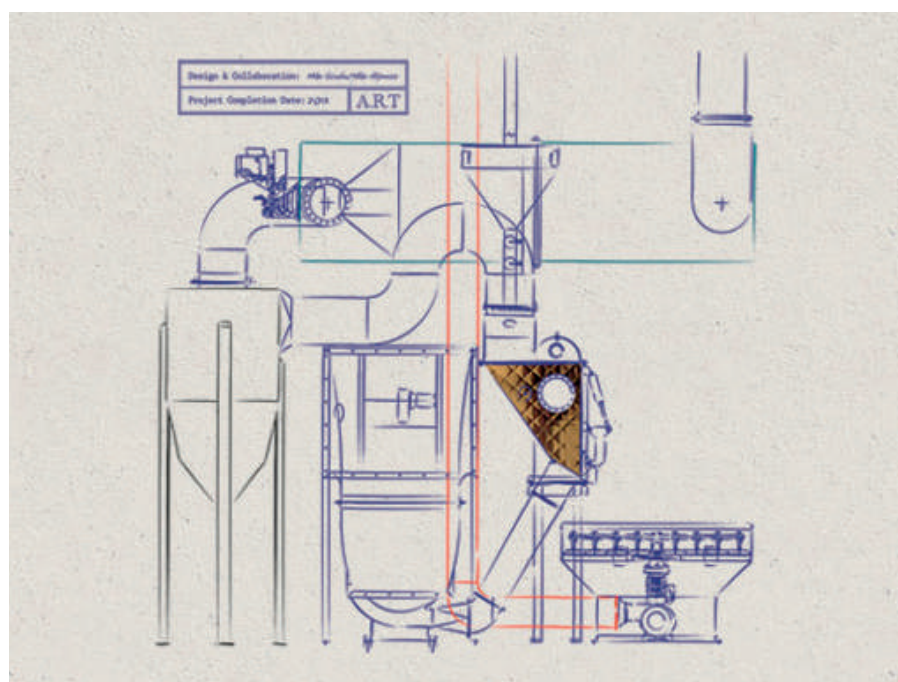


The brewing tanks at the Temple Brewery

Most technology has developed in the last 10 years, or at least the last 50. Not the espresso machine. The basic concept hasn't changed in over 50 years. Two boilers, one for water and one for steam, lie horizontally in the case. An external pump pushes the water through the copper pipes into to a pressure restrictor before slowly percolating through the coffee cake in the group handle. The pressure of the water, along with the temperature and hardness, determines the texture and flavour of the cup. In fact, the only variable which is still an unknown is the coffee grind size. A perfect 30ml shot should flow in 30 seconds. The sensors in the machine ensure that the temperature, pressure and volume of water all work at the touch of a button. If the coffee grind is too fine or too coarse then the flow will be quicker or slower, respectively, than it needs to be for a great cup. (NOTE research topic going for free)

After getting our brains stimulated we headed to Temple Brewery for a well earned burger and beer lunch. The journey across Melbourne was filled with fun facts about beer from Scottie. He also gave a great round up of the tasters during the post-lunch beer tasting; that man knows a lot about beer.

After lunch we had a tour from the head brewer at the Temple. The brewing room holds 12 vats in total; 3 for fermenting and 9 for brewing.



Allpress Hot Air Roasting System

The process for ales takes 8 weeks start to finish. For lagers, which are cold ferments, the process is longer as the lagering fermentation can take between 2 to 8 weeks due to the reduced temperature.

Once the beer has been made, the real toy comes out. The bottling machine is no bigger than a small table on wheels but that little contraption can bottle 72 crates per hour; that's 6 bottles in 11 seconds. The bottle machine is wheeled to the vat and the finished product flows down into the distribution pipe. Once each of the six bottles is filled, monitored by the fill line laser sensors, the caps are fitted using a high pressure press. A simple table slide ensures that the next six bottles are ready for the next delivery of fresh beer.

From our excursion we realised that the brewing of coffee and the brewing of beer have a lot of similarities; the temperature of the mix, the volume of water to solid and the mixing time are key drivers when selecting flavour. The roasting of coffee is also, apparently, very similar to the malsters where hops are converted for the brewing process but you'll have to take Scottie's word on that. That may have to be the next YM technical tour to confirm that he was right.

It was an excellent day with a lot of laughter and more learning than was intended. With a group of 20, this was our largest EngTrav yet. It will be great to see what happens next March.

Before then, if anyone would like a free space to use please contact Allpress Espresso. They have a community space in their studio which is wonderfully finished. All links to the hospitable companies who gave up their Sunday to look after us are below.

Allpress Espresso: au.allpressespresso.com

Temple Brewing Company: templebrewing.com.au

AMY LEZALA.

Young Member Chair



Athena at the SA Royal Yacht Squadron

The concrete Yacht Athena (Cont'd from cover page)

Working in the open, the concrete mix was applied by hand using electric vibrators and a scoop, to force mortar through the mesh layup. The mortar was applied from one side only to avoid cavities in the hull. Hull integrity was tested after 30 days by filling with water to above the water line and observing for leaks.

In November 2003, Panel members visited the yacht, then relocated under cover at a boatyard in Port Adelaide, at which stage it had received its first paint coats and was in the early stages of being fitted out. This event was combined with a cheese and wine tasting evening with a power point presentation of the hull construction.

In November 2007, Panel members again visited the boat, now outdoors, when masts had been fitted, the hull painted, much of the interior finished and with soft furnishings in place. This visit was covered in a subsequent News Bulletin.

Athena was launched on 23 December 2009 and proceeded to the Royal South Australian Yacht Squadron on 2 January 2010 with a crew of five persons. This turned out to be a much more exciting trip than had been expected when, half way there, a new propeller shaft bearing seized due to insufficient salt water cooling, despite careful testing beforehand. The drama of this story can be read in the RSAYS Quarterly dated 10 March 2010.

Athena's vital statistics are; length 15 m, beam 3.7 m, draft 2 m. For the technically minded, the yacht fitted out displaces over 18 tonnes and is

powered by a Perkins 4108 (4 cylinder 50 HP) auxiliary diesel engine. Athena is a ketch, having two masts and four working sails namely: main, mizzen, staysail and jib. Nominally, a crew of two can handle the yacht for short distances, but, on longer trips, a crew of 3 or more is favoured. Although, at times, Michael and his 'First Lieutenant' Lillie Seddon have sailed her alone across the Vincent Gulf.

The vessel is fitted with exemplary sophisticated state of the art navigational aids, including GPS navigation/chart plotter, auto pilot, radar, depth sounder, wind speed and direction, and a VHF marine radio. A galley with gas cooking facilities and fridge/freezer as well as hot and cold running water contributes to crew comforts. Athena has two heads, and berths to sleep seven people.

Michael carefully explained to our party the principal features of his magnificent vessel, and we marvelled at his dedication in completing the project after so many years. Half a lifetime!

After the viewing, members and partners repaired to the Yacht Squadron's newly refurbished dining room, overlooking the yacht basin, where many a lamp was swung, for a delightful evening repast. Our thanks to Michael and his enthusiastic crewperson, First Lieutenant Lillie Seddon, for hosting the event.

STAN GAFNEY

South Australia Panel Chair

IMechE President Mark Hunt - Tour Down Under

This January saw our President, Mark Hunt embark on his second international visit in representation of the Institution. Mark was accompanied by his wife Lisa for the two-week long visit to meet key members and industry leaders in Australia and New Zealand. Here is an account of how the visit developed over the six cities he visited:

Arriving after a 26 hour journey from the UK via Hong Kong, Mark and Lisa arrived in Perth on the morning of 19 January and were greeted by the Oceania Regional Chairman, Ken Tushingham. The next morning's visit was to Mundaring Weir to visit the museum at pump station number 1. This was the first pump station in the Goldfield water supply scheme developed and executed by C. Y. O'Connor. The pipeline scheme transported fresh water from Perth 330 miles to Kalgoorlie and was the first of its kind anywhere in the world. Although O'Connor did not live to see the success of his project, the pipeline is still in use today, although the pumps are electric.

As Ian Kirk, WA Panel Chairman commented: "Mark was visibly impressed by O'Connors' engineering prowess and was very supportive of the suggestion to put this

engineering achievement forward for recognition with a Heritage Award".

Mark said of the visit: "The itinerary spanned places of international significance, both in terms of industrial heritage and engineering innovation. In Western Australia, a Victorian project supplying fresh water to the gold fields 600 km away is testament to engineers' entrepreneurial spirit and perseverance and the fact that over a century later more than 60% of the original pipeline is still in use is a remarkable feat. This demonstrates that engineers give communities a stake in their own future".

In the evening Mark gave his George Stephenson lecture presentation at the Engineers Australia Auditorium which was followed by dinner at the C restaurant with a number of local members.

On 21 January, the President and his wife were greeted at Melbourne airport by the incumbent Chair of the Victorian Panel, Andrew Lezala. In the early evening, Victorian panel members gathered for a traditional Aussie barbie at Andrew Lezala's apartment.

In the evening of 22 January, IMechE Victoria enjoyed a turnout of forty six members for a splendid Gala dinner in the Chairman's Room of the RACV Club. All those present listened



intently to the President's delivery of the GSL entitled 'From Young Member to Youngest President'.

Matthew Cook, the new Victoria Panel Chairman, remarked: "The lecture received high praise and several members commented on the skill and competence with which the President conducted himself."



Left to right: Roshan Dodanwela, Brian Carter & Andrew Lezala receiving awards for their contribution to the Victorian panel

The President awarded two certificates of commendation on the night, one to Brian Carter (Victorian panel member) and another to Roshan Dodanwela (Victorian secretary), for their services to the Institution.

Andrew Lezala was also presented with a commemorative engraved glass memento in thanks for his efforts as Victorian Panel Chair, as he handed the role over to Matthew Cook on the night.

The next day, the president winged his way to NSW, where he was hosted by NSW panel chair, Monika Sud.

Prior to the GSL Mark met with the NSW Panel Committee and members of the Australian Defence Force at a private lunch.

The GSL in the evening in Sydney had a total of 25 attendees, a mixture of Defence Force potential recruits and approximately ten IMechE NSW members. Of the GSL, Monika states: "Mark's style was engaging, inspiring, thought provoking and a breath of fresh air. The trip really did inspire my panel members and brought in a new lease of life and enthusiasm to continue our good work in the NSW region."

Following a day's break from the activities, on 25 January, Mark and Lisa were taken on a tour of Brisbane City by Daya Dayanarte and Belinda Herden, visiting locations such as the "Gabba" Cricket Grounds, Brisbane City Halls, Central Railway Station, Anzac Square and War Memorial prior to arriving at the University of Queensland to meet the Head of the School of Engineering, Professor David Mee for a tour of the school.

That evening 34 people attended a dinner and presentation at the Victoria Park Golf Club in Hersten. Certificates of Appreciation were presented by Mark to Jack Taylor and Ian Marshall, two former Queensland Panel and Branch Chairs.

The next morning Leslie and Janet



Wellington Cable Car

met and accompanied Mark and Lisa on the Miramar II for a cruise on the Brisbane River en route to the Lone Pine Koala Sanctuary where they were met on site by YM Chair, Amy Lezala who accompanied them around the Sanctuary. This was followed by a traditional Australia day barbecue (what else?).

Early the next morning Mark flew across the Tasman to Auckland, New Zealand. A reception and dinner was held in the hotel where the guest list comprised many key members of MEG as well as senior members from the Institution of Professional Engineers New Zealand (IPENZ) including Dr Kevin Thompson, the outgoing IPENZ President. Mark comments: "As engineers we have much in common: imagination, innovation and inspiration. So we must use all three in a concerted fashion for the greater good of society. The leading Professional Engineering Institutions in the UK have an ideal opportunity to collaborate more closely for example with Engineers Australia and the Professional Engineers New Zealand in the name of the international community".

The group then convened at the lower terminus of Wellington Cable Car. Here, they were met by Simon Fleisher who is CEO of that organisation. The cable car,

which has been in operation for over 100 years, was submitted for an IMechE Heritage Award but was declined on the grounds that it had been significantly upgraded and modernised over the years.

Andrew Clark then transported the group to Callaghan Innovation, a government sponsored research organisation with branches in other centres that has morphed out of the old Department of Scientific and Industrial Research. There they were met by Deon Grobler and Richard Templer (General Manager), who escorted the group around the facility. Of particular interest was research on 3D printing using titanium as the medium for eventual production of artificial heart valves.

That evening, Mark presented his George Stephenson Lecture that evening to an audience of 38.

On 29 January, Mark and Lisa headed for the Auckland Museum of Transport and Technology (MOTAT) in good time for the presentation of an IMechE Engineering Heritage Award for the Wolfe Double Beam Pumping Engine that was commissioned in 1877. Win Miskelly introduced Mark who presented the plaque.

Mark said: "In New Zealand the Wolfe Double Beam Engine at the Auckland

Museum of Transport Technology was unique as only one of its kind still in operation. While the Wellington Cable Car still transports a million passengers per year despite the Victorian requirement for recreational use – it has more than stood the test of time. In contrast, cutting-edge technology is in no short supply in the Antipodes where engineers are leading the way in oil and gas, bio-medical advances, geo-thermal power, transport technologies and remotely piloted air systems to name but a few. What stood out loud and clear was that as engineers across our many disciplines we should concentrate on our similarities and not focus on the differences. I witnessed multi-disciplinary projects in power generation, transport and infrastructure that are all at the forefront of technological advances in the Southern Hemisphere”.

For the final evening, Mark presented his GSL in a lecture theatre at the university. This was attended by more than 60. The lecture was followed by dinner in the hotel with 20 members and partners taking part.

It was here that Mark presented Win Miskelly, New Zealand Country Representative, with a certificate recognising his many years of service to the Institution.

On the final morning (30 January) Mark, Ken and Win took a ferry across the harbour to Devonport where they were met by Ben Withy from the Defence Technology Agency (DTA). The DTA is situated on naval premises, but offers a service to all three armed forces.

The first section the group were shown was conducting research into Unmanned Aerial Vehicles (drones) and the autonomous control systems being developed. Following this, they were then shown the section dealing with materials and structural research with particular emphasis on failures that had occurred. DTA are particularly interested in the performance of composite structures such as the helicopters recently delivered to the Air Force are predominantly constructed from carbon fibre.

For Win Miskelly, the benefits of the Presidential Visit to New Zealand are vast, albeit difficult to measure: “I think the visit to New Zealand can be considered a great success and it is hard to quantify the benefits

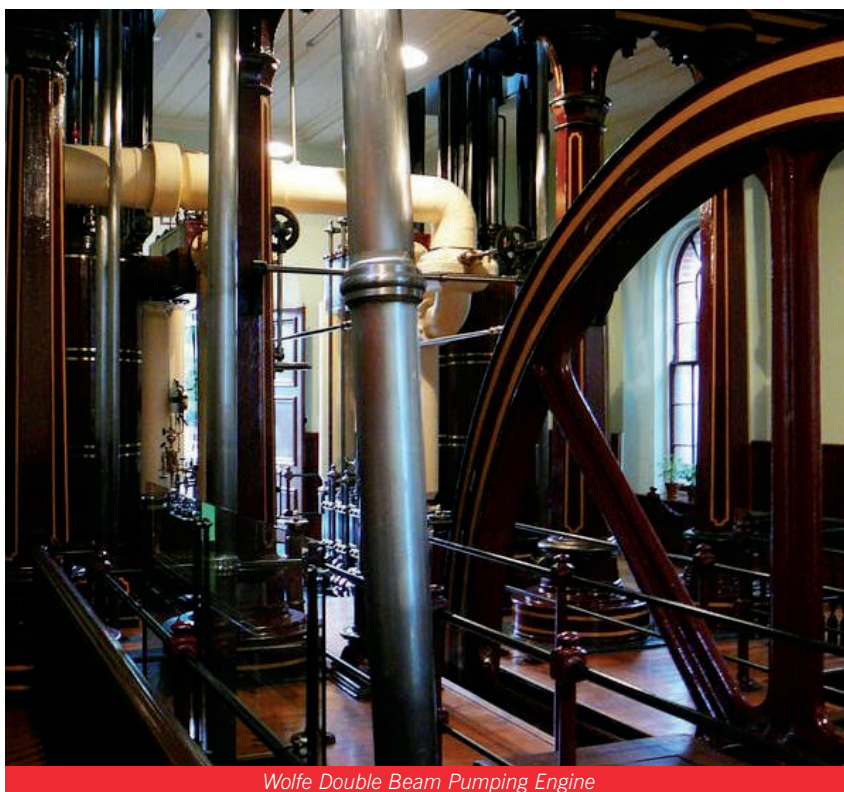
that such visits from the Presidents of the Institution can have on local membership.”

Summing up his own thoughts on the overall visit to Australia and New Zealand, President Mark Hunt concluded: “My Presidential Visit to Australia and New Zealand was a resounding success. By any scale of engagement it was a marathon of epic proportions covering 6 cities in 14 days (Perth, Melbourne, Sydney, Brisbane, Wellington and Auckland) and clocking up 45,000 kilometres in the process.”

Mark continues: “I met Engineering Technicians, Incorporated and Chartered Engineers as well as Fellows from the IMechE and sister Institutions all with a common aim of advancing the boundaries of engineering. No sector was left untouched: Government, Academia and Industry from Young Members to senior leaders. The brilliant engineers I met have made a lasting impression on me and I am pleased to report a growing understanding and support for what engineers are achieving on a global scale.”

IMAN KOUCHOUK

International Member Development Executive



Wolfe Double Beam Pumping Engine



President Mark Hunt presenting the heritage award for the Wolfe double beam pumping engine

FROM THE CHAIR

Greetings!

Exciting times are upon us. It has been most pleasing to see the steady growth of our Branch and particularly the emergence of and increasing participation by our younger members. It is both encouraging and inspiring to see their prominence within the Institution and their gradual taking over of it. Succession planning is critical and plays a vital role in a smooth transition to the next cohort.

All the credit must go to our members and volunteers. Our Branch is run entirely by volunteers and they all juggle the loads of work, family, IMechE and many other things in their lives, at times, without doubt, under demanding circumstances. Without their generous support, commitment, dedication and sacrifices our Branch could not exist and we would not have achieved many of the things that we have. My strong belief is that in any organisation, volunteers, in theory, should always do better than paid employees. While employees work for compensation, volunteers are there because of passion, loyalty and commitment. Volunteers do things when the IMechE needs it, not whenever they can. Volunteers do not expect anything in return. Volunteers never ask what is in it for them.

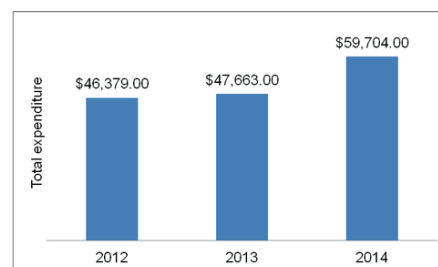
We are engineers and being modest is our intrinsic nature. However when we think and look back, in retrospect, you will be amazed to see the amount

of activities continuously going on at Branch and Panel levels. Usually, there is quite a close correlation between expenditure and activities, so expenditure should be a good, key performance indicator. In view of our total expenditure, which should demonstrate our level of activity, we can clearly see the upward trend from the graph to the right.

The 'NearYou' website and other means of electronic communication are now widely used for advertising and communication. We need to utilise these resources to their full extent. One major hindrance to this process is access restrictions due to some misinterpretation. Opting out of "Regional News and Updates" in the member profile forbids Branch from disseminating important information to its members. Hence, only a small proportion of members now receive Branch or Panel mass emails. Thus, I urge all members to log into their member profile and tick the box to receive "Regional News and Updates".

The Presidential visit was a great success and everyone involved is highly praised for their efforts and commitment for the great job well done.

Looking forward, it is wonderful to see that we have uncontested nominations for all Branch Executive positions. We look forward to expand the range of our activities with a major focus on recruitment, retention and advancement. Young Member Groups and Student Chapters will be instrumental in this undertaking.



The next major challenge will be the Asia Pacific Region's Design Competition planned for 2015, which will give our enthusiastic young members a fantastic opportunity to showcase their strengths.

It is promising to see a number of new volunteers emerging across the country in various capacities, fostering new initiatives. New blood is essential for a vigorous organisation.

The 2015 Oceania Regional Elections will be completed by the time this article is published, and so I congratulate the incoming Oceania Board, and thank the outgoing Board for their tremendous help, from the Regional perspective.

As you may be aware, this will be my last column of "From the Chair", which has made me realise it is indeed true that time flies. Two years gone. It almost seems like years tend to go quicker as you grow older. I think this might be because we instinctively measure time against our life span. It is yet another proof of relativity and time. When we consider this frame of reference, one year means one fifth of a life for a five year old, but only one fiftieth for a fifty year old.

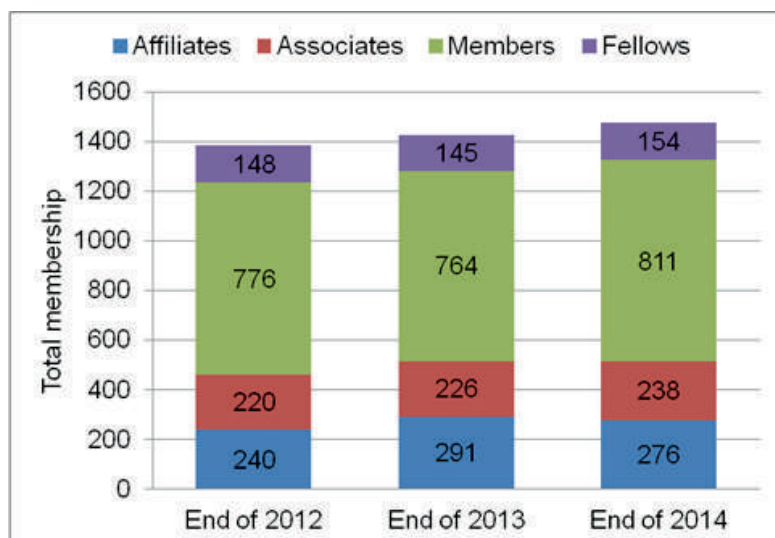
I took over a healthy organisation and I am pleased to be able to say that I am handing over a healthier organisation. I would like to thank you all for electing me to be the Chair of this fine Institution, and for your help, support, companionship and guidance during my tenure over the last two years. I congratulate the incoming Chair, and join with you to offer him any support he may require.

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Oceania Region News

It has been a busy start to 2015 for the Oceania Region. The presidential visit by Mark Hunt in January was a great success, with George Stephenson lectures presented at six locations across Australia and New Zealand. Thank you to all those who helped make this happen.

In January, Ken and I visited the Papua New Guinea University of Technology, in Lae. I found the visit to be very rewarding and was amazed at the enthusiasm shown by the staff and students. Our day on campus included a meeting with the Vice Chancellor, mechanical engineering staff and the engineering students. The discussions focussed on the challenges that the university faces and the services that IMechE can provide to the University and its students. I was astonished to learn that things I rely on in my daily and professional life are not available for the students at UniTech, such as reliable internet and access to computers. We are excited to continue working with the University of Technology in the future and thank Professor John Pumwa and his team for making our visit so memorable.

The annual face-to-face International Strategy Board meeting was held in Tokyo in

March. Ken and I attended to represent the Oceania Region. The meeting consisted of two days of productive discussion relating to the international strategy for the IMechE and setting our key areas of focus for the coming year. Academic accreditation, relaxing the requirement for the exclusive use of the English language and motivation and expansion of the volunteer network were all raised as important international topics and will be raised further within the IMechE over coming months.

I hope that you will have recently seen voting papers for the regional election. Later this month, Ken and I will step down from our current positions and hand over to the incoming Oceania Chair and Young Member Representative. I have been honoured to hold this position for the past four years and am looking forward to continuing to work with the IMechE in the future. Ken and I are excited to see what the new regional committee will achieve and wish them all the best.

BELINDA HERDEN

Oceania Young Member Representative

Editorial

Technology and, in particular, electronic technology is having a major impact on the changing face of modern engineering. A few years ago a self-drive car was science fiction, and now it is set to become

a reality in the near future. The advent of the battery powered vehicle will reduce the barriers to entry into the market significantly by eliminating a vast majority of the current powertrain system and relying instead upon fairly generic battery – motor systems. These reduced barriers to entry have opened up a whole new world of prospective vehicle suppliers with both Google and Apple weighing in to the field. Many of the previous challenges of the industry are taken away by the removal of the driver and the internal combustion engine and powertrain. These are replaced by software and battery technology challenges. Already, the production of a bug free, stable vehicle platform is one of the main challenges of the vehicle manufacturer.

The traditional mechanical engineer has to learn to adapt to and embrace these new technologies before the face of the market changes beyond their realm of knowledge. Given the rate of flux in the traditional manufacturing environment, it is quite feasible that the current multinational automotive manufacturers are replaced by a new wave of lean companies constrained by none of the restrictions placed upon previous heavy industry manufacturers within a short number of years. Recently, taxi firm Uber have started to make major inroads to the traditional taxi business. If you mix Uber with driverless vehicles you quite quickly come to a position where personal ownership of a car is no longer required and one then has to speculate on who will own the cars. The BBC recently reported on Mike Hearn, a Zurich based software developer who proposed that cars could, in fact own themselves, providing a service to the public at the best rates and covering their servicing and refuelling requirements with their profits. What seems like science fiction now, could certainly be the norm soon with the rapidly changing pace of technology.

MATT PROUDLOCK News Bulletin Editor

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Young Member News

Get out and live. The profile of Engineers has slowly been rising over the last decade, mainly through the work of Engineering Institutions such as the IMechE, TV shows such as Myth Busters and the Governments around the world.

The question is: what makes a 'good' Engineer?

**ENGINEER
SOLVING PROBLEMS
YOU DIDN'T KNOW
YOU HAVE
IN WAYS YOU CAN'T
UNDERSTAND**

Not only does a good engineer have to be good with maths, they need to be good with life. Studying the laws of physics and understanding how to different to the third order will allow you to solve many defined problems; an Engineer needs to be able to define the problem itself. Knowledge of the world is needed in both understanding the scenario and quickly cutting out the obviously inappropriate solutions.

For example, have you ever wondered why traffic lights are stacked as three separate lights with a set configuration? This is because a clever engineer realized that 4.5% of the population is

**I'm an
~~Engineer~~
~~Engenere~~
~~Engeneer~~
I'm good
with math.**

colourblind and cannot tell the difference between red and green; fairly key when stopping at a junction. By orientating the lights in a standard fashion it is not necessary to know what the colour is. If the top light is on then you need to stop!

If the engineer who designed the bike-share schemes of cities thought a little about human nature they would have saved on the continued operating cost. A fact that cropped up on the EngTrav15 bus was that the main costs of the shared bike schemes is the van which drives around redistributing the wheeled beasts. There is a tendency for the general public to rent a bike at the top of a hill and park it at the bottom but cannot be bothered to cycle back up the hill to return it to the original location. This leaves the bike racks at the bottom of the hills overflowing, whereas those at the top are empty. A clever engineer would preempt this and ensure that there are less bike racks at the bottom of hills, forcing the public to return up the hill to avoid the fine of stealing a bike.

So whether it is the genius of the popup tent to reduce camping tedium, adding zippers to babygrows for sleep-deprived parents or the thumb-stylus in gloves for mid-winter texting, good engineers need to know how the world works to develop appropriate solutions. The best education you can get as an engineer is to see the world.

Put down the text books, research papers and CAD machines. Step outside and watch the world go by, if only for a lunch break. It might surprise you what ideas start to flow.

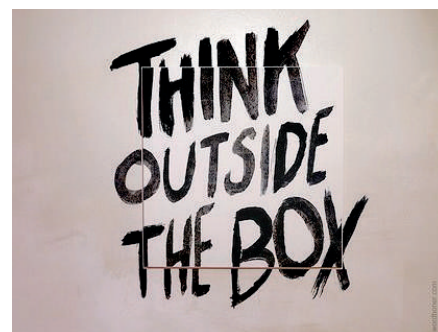
(NOTE – this also applies to Designers, Architects et al. We Engineers are not that special)

AMY LEZALA

Young Member Chair

QLD News

Well first let me introduce myself I am Wolfy Dempsey the new panel chair



for Queensland and the first thing I would like to do is to thank Leslie Yeow for all his previous years of service in the role and wish him well as he moves on within the IMechE to become the Australian Branch Chair.

I am a mechanical engineer with many years of experience in the Royal Navy having served on HM Submarines for 24 years aboard several classes of nuclear submarines. My later years as an engineer have been spent in the oil and gas industry working at refineries in New Zealand and Brisbane before settling in LNG in Brisbane with a plant at Gladstone on Curtis Island.

Recent events since becoming panel chair have seen the awards at the University of Queensland for the "Speak out for Engineering" for the best speakers and an award for The Frederic Barnes Waldron "Best Student" Award for 2014 to Kianoosh Naveh. Kianoosh is still currently at UQ working towards his PhD and we wish him well in his endeavours. The two student awards went to: 1st place John Pidgeon for his presentation on Development of Short Term Intra hour Concentrated Solar Energy Forecasting Capacity through DNI Measurement and Cloud Tracking. It was a look at barriers to solar energy implementation such as the intermittent nature of solar energy caused by cloud cover temporarily blocking the sun.

2nd place went to Sarah Mecklem for her presentation on Jupiter Asteroid Observation. Sarah's thesis project aims to develop a physical system capable of autonomously observing

asteroid impacts with Jupiter. The system will continuously track and monitor the planet's transit across the night sky.

The region is currently scheduling and progressing PRI (Professional Review Interviews) for prospective Chartered Engineers in the region. Although going well, with several already completed for the year, the interviews depend on a small band of volunteers, obviously putting a demand on a small team. More volunteers are needed to ensure we complete these interviews for prospective candidates and reduce the load on current interviewers. Please do not hesitate to contact me for further advice or information.

WOLFY DEMPSEY
QLD Panel Chair

NSW News

We have been very busy here in NSW these past few months with lots of activity.

The NSW Panel had the pleasure of hosting the Institution of Mechanical Engineers 129th President and youngest President in our 167 year history, Mark Hunt and his wife Lisa in Sydney on the 23rd January 2015.

Mark has been an Engineer Officer in the RAF for 18 years and is now the Type Airworthiness Authority for the RAF's intelligence gathering, surveillance, target acquisition and reconnaissance fleets of Sentinel and Sentry aircraft.

A big thank you to Defense Force Recruitment, especially Captain (Navy) Simon O' Brien, Director of Military Recruiting and Marcus Gore, General Manager Operations. The day ran to schedule and we all had a fantastic time.

Mark presented his George Stevenson lecture "From Young Member to Youngest President" where we had over 25 attendees, a mixture of defence force potential recruits and more than ten NSW IMechE members. We had quite a few questions post presentation and quite a number of them from the younger members in the group, the presentation was very engaging and appealed to all those in the audience. After the

presentation Captain O' Brien and Mark exchanged thankyou gifts.

Mark's style was engaging, inspiring, thought provoking and a breath of fresh air. The NSW Panel found Mark's personality and energy infectious and he has a talent for making everyone feel comfortable and involved.

The NSW Mechanical Chapter have had some technical presentations of late in conjunction with IMechE, EA and ASME at the Engineers Australia auditorium in Chatswood.

In March Geoff Stone presented on "Durability – An owners perspective". Geoff discussed the finer details of durability and its impact on life cycle costs. The presentation covered various aspects and perspectives of the Owner, the Contractor and the Suppliers. Geoff discussed how you achieve the goals of durability and if it has to be a conflict of cost, time and quality.

In April Ian White MIEAust CPEng presented on Procurement Practice which covered the process and obligations on both parties in procurement (purchasing and supply) with some useful tips on how to ensure that you get what you should be getting. Recently, the concept of pre-qualification has been introduced which places a further level of complexity on both sides of procurement.

Ian is a Mechanical Engineer and has worked on a wide range of projects ranging in value from a few thousand dollars up to projects with budgets in the multiple millions of dollars. The presentation was well attended.

We have some exciting news this quarter. One new panel member joins us officially in NSW. Anna Davis. We welcome Anna to the team.

Our first ever annual Christmas competition "12 days of Christmas" was very successful and our 12 lucky prize winners should have received their prizes earlier in the year.

MONIKA SUD
NSW Panel Chair

Victoria News

This year has certainly started with a bang for the Victorian panel and Victorian members. As part of the IMechE Presidential tour, the panel hosted President Mark Hunt and his wife Lisa for two days which included Gala dinner on 22 January at the RACV Club in Melbourne's CBD. The dinner was enjoyed by members with an attendance of 44 to witness Mr Hunt very competently deliver the George Stephenson lecture. During the dinner Brian Carter (Vic Panel member) and Roshan Dodandwela (Vic Panel Secretary) received long service recognition certificates which were presented by Mr Hunt. Andrew Lezala took the opportunity to step down as the extant Victorian Chairman, handing over the reins to myself (Matthew Cook) on the night. Andrew was also presented with a small token of appreciation for his outstanding service. Victoria then played host to both the Australian Branch Committee Meeting, the final of the 'Speak Out for Engineering' Competition and the IMechE Australia Annual General Meeting on Saturday



28 February. This very busy day was followed by a sit down meal that was very well attended. The Young Members Extravaganza was held the next day and included a tour of Allpress Espresso Roastery & Café in the morning followed by lunch at Temple brewery in the afternoon. My thanks to both Roshan Dodanwela and Khalid Abdullah for their efforts in organising these events.

In late April a technical lecture was presented on the British QE Class Aircraft Carriers, focusing on the MT-30 gas turbine engines. Although the lecture attendance was lean, the subject matter and Q & A session which followed was appreciated by members.

The Victorian panel is currently running a sub-committee looking into the development of a mentor/mentee programme. The main objective of the programme is to help engineers who are looking for a mentor locate a suitable person who is appropriate for their skill set and future plan. The panel will be organising a social evening that brings both parties together in an informal environment.

Going forward the Victorian panel continues to work hard with a CSIRO lecture on Laser Assisted Machining booked for 30 April, an exciting visit to 'Performance at the Limit' a Formula 1 inspired hands on workshop booked for 28 May and later in the year a site visit to the Hoppers Crossing pumping station. There will also be a number of social and networking events as the year progresses, so keep an eye on the IMechE Victorian section of the website. Please also keep in mind that technical lectures, site visits and social events are more successful with good member participation. Hopefully the remainder of 2015 will continue with the same pace and interest as it has begun.

MATTHEW COOK
Victorian Panel Chair

The Mechanical Heart With No Pulse

Scientists and engineers in Australia have successfully implanted a bionic heart in a sheep which works without

having a pulse.

Biomedical engineer Daniel Timms designed a centrifugal pump to replace the heart while studying at Queensland University of Technology in 2001. The mechanism utilises a spinning disc with multiple small blades on either side, representing the two sides of the vascular system. The rotor is held in place and driven magnetically, resulting in extremely low friction and energy losses. The large gaps also limit the amount of cell damage which occurs.

Dr Timms worked on the premise that the body needs a continuous blood flow and that could be done with a device which did not necessarily have to replicate the pumping action of the heart muscle. The BiVACOR is designed to replace only the lower chambers of the heart and would be sutured to the remaining upper two chambers of the existing heart. "Hundreds of millions have been spent on developing an artificial heart but most were modelled on the way the heart works, and were too large and didn't last for long," he said. "The shift in thinking to researching a device that would deliver a continuous flow of blood, rather than trying to copy nature, was like our first attempts at flight - we thought we had to replicate bird flight and so early flying machines had flapping wings," Dr Timms said. "BiVACOR has been a progression over 13 years. We still have a long way to go, maybe five years, till we can test it on humans."

Dr Daniel Timms' work was honoured with the QUT Young Alumnus of the Year award at the annual Outstanding Alumni Awards at the



BiVACOR centrifugal heart pump

Brisbane Convention and Exhibition Centre.

Dr Timms gained a Bachelor of Engineering (Mechanical) at QUT before embarking on a PhD in biomedical engineering at QUT and started research on an artificial heart more than 10 years ago.

His research has taken him on expertise exchanges to Japan to perfect the magnetic impeller at the 'heart' of his heart and to Germany to apply precision engineering techniques to manufacture the device.

"I have worked with great teams around the world who have spent countless hours, many as volunteers just out of the passion they have for this project, to get the BiVACOR this far," he said.

For more information see www.BiVACOR.com

Images courtesy of BiVACOR corp



IMechE On DEMAND

www.OnDemand.IMechE.org

On Demand is the Institution's new, integrated knowledge platform hosted on imeche.org.

A trusted, up-to-the-minute source of technical engineering insight, wherever you are in the world, whenever you need it. On demand strengthens engineers' technical knowledge



The **On Demand** service provides exclusive new video content to complement the latest news, reports, policy statements and case studies already on the site.

Because it's online, the service gives engineers immediate access to knowledge whenever they need it, wherever they are in the world.

The Institution's Head of Knowledge Transfer, Kelly Grant, said: "Building on George Stephenson's original vision for the Institution, **On Demand** enables us to share the latest technical knowledge, expertise and experiences with you - and your peers - across the engineering community.

"When developing the service, we considered your needs and the time constraints modern life places on you and other engineers. We also wanted to use the many opportunities technology provides us with, to ensure you can access the information, no matter where you are.

"**On Demand** features a selection of video content from our event programme as well as documentaries and interviews with industry leaders, all brought together on a single platform. Access to this range of technical and thought-provoking

material is instant. Viewing the content, whether it's a case study presentation, lecture or the latest insights, can count towards your continuing professional development (CPD) as an engineer, too."

Engineers can visit On Demand to engage with the latest ideas, innovations and thought leadership emerging from the institution's conferences, seminars and lectures.

By watching industry experts' latest keynote speeches and seminars, engineers can strengthen their technical knowledge and stay abreast of developments in their field.

They can also watch coverage of the institution's most influential activities and be inspired by videos about the future of engineering.

The On Demand editorial team regularly scour the Institution's events to ensure the service offers outstanding and unparalleled engineering content.

For example, recent On Demand content includes:

A captivating feature on the design and manufacture of the **Brompton** bicycle.

A technical lecture on the **Drax Ecostore Project**, given by production

director Peter Emery.

A compelling feature on how the **Teacher Industrial Partners' Scheme** is changing the quality of engineering outreach, thanks to teachers' interactions with companies such as Crossrail.

The service also aims to encourage aspiring engineers by providing them with inspiring content such as a series of videos on 'how to win' at Formula Student in 2015. The suite of videos includes a presentation by chief judge **Terry Spall** on how planning, project management and preparation can give Formula Student teams an advantage.

On Demand contains everything from bite-sized edits that are perfect time-fillers, to comprehensive features, giving engineers in-depth insight into a particular field. The service aims to be the destination for thought leadership in engineering.

With a constant upload of ideas, engineers at every stage of their careers can enhance their knowledge and fuel their engineering curiosity.

"We're proud of the service, and hope you enjoy it as much as we enjoyed developing it for you," said Grant.

Visit On Demand at www.ondemand.imeche.org to find out more.