



## ENGNow 360 LEADERSHIP CONFERENCE

In September of 2013 EngNow 360 brought together over 400 young engineers in Hong Kong for an Institution first: a pan-Pacific leadership conference specifically for young engineers.

Following over a year's preparation and organisation from an army of volunteers from the Hong Kong Branch the four day event focusing on various elements of international leadership and development was put together. It consisted of three major components:

- Asia-Pacific Speak Out for Engineering (SOE) final
- Design competition "Aiding the visually impaired"
- Two day symposium of lectures, talks and Q&A style interactions.

EngNow was hosted by the Institution of Mechanical Engineers North East Asia Region (NEAR), and jointly organised by South East Asia Region (SEAR), Southern Asia Region (SAR), Oceania Region (OR), the British Consulate-General, and Hong Kong Polytechnic University (HKPU).

EngNow 360 was launched during a ceremony at the British Consulate General, attended by Paul Lynch, Deputy Head of Mission. Throughout

the four days the event featured an impressive community of senior executives and business leaders from around the world.

The event also attracted accomplished academics and young members who came together to discuss and promote the values and challenges of leadership, and the developing roles of world-class engineers.

The Oceania region, of which Australia forms the majority, sent 8 representatives to the EngNow 360 leadership conference. The Oceania region chair Ken Tushingham, the Oceania Young Members representative Belinda Herden, the Australian Branch Chair Dayaratne Dharmasiri, the *News Bulletin* Editor Matthew Springer, the New South Wales Panel Chair Monika Sud and three SOE national finalists Simon Cowling, Scott Fisher and Amy Lezala.



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## SPEAK OUT FOR ENGINEERING FINAL

The first day of the event was the Asia-Pacific wide Speak Out for Engineering competition. The final was very different to many of the Australian finalists' previous competitions; being outdoors in the middle of Hong Kong Polytechnic University and having a large multinational audience all with interesting and diverse questions.

There were twelve competitors each giving a 20 minute oral presentation accompanied by a massive screen to show supporting information to the audience. The presentations, relating to mechanical engineering, were followed by a 10 minute discussion and questions from the judges and audience. Although in the 30+ degree heat the question time went very quickly.



*Design Event competitors let blind attendees trial their prototype designs*

Despite the heat the competition was fierce and all the competitors had learnt from the feedback given during national finals. The five judges, representing various industries and backgrounds including engineering, design and law, found it quite a struggle to decide the winners and finally announced two champions and one runner-up.

Unfortunately, this year the Australian competitors didn't place in the top three. Better luck for next year's national SOfE finalists. The joint winners were Yasir Ahmed Naveed, from North East Asia Region, with "Tuned Mass Damper for Rail Noise Control" and Archishman Ramasubramanian, from South East Asia Region, with "The Lazy Wok".

## BELINDA HERDEN'S ENGNOW LEADERSHIP LEARNINGS

- What events did you attend/ participate in?**  
I attended the SOfE and design competition and participated in the Leadership Conference
- From these events what was your take away message on leadership?**  
Successful leadership is not how well you shine, but how well those around you do. Leadership can be learned and practiced.  
The importance of attitude: Success = ability x effort x ATTITUDE.  
Attitude can be both positive and negative, so no matter how much ability or effort you put in, if your attitude is negative success will be as well.
- What was the best part of this event, and what would you do again for events in Australia?**  
Inviting visually impaired people to attend the design competition added to the competition's success. It gave the participants a real sense of satisfaction to see their designs being put to use and taught the important lesson "Design with the end user in mind". The calibre of speakers participating in the Leadership Conference was fantastic. The speakers were real life engineers who had created success in their careers. The lessons they had to share were inspiring and insightful.
- What was the most memorable quote(s) from the event?**  
"A leader is one who knows the way, goes the way and shows the way".

## DESIGN COMPETITION

The design competition set the challenge of improving the lives of the visually impaired. Eleven teams from across Asia-Pacific who had won local preliminary finals presented a pitch to five judges and then showed the prototypes to an audience of conference attendees, local visually impaired people and the judges.

Matthew Springer was one of the panel of judges and was amazed at the diversity of solutions presented; ranging from building-integrated navigation systems to a shoulder bag storage solution and a public transport information feedback and relay to smart-cups. The students had developed each of their ideas with real engineering and product design processes, having to answer questions on manufacturability, their business plan and how they would improve their design.

University Teknologi Mara, from Malaysia, won the competition with their well developed "NaviSense" navigational system. Runners up were teams from Chitkara University and Delhi Technological University. The most popular design was awarded to Hong Kong Polytechnic University team "Fit-Bag" an organisational bag with storage for a white cane.

The final two days of the conference consisted of a series of speeches, presentations and chaired forums by esteemed industrial leaders from a range of backgrounds. The 400+ attendees were treated to the very prestigious Hong Kong Polytechnic University's Jockey Club Auditorium.

One of the chaired forums included our very own Oceania Young Members representative Belinda Herden, who spoke on leadership from the perspective of young leaders.

## AMY LEZALA'S ENGNOW LEADERSHIP LEARNINGS

- What events did you attend/ participate in?**  
I participated in the SOfE and attended the Leadership Conference
- From these events what was your take away message on leadership?**  
It is about not always knowing but doing. You may not have the answer but you know where to find it, then you find it. It is about creating the optimal environment for the group you are leading to become it's best. Most importantly, for our stage in life, to be a leader you do not necessarily have to be in charge.
- What was the best part of this event, and what would you do again for events in Australia?**  
The greatest part of the event was having the opportunity to meet young engineers who are as keen as I am. I felt so enthusiastic about Engineering and about making a difference by the end of the conference. The greatest event was the leadership conference as it was a view from those at the head of the industry giving their stories of 'hows' and 'whys'. Very interesting and very motivating.
- What was the most memorable quote(s) from the event?**  
Sandra Maka - A leader knows the way, goes the way, shows the way.  
Andrew Webster - The greatest barrier in modern teams is trust. This is "Trust = (credibility+reliability+intimacy)/self-orientation"





Grand opening of the EngNow 360 event at the British Consulate in Hong Kong

The sessions that took place included 'View for Leaders: How Different and How Common We Are', chaired by Ir Edmund Leung, Chief Officer, KCRC, and past Chair of the Institution's Hong Kong Branch. In this session, the vastly experienced panel discussed the salient characteristics and qualities of a leader, locally and internationally.

Another popular forum was 'Future Engineering Leaders – What Does

it Mean?' chaired by Professor Po-Chi Wu. The panellists in this forum represented the diversity of young leaders who are already making a difference, shaping the future of engineering to improve our world.

The EngNow conference was closed with a short presentation by Professor Alan Lau, EngNow Programme Manager, followed by an extravagant and well-attended gala dinner.



The traditional Lion Dance at the Gala Dinner

## COMMENTS AND TAKE AWAY LEARNINGS

Some of the take away learnings from the attendees from Oceania are in the inset boxes, accompanied by pictures of the event.

The final part of the four day event was a gala dinner for all the organizing committee and sponsors. This included prize presentations and awards of recognition for judges and key officials.

A traditional lion dance was performed for all at the gala dinner and a final presentation from the Chief Secretary for Administration of Hong Kong Government, Carrie Lam.

The whole event was a massive success with learning opportunities for all involved. There was also a lot of mixing of ideas with members of all the Asia-Pacific regions intermingling and discussing some of the ideas brought up during lectures.

A big pat on the back is deserved for all the volunteers without whom the event wouldn't have gone ahead. The sponsors and numerous steering and organising committees should also be thanked for their huge effort in bringing together industry and young engineers who are now one step closer to future engineering leaders. ■

**Matthew Springer**

News Bulletin Editor

## MONIKA SUD'S ENGNOW LEADERSHIP LEARNINGS

- What events did you attend/participate in?**  
I attended SOFe, Design Competition and Leadership Conference
- From these events what was your take away message on leadership?**  
Good leadership skills can be learned
- What was the best part of this event, and what would you do again for events in Australia?**  
I really enjoyed the design awards day. The whole thing was organised extremely well and I liked that they brought in local visually impaired people to try out the various designs.
- What was the most memorable quote(s) from the event?**  
"Leaders rise above the detail to look at the overall picture"

## EDITORIAL

This *News Bulletin* will be my last and so I want to say thank you to all the contributors over the past two years and seven issues. I have enjoyed preparing and editing articles of such contrast and various subjects.

I wish the next *News Bulletin* Editor the best of luck, I hope you support him with feedback and article submission.

Thank you to all the responses received following Daya's call for volunteers, the committee was inundated with concerned emails and budding potential editors. After some consideration on previous experience and time commitments the Australian Branch Executive committee chose

Matthew Proudlock as the next News Bulletin Editor.

I'd also like to mention the Institution's *World Bulletin* an email digest of articles, notices and member profiles from around the world. This is sent out monthly from HQ, with upcoming local events.

I hope you enjoy this issue and good luck in this issue's wordsearch.

**Matthew Springer**

Check out the nearyou pages on **imeche.org** for contact details, events and previous issues.

If you have any feedback please contact the next Editor, **Matthew Proudlock** at **AustraliaNews@imechenetwork.org**

## TEAM SWINBURNE'S FSAE 2013/14 ROUND UP

As we move into 2014 Team Swinburne has a number of important activities currently taking place.

With the 2013 Formula SAE Australasia Competition now behind us we have a lot of work to do in analysing our 2013 car to identify areas which we would like to keep, improve or change completely for our 2014 car. These areas of improvement will be on top of the main take away learnings from our 2013 competition where our team found we still have a way to go in making our cars reliable and maintaining lightweight design. This will help to form the basis from which the team's engineering activities will stem.

This work will take place under the careful guidance of the team's new leadership group who are aiming to return Team Swinburne to the #1 position in the electric vehicle division of the FSAE competition after finishing in 2nd place behind RMIT in 2013.



Team Swinburne after the 2013 FSAE-A competition



Swinburne's 2013 FSAE car during skidtrack event

The Team Swinburne leadership team for 2014 is as follows:

Team Leader - Ryan Bilalis

Chief Engineer - Andrew Johnstone

Chief Commercial Officer - Matthew Tanis

Chief Of Manufacturing - Sam Garey

Upcoming events for Team Swinburne include a visit to Benalla College which has been kindly sponsored by Prahran Rotary Club for our 'Engineering Our Future' educational program. This program aims to inform secondary school students about engineering and then excite and motivate the students to pursue it as a career path after finishing school using our team and of course race car as motivational tools.

Other activities within both the public and internal Swinburne domains during the March timeframe will be announced through our website ([www.teamswinburne.com](http://www.teamswinburne.com)) or via our Facebook page ([www.facebook.com/teamswinburne](http://www.facebook.com/teamswinburne)) closer to the dates. These will include trivia night fundraisers along with recruitment and advertising activities both at Swinburne and in the wider community.

If you would like to know more about our team, want to get involved in developing our car or any of our social events please feel free to contact us at [mail@teamswinburne.com](mailto:mail@teamswinburne.com) and we will be more than happy to get back to you with more information. ■

**Matt Tanis**

Team Swinburne Chief Commercial Officer

## OCEANIA REGION UPDATE

Events and activities throughout the region typically wind down over the Christmas/new year period and this year has been no exception. The effort is substituted to some degree by planning for the year ahead, and a reflection on the year passed.

Much was achieved by the IMechE in the Oceania Region in 2013. Over eighty member events were held in Australia and New Zealand and the vast majority were very well attended. Our membership grew, and a significant number of 'professional interviews' were conducted, indicating the progress made by members in recognition of what they have achieved.

There are two particular aspects of

what we did in 2013 that I would mention. The first is the event, known as EngNow 360, which was enthusiastically supported by those members of the Australian branch who had the opportunity to attend. See headline article for details. I can report that EngNow 360 was seen by HQ as a great success. The mix of activities is a very good way to instruct, enthuse, and engage our young engineers. So much so that plans are now being made to hold EngNow 360 biannually, with the next one in Spain in 2015.

The second aspect is the significant expansion of Young Member structure within the Australian Branch, and with it, young member activity. It

has occurred due to the efforts of a particularly able group, who are the Young Member Section Committee, and others beyond who have offered their time and ideas. It is essential that activity of this kind occurs between our young engineers if the IMechE is to prosper as an international organization. I applaud all the initiatives taken and look forward to an expanding future.

Planning for the IMechE future is to be the focus of an Oceania Region Board meeting, to be held on 25 January 2014 in Dunedin, New Zealand. The meeting is being held at that time and place, to swell the IMechE presence at the Armstrong (Disappearing) Gun Heritage Award presentation on the



preceding day.

Aspects of the meeting will address the objective of enhancing the value to, and the experience of, being an IMechE member in our part of the world. We are very open to any suggestions members may have that will help to achieve our objective, however large or small, wherever within the Region you feel there is an opportunity. Contact me either through the web site, or via the News Bulletin Editor.

## FROM THE CHAIR:

### Greetings!

In retrospect, 2013 was an extremely successful year full of activities. I thank all the members and volunteers, acknowledging their help and camaraderie throughout the year. Without volunteers who walk the fine line balancing work, family, IMechE and many other things in their lives, under sometimes difficult circumstances, the Australian branch cannot exist. Without their generous support, commitment and sacrifices we would not have achieved many things we did.

Australian membership increased from 1384 to 1426. We gained Affiliates and Associates but lost few Members and Fellows. Western Australia now has the highest number of members closely followed by Victoria, Queensland and New South Wales.

An extremely pleasing and encouraging thing to witness is the emergence of an energetic and enthusiastic cohort of young members as our successors. The Branch structure was enhanced to include Young Member Groups and Student Chapters. Young Member Groups are established in all states and most states now have Student Chapters. They are active across the country and bring new, diverse and challenging ideas into reality. Engtravaganza 2013 held in Queensland was an extremely successful initiative. This will be held in South Australia for 2014. Outreach programme to inspire school children to take up engineering is promising. Young Members play a major role in Formula SAE. They help each other to develop their professional careers. High on their agenda are recruitment, retention and advancement. This year some of our long serving Committee

Finally, I can advise that the IMechE Trustee Board has approved a change in the election arrangements for Regional Chairmen and Regional Young Member Representatives. This has been done to remove the requirement that all fourteen officers stand down at the same time, and so to prevent a total loss of continuity on the International Strategy Board. Hence, Belinda Herden and I will be with you, in the positions we hold, for a further year. Elections for our

Members stepped down to make way for the younger generation.

With the expansion to Western Australia, SOFE competition was held in all five States. A sixth competition was also almost held in Tasmania but had to call off at the last moment, we are positive it will happen in 2014. Around Australia an unsurpassed number of learned society activities took place, and fourteen Fred Barnes Waldron Best Student Awards were awarded. Heritage Award for Sir Jack Brabham's Brabham-Repco BT-19 racing car was approved and arrangements are now being made for the award ceremony to be held in March 2014 in association with the Melbourne Grand Prix. All members are encouraged to attend.

News Bulletin has gone from strength to strength. The Editor is inundated with positive feedback. NearYou website is now widely used for advertising and communication. We are increasingly dependent on ICT for communication and to provide services and resources to members. Social media plays a major role in engagement with the younger generation. Facebook and Twitter has now become the norm in communication with young people. Facebook and Twitter cross feed is now linked to events and data on NearYou as well. This is the way of our future and members are encouraged to move on to electronic means.

Eight of our members participated in EngNow 360 (Asia Pacific Initiative) and associated activities held in Hong Kong. We had various involvements from judging the Design Competition, participating in ISB meetings, contesting in Asia Pacific SOFE Competition, to participating

replacements, and those in North East Asia Region will be in April 2015. Elections for officers in the Africa/Middle East and Southern Asia Regions will take place in 2014. Elections for officers in Europe, Americas, and South East Asia Regions will take place in April 2016.

We have a lot to do between now and our election. Have a good year. ■

**Ken Tushingham**  
*Oceania Region Chair*

in the Young Leadership Conference. Two of our members participated in the Volunteer Conference held in Birmingham. Those were good opportunities to meet our counterparts from London and around the globe and to learn from each other. We are proud that we nominated two of our members for Young Member of the Year Awards; one in Member Engagement category and the other for Overall Young Member of the Year.

Recently one of our newly arrived members sought my advice on how to succeed in the job market. This is an area extremely difficult to ascertain. Only possible advice is to be positive, flexible, prepared to adapt, patient, and keep trying. Don't despair or be discouraged.

Our colleagues Geoff Stone, David Heppenstall and Chris Hoskin have moved on. We are grateful for their contribution over the years. Matt Springer set off a new chapter of his life. We wish Matt and Lindsey all the very best for their married life. Professor John Pumwa assumed Acting Vice Chancellor position of The Papua New Guinea University of Technology. Congratulations John.

2013 was also the 50th death anniversary of President John F. Kennedy. Reflecting on his famous words "Ask not what your country can do for you; ask what you can do for your country", I would say those words are equally valid to our IMechE too. ■

Kind regards.

**Dayaratne Dharmasiri.**  
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## IMECHE HERITAGE AWARD FOR THE REPCO BRABHAM BT19 RACING CAR

The Victorian Panel is delighted that an application made by John Burt, just before his death in 2012, to recognise the Repco Brabham BT19 racing car as an engineering heritage item has been successful.

Jack Brabham (now Sir Jack) is an Australian born motor racing driver / mechanic who, along with fellow Australian engineers Ron Tauranac, Phil Irving (member of the IMechE) and Frank Hallam (Chief engineer at Repco), designed and developed the Repco Brabham formula one racing cars. The development of the Repco Brabham engine began in 1964 and Phil Irving headed the design team based in the UK. The engine, based

on a V8 lightweight aluminium block built by GM for the Oldsmobile, was modified in Australia under the guidance of chief engineer Frank Hallam.

In the 1966 season Jack Brabham achieved three pole positions and four consecutive wins in a nine-race –long season. In his career he was three times world champion driver (1959, 60, 66) and won the manufacturers championship twice (1966, 67).

It was with the Repco Brabham BT19 that he won the world drivers' championship and the manufacturer's championship in 1966. The BT19 was the first car to have won the Formula one world championship bearing both the constructors and drivers name, an outcome unlikely ever to be repeated.

The award ceremony will be held in March 2014 during the Melbourne Grand Prix, as a finale to the Victorian Panel's Automotive lecture series.

In November 2013, Repco hosted a dinner in Melbourne to celebrate Sir Jack Brabham's achievements. Sir Jack who is 87 years of age and lives in the Gold Coast attended the event. Repco invited Andrew Lezala (Victorian panel Chair) and Roshan Dodanwela (Hon Secretary Victorian panel) to attend the event. Andrew



The Repco Brabham BT19

## ARTICLE UPDATE – NB167 LANDING HELICOPTER DOCK

Following the article on the arrival of the first Australian Landing Helicopter Dock (LHD) to the BAE Systems shipyard at Williamstown, Victoria members may be interested to know that the hull of the second and final LHD was loaded onto the heavy lift ship, the Blue Marlin, and left Spain bound for Australia just before Christmas. The Canberra class LHD is the largest ship to ever be built for the Royal Australian Navy in an alliance between the Spanish Company Navantia and BAE Systems, Australia. At the time of writing, it is on track to arrive in Australia in the mid to late February 2014. The sight of these two colossal vessels alongside

at Williamstown is sure to be very exciting and will be well worth a look before LHD1 (Nuship Canberra) departs for sea trials and eventual relocation to Garden Island, Sydney.

### Matthew Cook

Senior Mechanical Engineer, IMechE Victorian Panel, Committee Member



Andrew (left) with Sir Jack Brabham and Mr John Moller (CEO of Repco) with the certificate.

made a presentation on the history and activities of the IMechE and on the value and relevance of the Heritage Award. While the Heritage Award plaque will be presented in March 2014, Andrew presented Sir Jack with a certificate to acknowledge recognition of his contribution.

Please refer to the Victorian panel page of near you for details of the Heritage award ceremony. ■

### Roshan Dodanwela

Hon. Secretary, Victorian Panel



### NB169 – Wordsearch Competition

ADELAIDE, AFFILIATE, ARMSTRONG, ASSOCIATE, AUTOMOTIVE, BRABHAM, DISAPPEARING, EDITOR, ENGNOW, ENGTRAVAGANZA, FACEBOOK, FELLOW, FORMULA, GUN, HERITAGE, LAST, MEMBERS, NEW, ONE, REPCO, SWINBURNE, TWITTER, WINNER, YOUNG  
Please email your answers to the Editor, first correct entry will win a prize.

### NB168 Wordsearch Winner

Congratulations to Arshid Alam from Melbourne, pictured to the left being presented his prize by Andrew Lezala, Victorian Panel Chair at the Christmas Function



# GAS TURBINE POWER HARNESSSED BY NAVAL VESSELS

Matthew Cook explores the relationship between Gas Turbines and Naval Vessels.

In the naval world, the need to propel a large vessel at speed is an essential part of a ship's capability. While diesel engines are very good at efficiently handling low speed cruising at 10-15 knots, the need for large and sustained increases in speed requires a prime mover with some serious muscle.

Gas turbine engines are appealing primarily due to the staggering power to weight ratio and their overall simplicity. A single gas turbine engine can produce anywhere from 15MW to 40MW (20,100Hp to 53,640Hp) of power. Compare this to a diesel engine producing approximately 2MW to 6MW (2,700Hp to 8,100Hp) and the delta is clear. While we are more familiar with an aero gas turbine engine perched under the wing of a commercial aircraft, in fact modified gas turbine engines have been used in maritime, especially naval vessels, for decades.

The two major players in the naval gas turbine engine field are General Electrics (GE) and Rolls-Royce (R-R). Both organisations have developed maritime gas turbine engines from their mainstay civil aviation engines. GE's most successful marine engine in their range is the LM2500; this engine is a derivative of their CF6 aircraft engine. There are three versions currently available and power ranges from 25MW up to 35MW for the latest generation LM2500+G4. This engine is ubiquitous across US warships and interestingly, is the engine of choice for the Royal Australian Navy (RAN) and is used on all the RAN's naval vessels that harness gas turbine power including Anzac Frigates, Guided Missile Frigates, the new Air Warfare

Commercial aero engine



ANZAC Frigate.

Destroyers (AWD) and the two massive Landing Helicopter Docks (LHDs).

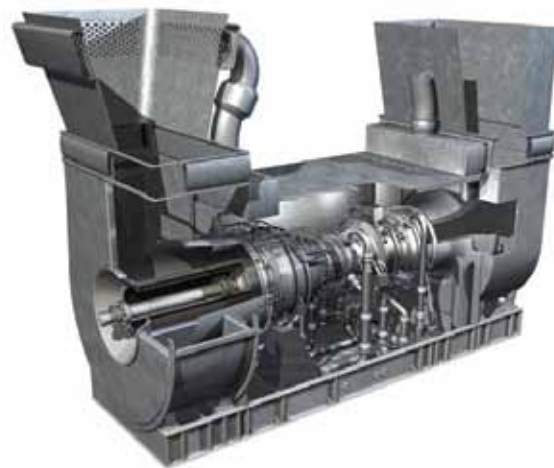
Rolls-Royce has had a number of marine gas turbine engines over the years, including Olympus Tyne and Spey. In recent times, their two prime engines are the MT-30 and WR-21. The MT-30 is their most powerful engine with a power range from 36MW to an impressive 40MW, and is derived from the Trent 800 aircraft engine. The WR-21 engine has been developed mainly from the RB-211 and Trent 700 aircraft engines. It has a power output of 25MW and is a unique gas turbine engine due to the use of intercooling during the compression stages and recuperation of exhaust gas to heat pre-combustion air which results in a 25% fuel saving. To date the only naval vessel to be powered by WR-21 is the latest British Type-45 destroyer of which there are six in the fleet. MT-30 has enjoyed a wider use including the new British aircraft carriers (HMS Queen Elizabeth and HMS Prince of Wales), the US Littoral combat ships and more recently a compact package version for the South Korean Navy. The engine has also been chosen for the new British Type-26 Global Combat ship programme.

Using an aero gas turbine as a prime mover in a ship is no mean feat and takes significant changes to both the engine and how it is packaged. Marine gas turbine engines are supplied in an enclosure package which in turn is mounted in the ship's machinery space. The enclosure is then connected to dedicated intake and exhaust ducting that is provided by the ship builder. See image right, gas turbine in enclosure.

The aero engines used by both R-R and GE are bypass engines and

possess a large fan at the front of the engine which is driven by the power turbine. This is obviously not viable or necessary for a marine application, therefore the fan is removed but the intermediate and high pressure compressor stages are maintained. See image on page 8, cutaway of Rolls Royce Trent 800/MT-30. The free power turbine stage of the gas turbine, instead of driving the fan, is now used to drive the output shaft providing the rotational power the ship requires.

The engine is mounted within the enclosure which is pressurised and provides protection, silencing, fire protection and ventilated cooling air which flows past the engine. The package is mounted on a baseplate



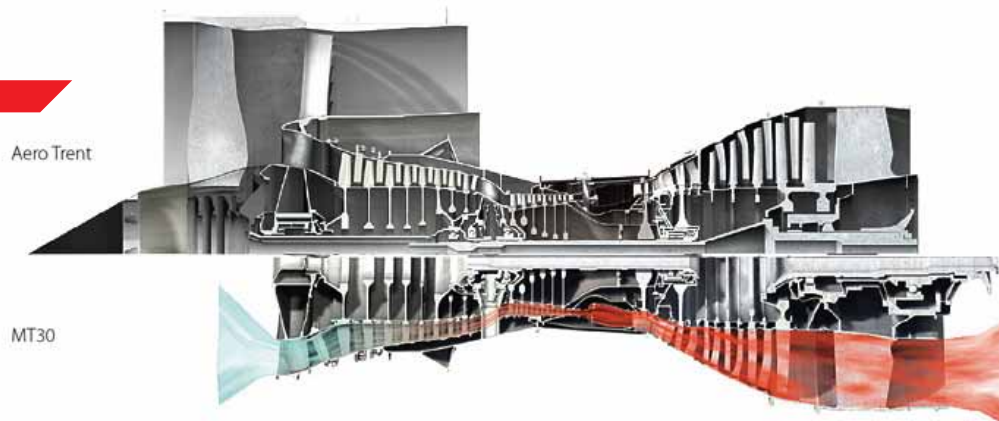
Gas turbine in enclosure

which in warships is shock mounted to the hull. It is a requirement for naval vessels that the engine should survive a certain level of shock (essentially from a large explosion) and be serviceable. In the event of an engine fire, the enclosure can be sealed and purged with a fire suppressant such as CO2. The engine also requires modification to enable it to survive in a marine environment. Corrosion is the obvious concern, and compressor

blades, casings and structures are all treated with coatings to prolong the engine life. When it comes to fuel, marine gas turbine engines are not bound by stringent aviation requirements and are designed to run on marine grade diesel fuel.

While a ship can be powered solely by a gas turbine engine, most naval vessels are equipped with a combination of diesel and gas turbine engines. This helps to reduce fuel consumption and spreads propulsion requirements across several engines. There are a number of combinations in which the prime movers can be utilised in ship. Traditionally, ship propulsion systems have used a mechanical transmission where the prime movers drive a gearbox, which in turn powers the main shaft and propeller(s). An example of this is the Australian ANZAC frigates which are powered by one GE LM2500 gas turbine engine and two MTU diesel engines. This layout is known as Combined Diesel or Gas (CODOG) and means that the ship can run on either diesel engine or gas turbine power. One drawback of mechanical transmission drive is that the engines need to be in line with the propeller drive shaft. This limits where the engines can be located and thus impacts ship design and layout.

In contemporary times, naval vessels have begun to turn electric. The



Cutaway of Rolls Royce Trent 800/MT-30

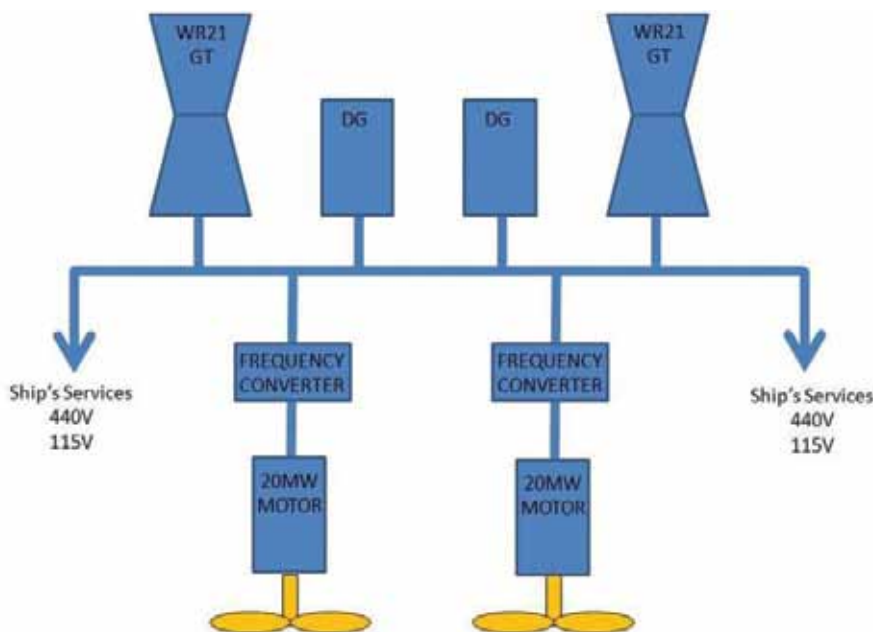
latest British Destroyer Type-45 is an example of an electric ship. It is equipped with two Rolls-Royce WR-21 Gas Turbine engines/alternators and two Wartsilla diesel engine/alternators. These power both the ship itself and two electric motors which drive the propellers. Such a layout is known as Integrated Electric Propulsion (IEP). See image bottom left, British Type-45 Propulsion island configuration. This system means that there is no real restriction (propulsion wise) on where the engines are located within the hull. This has several advantages for both ship design and construction as the location of the engines is no longer dictated by the propeller drive line. Both the gas turbine and diesel engines can essentially be located in advantageous areas of the vessel to aid stability and maintenance access. It also means that the ship's engines are not concentrated in one area, making the vessel less vulnerable to being disabled by a concentrated strike. The use of several prime

movers in an IEP layout is known as an island configuration and gives the ship propulsion added advantage and flexibility as it can run on different engine combinations such as one gas turbine and two diesels or just on diesels for example. The new Australian Landing Helicopter Dock (LHD) is also an electric ship, harnessing power from a single GE LM2500 GT/alternator and two MAN diesel engines/alternators. In fact the entire ship can be solely powered and propelled by the gas turbine/alternator package alone.

Pressure has been building on engine manufacturers to improve efficiency for some time. While gas turbine engines offer amazing power, they are not cheap and their specific fuel consumption (SFC) is generally poor. As mentioned earlier, Rolls-Royce attempted to tackle this issue with its WR-21 engine. While a 25% fuel saving sounds impressive, the large upfront expense of intercooling and recuperation equipment means customers will not see a return for many years, if ever. Added to this, are the advances in diesel engine performance with the power output improving while still offering good SFC. Whether this will ever challenge the domain of the gas turbine engine remains to be seen. But right now when considering propulsion options for a naval vessel, for sheer power the marine gas turbine engine remains omnipotent. ■

**Matthew Cook**

Senior Mechanical Engineer  
IMechE Victorian Panel, Committee Member



British Type-45 Propulsion island configuration



## STATE NEWS

### SA NEWS

Our recent panel activities have centred on preparations for the Australian Branch Committee Meeting, Annual General Meeting and the Australian Final of the Speak Out for Engineering Competition. The winner of which will be awarded the John Burt Trophy. These events will be held in Adelaide on 21st, 22nd and 23rd of February.

A technically oriented excursion to a well-known Barossa Winery has been organised for the Young Members Group on the same weekend. The sole purpose is to enable them to discover the mechanical engineering aspects of wine making!

In terms of the number of events run and the participation rate, The SA Joint Technical Programme has been less successful during 2013 than in previous years. It is to be hoped that there will be a more robust programme for 2014. The programme is jointly organised by The Institution of Mechanical Engineers, The Institution of Engineering and Technology, Engineers Australia and The Royal Aeronautical Society. The programme has been in existence for over twenty years.

Other activities have included several panel members undertaking on-line tutorials to hone their interviewing skills. This requirement was recently introduced by the Engineering Council UK. Unfortunately, this requirement has resulted in regrettable delays to those waiting for membership upgrade interviews and we offer our apologies. However, there is light at the end of the tunnel and we will be better prepared for the future.

The Panel was particularly looking forward to welcoming the Cambridge University solar car entry in the October 2013 Darwin to Adelaide solar vehicle event, on its arrival in Adelaide. The entry was reviewed in PE December 2012. Unfortunately the vehicle sustained severe structural damage when it rolled, during what has been described as an "unscheduled test", and was a non-starter. As they used to say in the old days "Back to the drawing board".

Our Speak Out for Engineering Competition was held during October. Our winner was Benjamin Shields, who has subsequently joined the RAAF and is based in Newcastle, NSW. We wish Benjamin all the best for the future.

We would like to attract Young Members to form a panel in South Australia. Should any younger members wish to become involved, they can contact Amy Lezala at amy.lezala@au.transport.bombardier.com for more information.

Having held the position of Hon Sec of the SA panel since 2006, the writer has stood aside and his place has been taken by Elizabeth Smith.

**Stan Gafney**  
SA Panel Chair

### QLD NEWS

As we approached the Summer months, the Queensland Panel prepared to host the October Student Evening in partnership with the Young Member's Section at the University of Queensland and eventually the Christmas Function as well. Unfortunately despite the best efforts by the Panel, the proposed event did not eventuate due to resourcing issues. It was then decided that additional effort would be placed to organise the Christmas Function. Very few however responded to the Christmas invitations sent to all Members in Queensland for a day of Lawn Bowling. In the end the event was cancelled due to inclement weather. Additional efforts will be required in 2014 to engage the local Membership so that they attend these events.

Three more Professional Review Interviews were performed by Members of the Panel during the last few months. All were successful in achieving professional registration as CEng MIMechE. The panel congratulates them on their achievement. It is pleasing to see a steady number of candidates applying for Professional Registration as Chartered Engineers. It is also good to note that there are a number of Members relocating to Queensland to live and work. The Queensland Panel welcomes these "new" engineers and hopes that they will participate in and contribute to their local Panel activities.

The Fredrick Barnes Waldron Best



*The Cambridge University solar car  
Entry on launch*



*The solar car following its crash*

Student Prize for the University of Queensland for 2013 has been won by Mr Morgan Lewis. Unfortunately the University decided not to organise a "pre-graduation" function in December. This is the event at which the IMechE normally awards the prize to the winning student. The prize will be awarded to Morgan in early 2014.

Plans have now being made for the Queensland Panel AGM to be held at a new location in 2014 – the Brisbane Square Library. This should provide a more central location for the Panel AGM which will hopefully attract more participants. The 18th of February has been chosen as the date for the Queensland Panel AGM which is a few days prior to the Australian Branch Committee Meeting and AGM in Adelaide.

While 2013 has been an interesting year in that both the Panel Chair and Treasurer attended functions overseas, I believe the Panel can do more to cater for the interests of Queenslanders by engaging local Members. The Young Member's Section has been quite busy through the year organising the "Engrtavanza" at the Gold Coast theme parks and "A Day in the life of Real Engineers" at the University of Queensland.

I trust we have all had a safe and enjoyable festive season and look forward to another busy year with plans for more events in 2014. In particular, we look forward to the next Branch AGM and National SOFE Finals to be held in Adelaide in February.

**Leslie Yeow**  
QLD Panel Chair



*Christmas Drinks evening for members and their partners in December at the Kelvin Club*

## VIC NEWS

In October 2013 the Victorian Panel organised a joint technical presentation titled "Fukushima, the accident and the aftermath". It was presented by Professor John Price, a former member of the Safety Policy Unit of the National Nuclear Corporation UK. It was a popular lecture which had over 60 attendees.

A social networking evening was organised in October which saw about 12 people attend. Amongst them were about 4 university students who were interested in learning more about the IMechE and networking with senior engineers. These events are a regular event in the Victorian Panel calendar and are organised as informal get-together's in a pub.

In November the Panel re scheduled a site visit to the newly built Craigieburn Train Maintenance Depot. This depot is the most up to date train maintenance and stabling facility in the Southern hemisphere. There were about 30 attendees.

The Panel organised a Christmas Drinks evening for members and their partners in December at the Kelvin Club (pictured above). This was a departure from the norm of having a Christmas lunch on a weekday. It was a successful event with about 30 attendees. Drinks were sponsored by Metro Trains.

The program of events for 2014 is looking full. The Panel has organised a series of lectures focussing on the automotive industries. The idea behind this is to highlight the innovation and success stories that often go unnoticed. There will be approximately four lectures conducted by Holden Special Vehicles (HSV), Holden and Tomcar

(the Australian built all-terrain vehicle). The lecture series will end with the presentation of the Engineering Heritage Award to the Repco Brabham BT19 Formula 1 racing car at the Australian Grand Prix in March 2014. Apart from these events the Panel committee has site visits, social networking events and more joint technical presentations planned for the rest of 2014.

**Roshan Dodanwala**  
*Vic Panel Hon. Secretary*

## NSW NEWS

We have had some activity here in NSW. In September two NSW committee members; Simon Cowling the Honorary Secretary and myself as Chairman of the NSW Panel attended the EngNow 360 conference in Hong Kong. More on this in the headline article.

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

In August John Aran from Metso grinding gave a presentation on an "Overview of Fixed Mining Equipment with Emphasis on Grinding Mills". This presentation gave a brief overview of the equipment and technology used by the mining industry throughout the entire process; from processing, filtration and preparation of the Ore for shipment.

In September the sixth running of the Speak Out for Engineering Competition in NSW was held. Two excellent papers were given, with good attendance and lots of questions from the audience.

Adam Benwall from Aurecon gave a

presentation on "A basic introduction to overhead wiring" This presentation gave an overview of where overhead wiring sits within the rail environment and covered the main technical challenges, interfaces and safety aspects involved.

Nick Simpson from ARUP gave a presentation on "Moving Buildings". We are always moving; walking, in cars, on trains, so why do we complain about buildings and bridges moving? Why do they move and how can we, as engineers, stop them moving? Nick gave us some history, theory and possible answers to these questions.

Both presentations were of high quality with clear presentation skills and both participants answered questions from the audience confidently and fully. Sadly there could only be one winner and that was Nick Simpson who received 1st prize and Adam received 2nd prize.

Nick will go on to presenting at the national finals in Adelaide this coming February 2014.

In October James Fraser a fast moving consumer goods (FMCG) marketing specialist gave a presentation on "Profiting from Innovation". James has a deep understanding of new product development, ideation, product costing, product sourcing, regulatory compliance and project management.

In November Alex Koncar, Director of GreenKon Engineering and a recognized energy management, expert gave a presentation on "Effective Energy Management through Optimizations of Computerized HVAC Controls". Alex presented on ways to reduce energy consumption and power bills, in an innovative and cost effective way, with a main focus on medium to large versatile facilities (existing, new and yet to be built) with complex computerised HVAC systems.

Alex's unique approach to energy management, reassesses every opportunity for improvement of energy efficiency and cost reduction measures

We encourage NSW members to attend when possible. Information on all talks can be found on the near you page of the IMechE website. The NSW Young Members group are still planning a trip to The Powerhouse Museum's repository in Castle Hill where they



keep their collection which they cannot fit into the museum in Pymont. An expression of interest email has been sent out, so please contact a committee member if you are interested in attending.

We have conducted a total of nine membership interviews in 2013. I would like to thank all those that have given up their time to conduct these interviews.

We had our Christmas party at a lovely Vietnamese restaurant in Surrey Hills where a few wines were drunk and lots of great food was eaten.

Sadly the NSW committee are having to say goodbye to Jack Sky our NSW Treasurer. Jack has decided to return to the UK but prior to leaving he is learning to surf so that he can truly say he experienced the Aussie lifestyle before departing. Thanks to Jack for all his support in the NSW committee.

**Monika Sud**  
*NSW Panel Chair*

## WA NEWS

2013 was a great year for Young Members in WA, with the State's first Young Members Group establishing itself and building ties with industry and the universities around Perth. But we don't want to keep looking backwards – it's a New Year and time to look forward to an excellent year of continued growth in the state in 2014!

We have new team members joining the panel who are moving in from interstate and overseas that will bring their experience from other Young Member's Groups to help build stronger networks and improve the events and experiences we can bring for our members here in WA in the coming year.

We have an exciting calendar of events in the works for 2014 and will be hosting a mix of exclusive site visits, interesting and diverse technical evenings, challenging competitions and fun social events. These will keep our members interested and involved, building networks with their peers and continuing to support their professional development.

Lastly, we will be continuing to strengthen ties with other Young Members Groups in Australia and across the globe, sharing ideas and experiences and finding opportunities to improve the services that we offer our members. 2013 was a great year but we're confident that 2014 is going to be even bigger and better!

If you're interested in getting involved with the WA Young Members Group or want more information about the panel and what it can do for you, please get in touch:

E-mail: [WAYMRep@imechenetwork.org](mailto:WAYMRep@imechenetwork.org)  
Facebook: [www.facebook.com/ImecheWestAustralianYMS](http://www.facebook.com/ImecheWestAustralianYMS)

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**Dan Stewart**  
*WA Young Member Representative*

## YOUNG MEMBERS SECTION NEWS

Happy New Year to all of the Young Members! There is an excited energy amongst the team for the challenges we have set ourselves this year. The events calendar is being planned, we are organising the annual Engtravaganza and we are launching a new #GetInvolved campaign.

To provide a service which you want to use we are always looking to prioritise events which have been requested. A schedule is being created for the coming year so that we can advertise the events well in advance. The only limitation in the number of events we host is the number of organisers we have. If you would like to see more events and are able to donate some of your time to the cause, we would love to hear from you. If you have any requests for events, we would also love

to hear your ideas.

One requested event has been brought to life by the repeated question "How do I become a full member and what level should I apply for?". At the end of 2013 we generated a presentation titled 'Paths to Registration' which is a guide on the membership application process. If you would like to know more about what membership level you should apply for and the application requirements, please let your local Representative know that you would like an event to be held in your area.

On top of the local events, we at the Young Member Section are busy arranging the 2014 Engtravaganza. This will be held in Adelaide on February 23rd at the wineries of the Adelaide Hills. More information on the event can be found on the Near You pages of the website or on our Facebook page. It will be the second time the Section has been in the same city at once so we are all looking forward to a fun catch up. It will be an event not to miss.

Young Members often ask how to best progress in the industry. To address this we are launching our #GetInvolved online profile campaign on the Near You page of the website. Although we in the Young Member Section may not be experts (yet) we have spent time working as engineers and have earned some stripes. Every career is different but our online profiles are being uploaded to offer some inspiration on how we reached our current roles. You will also find our new Friday Five; a set of five questions, answered by a different influential engineer each Friday. These are insightful, motivational and often entertaining. If you would like to offer your voice to the Friday Five please contact the Young Member Section. We would love to hear about your journey.

On top of all this organising, our YM State Reps are on the move to WA as their careers progress. We now have openings in QLD and NSW for any volunteers that would like to develop their skills in leadership and organisation. As you can see, it has a great impact on your CV.

**Amy Lezala**  
*Young Member Section Chair*



WA SOfE Winner – Christopher Ong

## VICTORIAN PANEL AUTO LECTURE SERIES

### Australia's Automotive Present and Future

A focus for the Victorian panel during the early part of this year is a collection of events on an automotive theme.

This includes luxury vehicles, offroading, V8 and Formula One, finishing with the Engineering Heritage Award presentation for the Repco Brabham BT-19 racing car.

#### 12th Feb – Holden Special Vehicles – Development of the Gen-F GTS

We have a presentation from HSV on the design and development of the Gen-F GTS. The supercharged V8 Holden Special Vehicles Gen-F GTS is not only the most powerful Australian-made production car ever sold, it is one of the most advanced.

#### 20th Feb – Diversity in the Australian Auto industry - the Tomcar

Originally researched and developed in conjunction with the military, the TOMCAR has been in continual active development for over twenty years. The

TOMCAR's original battlefield pedigree translates into an elegantly simple and visionary design that makes it easy to drive and allows quick repair capabilities in the field.

#### 6th Mar – An Audience with Richard West formerly of Williams F1 Team

Presentation by Richard West, former motorsport director of TWR Jaguar and former commercial director of Williams F1 team. .

#### 16th Mar – EHA Presentation for Repco Brabham BT19

The Engineering Heritage Award for the unique Repco Brabham BT19 Formula One car will be presented to Sir Jack Brabham and the Chief Engineer of Repco at the Melbourne Grand Prix.

For further details, times, locations and booking visit the Victorian Panel **NearYou** pages. *Avoid disappointment and book online now!*



## ENGTRAVAGANZA 2014

Engineering behind wine - Barossa Valley Winery  
23rd February 8am to 4pm

The second Annual Australian Young Members Engtravaganza is set to take place alongside the 2014 AGM in Adelaide. Spend a day behind the scenes of one of the world famous Adelaide Hills wineries, learning which engineering skills are required to grow the vines and balance the flavours when producing wine on a mass scale. Enjoy the produce and some lunch whilst overseeing the beautiful landscape of the Adelaide Hills Region.



Travel from Adelaide CBD and to the airport will be included.

**For more information contact Amy Lezala**

+61 (0)4 0069 9962

[AustraliaYMChair@imechenetwork.org](mailto:AustraliaYMChair@imechenetwork.org)



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Check out the young members on **Facebook** as well! Follow the links on their **nearyou** page.

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