

## Weighty Issues for New Zealand's Roads

**Tim Davin**, IPENZ's Director – Policy, discusses the government's proposed changes to the Land Transport Rule – Vehicle Dimensions and Mass Amendment, which will allow operators to apply for permits to carry heavier loads, and in some cases, operate longer vehicles on New Zealand roads.



The Ministry of Transport is proposing to increase allowable vehicle weights and dimensions. The argument is that this will enable freight transport to be more efficient, with more freight being moved for less fuel, lower labour costs, less emissions and with increased safety. These are powerful arguments, however, there is concern that the analysis of the costs has been inadequate – particularly relating to the impact on roads – and it cannot be argued that it will improve productivity without such an analysis.

Studies suggest that there will be a 16 per cent reduction in the number of trips and a 21 per cent reduction in fuel use. This could

boost New Zealand's gross domestic product by between \$250 million and \$500 million per annum.

The proposal is to increase weight limits from 44 tonnes to 53 tonnes – an increase of 20 per cent. The damage to road pavements is generally regarded to follow the fourth-power rule. This means that if a load is doubled, the damage to the road pavement increases 16-fold. While there is ongoing debate about whether the number is smaller or larger than the fourth power, if you assume it is the fourth power, and axle loads are increased by 20 per cent, then the damage to a road by each truck will increase by 102 per cent. This far outweighs the reduction in trips of 16 per cent.

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## President's Message

### Positive Feedback from Branch Visits

During July and early August the senior leadership team of the Institution visited all the Branches (except South Canterbury where the weather disrupted air travel, but for which an alternative is planned).

I addressed the Auckland, Wellington, Canterbury and central North Island Branches assisted by the Chief Executive, Andrew Cleland, and the Director – Engineering, Charles Willmot. Deputy President, Garry Macdonald and the Director – Policy, Tim Davin, spoke to the other South Island Branches and Vice President, Steve Reindler, completed the tour in the upper North Island.

The address covered four themes: the contribution institutions make to the wealth of nations, the importance of engineering to our society, the profile of engineers in our society and an overview of the current work plan for the Institution.

I was delighted that the presentations were so popular and I have received numerous compliments on both the issues covered in the presentation and the conclusions of the research behind the four themes.

The results of the independent audience perceptions on the profile of engineers in society were perhaps the most surprising to our Members. This reinforces my observation that engineers' perception, that their work and contribution to society is not understood or valued, is just that – a perception. Independent research shows that it is not based on fact, that the community at large has a very clear understanding of just how important engineering and engineers are to the nation's economic and social development and to environmental sustainability.

Engineers come a very close second to doctors as the profession that makes the greatest overall contribution to New Zealand.

The community also accurately differentiates between the roles of professional engineers, engineering technicians and tradespeople. The urban myth that we are often mistaken for mechanics simply has no basis and I suspect that the biggest contributor to this myth is some of the profession itself.

Together with the Chief Executive, I also visited academic staff at the Auckland and Canterbury Colleges of Engineering and discussed, amongst other things, the National Engineering Education Plan (NEEP), a multi-agency initiative being led by IPENZ to address a number of endemic problems with the existing technician, technologist and professional engineering qualifications, their national consistency and integration between them. You will be hearing more about this project in the near future.

I was also invited to address the annual conference of the Association of Consulting Engineers New Zealand (ACENZ). I shared with them the current work plan for the Institution and took the opportunity to thank them for assisting with the Futureintech and Techlink projects by making staff available as neighbourhood engineers and engineering ambassadors in schools.

These have been very successful programmes and we are now starting to reap the benefits with an increase in both the numbers and quality of secondary students undertaking engineering as a profession.

The feedback I received confirms that our work programme also aligns with the issues that concern the industry's consulting sector.

In all it's been a busy month, but the opportunity to get around the country, out there amongst the Members, and talk to them about current issues and trends was valuable and will inform the future direction of the Institution.

Anthony Wilson  
IPENZ President

To date, there has been no analysis of the impact on roads. This proposed change will result in more loads over 44 tonnes on more roads than is currently the case. There is also concern that rather than decreasing the number of trips by 16 per cent, with improved competitiveness, road freight will become more attractive to operators, causing an increase in trips and emissions.

With larger vehicles on more roads, and an increase of number of trucks, it's possible we will face more damage on more roads. Until research is undertaken on the likely extent of the damage, and the true costs are balanced against the benefits, it cannot be concluded that this will improve productivity.

The impact of making an uninformed decision could be considerable. Twice the wear on roads will not be noticed overnight. Road pavements are designed to withstand a certain number of (equivalent) axles over

time. The proposed change will shorten the usual 20–30 year lifespan of pavements, but the cost will not be felt for some time.

Rising costs will not be solely met through heavy vehicle road user charges. Currently freight vehicles contribute around 37 per cent of the government's revenue, and fuel excise contributes 63 per cent. Also, local governments pay half the cost of local roads, so increased maintenance costs will inevitably fall on petrol users and ratepayers.

The proposal will allow heavier vehicles to operate but they will be restricted to specific routes. This may not be practical. Freight movement relies not only on the state highway network, but on local roads at every origin and destination. With more freedom of movement for large trucks, will it be practical to specify such a large number of routes? How will we to carry out suitability assessments of the routes? And how can we ensure trucks will use them?

We must recognise that 88 per cent of roads in New Zealand are local roads and a third are unsealed. Many trucks, particularly tankers, which currently do not operate at full capacity, are able to increase their loads without modification. This means that low-strength and low-volume rural roads and bridges will have to cope with heavier milk and wine tankers. Growth in the agricultural and horticulture sectors will only exacerbate the problems.

The issues are much more complex than simply considering economic benefits, reduction in emissions and improvements in safety. The cost of the impact on roads must be assessed. Who will benefit and who will pay has to be evaluated. If the issues are analysed they can be addressed.

I support improving New Zealand's economic performance and productivity, but without a serious analysis, it is impossible to conclude that an increase in vehicle weights will contribute to that goal.

## Coastal Research Unit With International Links



A major centre of research excellence is being established in Tauranga involving the University of Waikato and Germany's University of Bremen. Called INTERCOAST, interdisciplinary researchers from the two universities will work together on projects that focus on the Bay of Plenty coast and inner continental shelf, and comparable areas of the North Sea.

More than \$5 million is being provided by the German government through the German Research Foundation (DFG) with local funding and in-kind support for the centre now being organised, potentially including stakeholders such as the Regional Development Fund.

"This centre will ensure that Tauranga harbour and its port will be the most comprehensively researched harbour in Australasia," says Waikato University Deputy Vice-Chancellor, **Professor Doug Sutton**. "The issues surrounding the area involve environmental and social sciences, law and management and the collaboration means we can draw on Northern Hemisphere

research and experience when planning for the harbour's long-term growth and enhanced profitability."

INTERCOAST will start in November this year, and for the next nine years as many as 39 PhD. students, along with postdoctoral fellows, all recruited internationally, will work on a variety of coastal projects significant to both the North Sea and Bay of Plenty coasts.

These projects have been developed with input from Environment Bay of Plenty and the Port of Tauranga, and include impacts of harbour development on ecosystems, protection and utilisation of harbour and coastline, management of shared and migratory fish stocks, sediment studies and habitat dynamics, and opportunities for open ocean aquaculture.

The idea for a coastal research unit has been driven by Waikato University's Research Professor of Coastal Environmental Science, **Terry Healy FIPENZ**. Professor Healy has had a long association with Bremen University and in particular **Professor Gerold Wefer**,

whom he describes as a "super star" in his field, and who has spent time at the University of Waikato as a prestigious Julius Von Haast Fellow, funded by the Ministry of Research, Science and Technology.

"This is a high-level agreement and something quite special," Professor Healy says, "It's the first project to come out of the New Zealand-Germany Science and Technological Agreement and covers two of the identified six priority areas for collaborative research in the agreement, namely environmental change and marine."

"Bremen has one of the world's top five oceanographic institutes and so we're teaming up with some of the best in the business, coupled with the support of major organisations in the Bay of Plenty to carry out this important work."

INTERCOAST will strengthen the University of Waikato's links with Tauranga and the Bay of Plenty, and will be the first investment by the university in internationally recognised research clusters in the Bay of Plenty.

# Standards and Volunteers

The Engineering Practice Board (EPB) keeps a watchful eye on the way IPENZ treats Members who serve on standards committees, and occasionally helps them to make strategic decisions on how a standards committee should be guided. The vision of a prosperous and sustainable society for all through engineering leadership is always in view.

In recent times, IPENZ has been nominating Members at the rate of about two each month, covering topics in building materials, building services, energy efficiency, fire engineering, greenhouse gases, land development, risk management, and others. At present, IPENZ reimburses travelling expenses for our volunteers, but does not pay for their time. The EPB has discussed paying volunteers who serve on standards committees, but recognised that spending Institutional funds is beyond its terms of reference and escalated the proposal to the Governing Board.

IPENZ has a reciprocal recognition agreement with the American Society of Mechanical Engineers (ASME) and it is interesting to see how it deals with the problem. ASME writes its own standards, and what is perhaps its best-known, the *Boiler and Pressure Vessel Code*, is cited in the New Zealand standard AS/NZS 1200 *Pressure equipment* and in the Department of Labour's *Approved Code of Practice for Pressure Equipment*.

According to the May edition of ASME's journal *Mechanical Engineering*, ASME VIII-2 *Rules for construction of pressure vessels* has recently been revised, and became mandatory in United States' jurisdictions on 1 July. The information in the code has been updated and reorganised. Before starting the revision, ASME surveyed users and discovered that "make the code more user-friendly" was one of the top requests.

"We had no choice if we were to develop a world-class pressure vessel design code that would exceed our customers' needs," says **Louis Hayden**, ASME's Vice-President of Pressure Technology Codes and Standards. "To be blunt, [the Standard] was difficult to use, particularly for early-career engineers. We needed to start from scratch after reviewing pressure vessel codes from around the world."

The ASME Boiler and Pressure Vessel Committee consists of a volunteer manpower base of about 800 engineers. But experience with new code or rewrite activities demonstrated that the volunteer manpower base did not have enough industry-sponsored time. Apart from having 800 volunteers, the ASME experience is identical to that of IPENZ.

ASME contracted out the work of developing the first draft of the revised standard using a steering committee of its own members to provide technical oversight and direction to the development team. It revalidated all the design rules and provided hundreds of equations and curve fits to facilitate computerisation. It adopted International Organization for Standardization (ISO) formats. ASME arranged "beta testing", presumably a variation of our public consultation process, but with a formal requirement to use the new standard on a recently-completed project designed according to the previous version.

The beta testing showed that the new standard led to significant cost savings due to the increase in allowable stress and reduced reinforcement around openings, resulting in a reduction in forged nozzle thickness.

**Tom Pastor**, Chair of ASME's Subcommittee on Pressure Vessels, believes that ASME would use this development process again. "The number of volunteers... and the number of volunteer hours... continue to reduce each year, so that large projects...will need to be directly funded as R&D."

Can this be a model for IPENZ and Standards New Zealand to follow? Both bodies share ASME's difficulty finding expert volunteers and the financial backing to serve on working parties. Some employers see value in allowing their expert staff members to serve on company time, especially if they write design guides that may be the precursors to standards.



# IPENZ and Sustainability

Following a Governing Board decision in May 2008 it was proposed to assess the greenhouse gas emissions of IPENZ National Office following guidelines defined by the Ministry for the Environment.



One of the five fundamental ethical values given in the IPENZ Code of Ethics is “Sustainable management and care for the environment”. Practice Note 05 *Sustainability and Engineers* spells out the need for sustainable management of the planet’s resources and the responsibility placed on engineers in this endeavour.

## The Ministry for the Environment Guide

The Ministry for the Environment (MfE) has published a guide document for companies to use in reporting on their greenhouse gas (GHG) emissions. This can be found at [www.mfe.govt.nz/publications/climate/guidance-greenhouse-gas-reporting-apr08/index.html](http://www.mfe.govt.nz/publications/climate/guidance-greenhouse-gas-reporting-apr08/index.html). The MfE guide improves objectivity, defines a standard scope and procedure, and provides the conversion factors to be used. IPENZ has followed this guide in estimating IPENZ emissions.

## Stocktake

The assessment of IPENZ GHG emissions was carried out for 2007 with the following results.

Scope	Includes	CO <sub>2</sub> -e kg	Per cent
Scope 1: Direct emissions	Transport fuels	30,302	15.6
	Refrigerants	28	0.0
Scope 2: Electricity indirect emissions	Electricity from the grid	25,056	12.9
Scope 3: Other indirect emissions	Transmission of electricity used	2,156	1.1
	Taxis and rental cars	6,190	3.2
	Domestic air travel	87,512	45.1
	International air travel	27,260	14.1
	Waste to landfill	15,500	8.0
Total		194,004	100.0

**Table 1:** IPENZ (National Office) 2007 emissions in kilograms of carbon dioxide equivalent.

Notes on Table 1:

- This is for IPENZ National Office (158 The Terrace) only.
- Considering the significance of the landfill values (eight per cent of total) it would be desirable to measure this component with greater accuracy.
- Because of availability, some data were taken from 2008.

## How well is IPENZ doing?

There is currently no reference standard to measure IPENZ against. All organisations work in different ways and each business will have different impacts. On a typical day there are approximately 50 people working at National Office, or on business associated with the office. This puts IPENZ’s GHG emissions at about two tonnes of carbon dioxide equivalent (CO<sub>2</sub>-e) per year. This is only representing work hours. The national averages in the following table (from the United States’ Energy Information Administration) are for the whole country and all of its activity, but it may help put National Office’s emissions into perspective.

Country	Tonnes
Australia	20.6
United States	19.8
New Zealand	9.4
China	4.6
India	1.2
Nepal	0.1
World average	4.5

**Table 2:** Approximate 2006 CO<sub>2</sub>-e emissions per person.

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### How could IPENZ do better?

#### Air travel

Air travel contributes to 60 per cent of the IPENZ GHG emissions and is an obvious target for reductions. Suggestions for reducing this include:

- greater use of audio-conferencing
- use of other forms of video-conferencing
- change of organisational structure to reduce the need for travel
- hold meetings at locations where the overall travel for all participants is least
- use other forms of transport (bus or train).

#### Transport fuels

Transport fuels are the next biggest contributor to National Office's GHG emissions and represents petrol bought by IPENZ staff for their travels by car. The suggestion in this area is to review the policy for the use of motor vehicles with a view to reducing the total fuel quantity consumed. This may include less use of vehicles or using smaller or alternatively powered vehicles.

#### Electricity

Electricity is used for lighting, heating and cooling (etc) at 158 The Terrace. In 2008 the IPENZ Sustainable Office Project investigated some options for more efficient use of electricity in the office. The findings of this project and some other suggestions follow:

- Shutting down computers – The benefits of shutting down computers overnight are not as clear as one might assume. Modern computers, when not used for a period of time, automatically go into a low-power-use mode. The power consumed in this mode is very low and savings achieved by physically turning the machine off are very small. Monitors also have a similar power-saving facility. The argument for switching off unattended computers is not a strong one.

- Air conditioning – Suggestions generally state that National Office should use less air conditioning. One proposed that windows could be changed to allow them to open and provide natural ventilation. This measure is not recommended as the building does not lend itself to providing a comfortable working environment for all occupants by natural ventilation. The proximity to Wellington's urban motorway creates a significant noise issue and a partial natural solution is regarded as impractical.
- Lighting – Consider switching so that lights can be selectively switched off in areas and at times when there is no need for light.

#### Publications

Reporting under the MfE guidelines does not include disposal of paper generated by IPENZ but sent to others. However, IPENZ could consider offering Members the option of receiving all publications electronically. Members may still choose to print some parts of the publication, but they will only print the pages that they need, and will do that accepting the responsibility for conscientious disposal.

Alternatively, IPENZ could move all publications to a web environment. This model offers other significant benefits as well as reducing paper use.

- The ability for Members to set up their individual profile and receive information customised for their personal areas of interest.
- Links that direct Members to the web sites of other institutions where relevant.
- The ability to track Member interest in publications and enable IPENZ resources to be deployed where interest has been demonstrated.
- Reduced costs in surveying Members and in carrying out elections of officers.



**IPENZ paper**

IPENZ uses a lot of paper, but how this activity is measured for its GHG emissions depends on how the paper is finally disposed of. If all the paper is recycled then the impact is reported as zero. If it is burned to provide heat, it could be considered renewable energy and be close to a zero rating. If it is disposed to landfill then it will be a significant producer of GHGs.

Paper generated by IPENZ	Tonnes	Per cent
Photocopy and printer paper purchased	7.7	34
<i>e.nz magazine and engineering dimension</i>	11.4	51
Other printed material	3.4	15
Total	22.5	100

**Table 3:** Approximate quantities of paper generated by IPENZ in 2007.

Most of this paper is not included in the GHG standard reporting as it is not disposed of by IPENZ National Office. What Members do with their copies of IPENZ publications after they have read them is a personal decision for them, much like what they decide to do with their daily newspaper.

**Other environmental parameters**

The GHG reporting standard defined by MfE could be considered the IPENZ “carbon footprint”. This does not take everything environmental into account and is only part of what would be included in the identification of an “ecological footprint” where impacts on all of the Earth’s resources are considered.

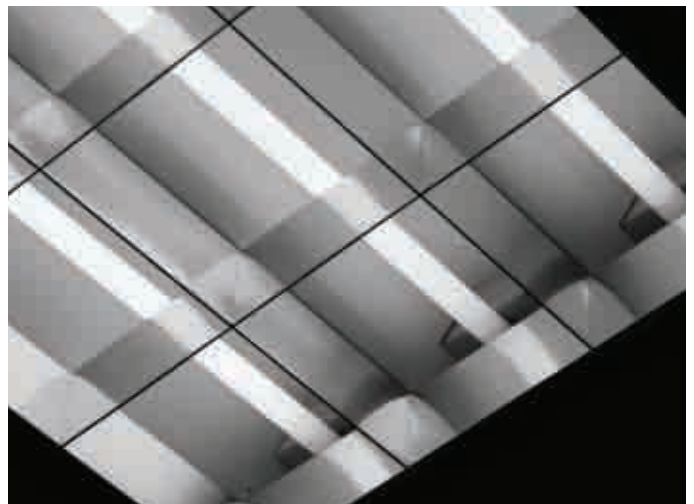
- Although recycling paper counts as zero for GHG emissions, the recycling process does tax the environment in other ways. It takes

transport and energy. Some people may also have reservations about the overall effectiveness of the recycling industry.

- As well as GHG emissions, IPENZ may wish to monitor and report on its wider impacts on other environmental parameters such as water, air, soil, ozone depletion and biodiversity.
- Environmentally, less consumption is generally a sounder option.

**Next steps**

The figures given in Table 1 are a snapshot of approximately where IPENZ was in 2007. The intended purpose of reporting this information is to measure change in IPENZ’s sustainability over time. To achieve meaningful results it is proposed that IPENZ repeats this annual assessment of GHG impacts for a number of years. IPENZ also plans to put measures in place to reduce its footprint, and report on its progress in this endeavour.



# Progress for Futureintech

Futureintech receives a lot of anecdotal evidence about its success in schools, but it can be difficult to quantify the results among the many influences that go into a student's education and career choices. One thing that can be measured is the increasing number of students, teachers, and careers advisers the Futureintech team interacts with from year to year.

To track progress in this area, Futureintech sets a range of annual targets. These are not only useful for measuring the programme's growth, but also to help to pinpoint areas that it can focus on in the future.

As of 7 July this year, results show that Futureintech Ambassadors continue to be in high demand in classrooms around the country. Last year's target for Ambassador visits was 875, and this number was easily exceeded. This year, the target has been raised to 1,050, and Futureintech is well on its way to reaching that goal, with 820 visits completed.

During these visits, Futureintech has interacted with 18,454 students, which is well within reach of its goal of 26,250 students by the end of the year. The team has interacted with 149 careers advisers out of a goal of 210, and 1,953 teachers out of 2,240.

Examining numbers for specific types of school engagements gives Futureintech further insight into how it can improve. For instance, the goal for the number of schools working with Ambassadors is 250, and the programme is currently on track with 168 schools engaged.

Futureintech encourages long-term engagements in which Ambassadors support ongoing school projects with repeated visits. Fifty-five such engagements have been organised so far, and this number is expected to increase later in the year as the projects near completion, bringing the programme closer to its goal of 120.



Futureintech Ambassador, **Pranil Wadan GIPENZ**, talks to students at Remuera Intermediate.

## Evaluating the results

In order to get a clearer picture of Futureintech's influence, IPENZ has contracted the New Zealand Council for Educational Research (NZCER) to evaluate the impact of Ambassador visits and the different activities they conduct in the classroom.

Over the course of two school years, NZCER will conduct an evaluation of Ambassador activities in primary schools and a similar study in secondary schools. In each case, the study will be based on telephone interviews with 30 teachers in Ambassador-engaged schools, as well as in-depth case study visits to four of these schools.

The NZCER is well placed to undertake this research, and the proposed team has solid experience in conducting qualitative evaluations of school-based initiatives. The team also has expertise in the area of career choice, particularly with reference to technology, engineering, and science.

We will report the results of this study in *engineering dimension* in 2010. For more information, contact Futureintech at [enquiries@futureintech.org.nz](mailto:enquiries@futureintech.org.nz)

## Enginuity Day Hopes to Boost Women in Engineering

On 2 July, high school girls from all over the North Island met at the Faculty of Engineering at the University of Auckland for a day of activities designed to boost the numbers of female engineers.

More than 240 girls from 38 secondary schools took part in Enginuity Day. Activities ranged from learning how to programme a robot, how to cut a diamond, how to track underground pollutants and how to test the strength of artificial bones.

This year's theme was "how engineering will make a difference to our lives in the future". The girls met female

graduates such as **Priscilla Chung MIPENZ**, a Water Infrastructure Planning Engineer at Manukau Water Limited.

"With global issues of climate change, population growth, and scarcity of resources, a big challenge will be how water engineering can provide for health, sanitation, and disaster prevention. I am proud to be a water engineer who can make a difference," Miss Chung says.

Currently, 22 per cent of engineering undergraduates are women. Women in Engineering Equity Advisor, **Robyn McLeod**, says the faculty hopes to increase its number of female students to 50 per cent.

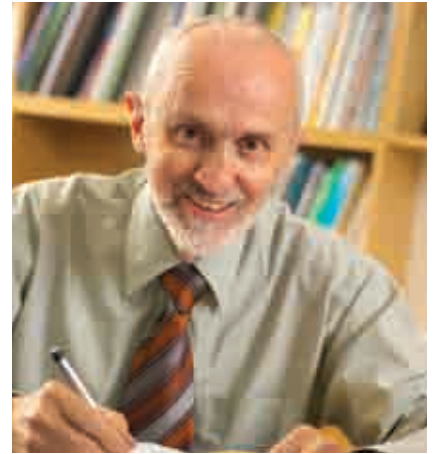
# Fellow Receives Eminent Sustainability Award

IPENZ congratulates **Gerry Carrington FIPENZ**, who recently received the Outstanding Contribution to Sustainable Energy award at the 2009 Energy Efficiency and Conservation Authority (EECA) Awards. The award recognises Professor Carrington's contribution to research, teaching and sustainability in New Zealand – work that will continue to benefit New Zealand's sustainable energy practice.

Professor Carrington's vision for a co-ordinated research effort focused on the sustainability of New Zealand's energy system has seen him establish and lead two key enduring energy research bodies, the Otago Energy Research Centre and the National Energy Research Institute.

His passion for efficient energy management, building the capability of the next generation and the integration of technology and business skills, led him to initiate, develop and lead New Zealand's first energy management tertiary education programme in 1997 – the Energy Management and Energy Studies degree programme. Between 2000 and 2004 he was the founding Director of the Interdisciplinary Applied Science programme.

Professor Carrington is recognised internationally for his research over the past 25 years on thermodynamic process analysis and the use of efficient energy technologies for space heating, water heating and industrial drying. Driven by the strong motivation of applying his work for the economic benefit of New Zealand, he has made sustained, outstanding contributions to these areas including groundbreaking developments in thermal processes and technology.



Gerry Carrington FIPENZ.

## IPENZ Foundation Scholarships 2010



- The IPENZ Foundation/Taranaki Branch Scholarship – targeted at students from the Taranaki region.
- The IPENZ Foundation/Hawke's Bay Branch Scholarship – targeted at students from the Hawke's Bay and Gisborne regions.
- The IPENZ Foundation/Nelson-Marlborough Branch Scholarship – targeted at students in the Nelson-Marlborough region.
- The IPENZ Foundation/Auckland Branch Scholarship – targeted at students from the Auckland region.

Students from anywhere in the country are encouraged to apply for the 2010 national and regional scholarships (please note that the regional scholarships may not be awarded if there are no suitable candidates from that region).

If you know of suitable applicants who intend to pursue tertiary education in engineering or technology, please pass this information on to them.

Should you have any questions please do not hesitate to contact the IPENZ Foundation Executive Officer, Susie McCutcheon on 04 473 2029 or [foundation@ipenz.org.nz](mailto:foundation@ipenz.org.nz) or go to the scholarship area of the Foundation web site [www.foundation.org.nz/scholarships.cfm](http://www.foundation.org.nz/scholarships.cfm)

The IPENZ Foundation is a Charitable Trust and one of its objectives is to encourage New Zealand school leavers into tertiary education in the fields of engineering and engineering technology. The IPENZ Foundation Scholarships are worth \$5,000 each and are available to assist students who are planning on commencing tertiary study towards an IPENZ-accredited engineering degree with their university costs. The application period for the 2010 scholarship round is now open.

There are a number of scholarships available. In the 2010 scholarship year, as well as the national scholarships which are available to students from anywhere in New Zealand, IPENZ Branches are offering to co-fund four other scholarships.

## Engineering or Art?

“The walls between art and engineering exist only in our minds.” – Theo Jansen.

Following the success of last year's inaugural engenerate/IPENZ photography competition, IPENZ is running it again in 2009. This year's theme is “Engineering or Art?”. Entrants are asked to unleash their creative side and push the boundaries.

To help entrants we have come up with some tips.

- Remember this competition is about engineering so there has to be something about the photograph that links it to engineering.
- Art provokes a reaction – whether it is positive or negative – but keep in mind, would you want it on your wall?

There are a variety of prizes up for grabs for the competition winners. The first prize winner will receive a digital SLR camera of their choice up to the value of \$1,200, while the second prize winner will receive \$500 cash. There is also a Members' choice prize worth \$500 and highly commended entries will receive a \$20 digital print credit.

Judging will take place in mid-September. IPENZ Members will once again have a chance to select their favourite photograph in the Members' choice competition. Voting for this will be via the IPENZ Poll which appears in *engineering direct* each week and via the Members' Area of the web site.

The competition is open to all current financial Members of IPENZ. For more information and the competition criteria, visit [www.ipenz.org.nz/engenerate/photocomp.htm](http://www.ipenz.org.nz/engenerate/photocomp.htm) Entries for the competition need to be uploaded to the web site by 5.00pm, Tuesday 1 September 2009.

So get out your camera and hunt high and low for that photograph that challenges the viewer with the question, is it “Engineering or Art?”.

A special thank you to Beca for sponsoring the competition again this year.

# Royal Society Farewells Neville Jordan as President

The Royal Society of New Zealand farewelled **Neville Jordan DistFIPENZ** as President at a ceremony in June, where it created a time capsule and unveiled plans for its new premises.



**Neville Jordan DistFIPENZ.**

Neville Jordan held the role of President from 2006 and was the Society's 46th President. Previous presidents include some of New Zealand's most famous scientists – **Sir Charles Fleming**, **Sir Ernest Marsden** and **Sir James Hector**.

Mr Jordan says he's proud of the role the Royal Society is performing and thinks the new building will help ensure the Society is well placed to continue its role throughout the 21st century. "We have strengthened our international networks, we're fostering young scientists, and we're supporting high-quality research within New Zealand," says Mr Jordan. "Science and technology are of great value to our country and I am proud of our role in upholding and promoting it."

The time capsule, which was symbolically sealed by Mr Jordan, was designed and manufactured by Industrial Research Limited (IRL). Its design is based on the well-known lead-rubber bearings which were originally invented in New Zealand and are now used throughout the world for seismically isolating buildings and bridges. The time capsule will be "buried" under a glass panel in the foyer floor of the new building until it is unlocked in 50 years time and the key will be handed from president to president.

**Dr Garth Carnaby** has been appointed the new President of the Royal Society. Dr Carnaby is an elected Fellow of the New Zealand Academy of Science and has spent his career in research. He worked as a Bench Scientist at the Wool Research Organisation of New Zealand (WRONZ) for 20 years, and then for 15 years in various science leadership and CEO roles at WRONZ and Canesis Network Ltd. For the last five years, Dr Carnaby has held numerous governance and chairmanship roles as a Professional Director of science and technology companies in both New Zealand and Australia.

# Honorary Fellow Receives Leadership Award



Sir Peter Blake's widow, **Lady Pippa Blake**, presented the Blake Medal to **Dr John Hood** on board *HMNZS Canterbury*.

On 26 June, seven New Zealanders received an annual Sir Peter Blake Leadership Award.

**John Hood HonFIPENZ**, Vice-Chancellor of the University of Oxford, became the fifth recipient of the Blake Medal, the supreme award for an outstanding leader. This was presented by Sir Peter's widow, **Lady Pippa Blake** on board *HMNZS Canterbury* in Auckland.

Dr Hood studied engineering at the University of Auckland, where he earned a PhD. in civil engineering. He then won a Rhodes

scholarship to Oxford (Worcester College), where he studied for a Master of Philosophy in management.

From 1998 to 2004 he was Vice-Chancellor of the University of Auckland. During his time there, he served on a number of external bodies, including the New Zealand Vice-Chancellors' Committee, of which he was Chairman from 2002 to 2004, the Knowledge Wave Trust, which he also chaired, and Universitas 21 Limited and Universitas 21 Global, of which he was a Director.

He was also a Member of the Prime Minister's Growth and Innovation Advisory Board, the Prime Minister's Enterprise Council and the New Zealand Secretary for The Rhodes Trust, a Trustee of the Asia 2000 Foundation, and a Governor and Trustee of the King's School. In 2008, the British Prime Minister appointed Dr Hood as one of the United Kingdom's seventeen Business Ambassadors.

Dr Hood has held a number of directorships in prominent New Zealand companies and bodies, including Fonterra, Fletcher Challenge, and ASB Bank Limited, and was the Chairman of Tonkin & Taylor Ltd. His experience of international business covers Australasia, the Americas, Europe, Asia, and the South Pacific Island countries. He has also been a Strategic Consultant to a number of major corporations. As well as his extensive industry experience, Dr Hood has been a Visiting Senior Lecturer in the Department of Civil Engineering at the University of Auckland.

Dr Hood is the first person in the University of Oxford's 900 year history to be elected to the Vice-Chancellorship from outside the university's current academic body. At the conclusion of his tenure at the University of Oxford in September, Dr Hood is to become President and Chief Executive Officer of the Robertson Foundation, a private, family-led philanthropic trust in the United States.

# Tom Paulay DistFIPENZ 1923–2009

Well known for his distinguished career, pioneering engineering theory, and his lengthy and engrossing lectures, **Professor Tom Paulay DistFIPENZ** passed away on 28 June 2009.



**Tom Paulay DistFIPENZ**, with his portrait at the University of Canterbury.

Born in Hungary, Thomas Paulay served in the Royal Hungarian Army and during World War II fought the Russian Army in his homeland and eastern Poland. After his discharge from the army in 1946 he studied one year of civil engineering at the Technical University of Budapest.

In 1948 he fled to Austria and West Germany to escape Stalin and Red Army control. In West Germany, he enrolled at the Technical University of Munich but the lack of financial resources ended his studies in civil engineering. He spent three years in Germany as a stateless refugee, working with a charitable organisation.

In 1951 he was granted a scholarship by a group of Catholic students at Victoria University in Wellington and immigrated to New Zealand with his wife and oldest daughter. After a stint as a labourer in Oamaru, he resumed his studies in civil engineering at the then Canterbury University College. On completing his studies in 1954, he joined the consulting engineering practice of **Don Bruce-Smith** where he worked for the next eight years designing reinforced concrete buildings.

In 1961 he was invited by **Professor Harry Hopkins** to apply for a lecturer position in the Department of Civil Engineering to teach structural design. He completed his PhD. on the coupling of shear walls, under the supervision of Professor Hopkins in 1969.

Professor Paulay was promoted to a Personal Chair in civil engineering in 1975 in recognition of his contribution to research and teaching. He retired from

the university in 1988 and was made an Emeritus Professor the following year. During his retirement, he continued his research interests and supervision of postgraduate students.

Professor Paulay was one of the greats of earthquake engineering of the 20th century – one of a handful of people round the world who have shaped the art and science of seismic design to its present form. His status was recognised last year by the International Association of Earthquake Engineering with his election as a “Legend of Earthquake Engineering”.

Professor Paulay was one of a few very great persons who formed the science and practice of earthquake engineering in a highly dedicated way. He was co-founder of the theory and method of capacity design. In the international engineering community, and especially in Europe, the name of Professor Paulay is inseparable from the capacity design of ductile structures concept and design method that changed earthquake engineering decidedly for the better.

This innovative procedure revolutionised the conceptual design, calculation and the detailing of structures for earthquake loading. Professor Paulay’s most creative and original contributions to the non-linear behaviour of buildings with torsion, and to the stiffness of reinforced concrete structures, have given strong impacts to the science and professional community of earthquake engineering. The Swiss and European Building Codes were also strongly influenced by his work and he brought

philosophy of capacity design into the first draft of the *European Seismic Design Code*, later to become *Eurocode 8*.

Results of his research efforts included numerous technical papers, and three co-authored text books, two in English and one in German, which have internationally become the standard texts for understanding and implementing seismic design of building structures, and which have been translated into many languages. He put great efforts into contributions to design codes, both in New Zealand and overseas, preferring to be a corresponding member. His extensive efforts in this regard are reflected in New Zealand seismic design codes which have influenced code developments worldwide.

Professor Paulay served many years on New Zealand Standards Committees, notably the concrete structures design standard. Not only did he bring his knowledge to the finished documents, he motivated and inspired others with his wisdom, insights, enthusiasm and hard work.

More than three decades of students at the University of Canterbury and many others in earthquake-prone countries benefited from Professor Paulay’s teaching, wisdom and inspiration. His clear insight into structural performance and his emphasis of the different roles of analysis and design enlightened his students. The outcome of this was a generation of New Zealand design engineers who understand structures at a level that is envied in other countries.

Professor Paulay received numerous honours, both civic and technical, including the Order of the British Empire in New Zealand, The Order of Merit of the Republic of Hungary, Fellowship of the Royal Society of New Zealand, and honorary doctorates from universities in Switzerland, Hungary, Romania and Argentina, and a great number of awards for research excellence – too many to list.

With his death on 28 June 2009, an era of New Zealand earthquake engineering has come to an end.

In response to the notice of Professor Paulay’s death, some Members expressed a desire to record a personal tribute. A web page is available for Members to record a message at [www.ipenz.org.nz/sesoc/tribute.cfm](http://www.ipenz.org.nz/sesoc/tribute.cfm)

# Managing Climate Change Risks

IPENZ is planning a series of one-day seminars on the impacts of climate change to be run in various locations around the country throughout September 2009. The seminars will focus on providing a greater understanding of changes to rainfall and flood regimes, and their implications for design works and planning decisions.

Each seminar starts with an overview of current legislation, standards and guidelines around the management of risk and climate change adaptation. It will be followed by a series of presentations and case studies on catchment planning, stormwater risk management and flood risk management.

The seminars are relevant to engineers, planners, architects and asset managers whose expertise is needed to incorporate climate change considerations into infrastructure design and planning. It is particularly suitable for those working in the fields of river, stormwater and water supply.

The workshop is supported by IPENZ, the Ministry for the Environment, the National Institute of Water and Atmospheric Research, Environment Waikato, Marlborough District Council and MWH Ltd.

For information on dates and locations please visit [www.ipenz.org.nz/ipenz/nzecal](http://www.ipenz.org.nz/ipenz/nzecal) or email the Professional Development Team at [cpd@ipenz.org.nz](mailto:cpd@ipenz.org.nz)



## Professional Development Events – IPENZ Short Courses

### August 2009

#### Resource Management Act for Engineers

Rotorua 18 August  
Auckland 19 August  
Nelson 26 August

#### Effective Report Writing for Engineers

Whangarei 27 August

#### Relationship Management and Effective Communication

Hamilton 20 August

#### Legal Issues for Professional Engineers

Auckland 20 August

#### Managing Variations and Claims in a Project/Contract Environment

Wellington 21 August  
Christchurch 26 August

### September 2009

#### Resource Management Act for Engineers

Christchurch 1 September  
Wellington 10 September

#### Professional Portfolio Development for Young Engineers

Auckland 8 September

#### The Role of the Expert Witness

Nelson 8 September  
Auckland 9 September

#### Avoiding Ethical Dilemmas

Christchurch 8 September  
Wellington 9 September

#### Introduction to Corrosion in Engineering

Christchurch 16 September

#### Effective Report Writing for Engineers

Wellington 17 September

#### Specification Practice

Napier 22 September

#### Legal Issues for Professional Engineers

Wellington 24 September

#### Relationship Management and Effective Communication

Auckland 24 September

#### Engineers and Consultation: "Current Practice and Lessons Learnt"

Auckland 28 September

#### Cost for IPENZ short courses (incl. GST):

**\$520** – IPENZ Members  
**\$540** – Technical Interest Group members  
**\$605** – Non-members

For more information on these courses please visit [www.ipenz.org.nz/ipenz/nzecal](http://www.ipenz.org.nz/ipenz/nzecal)

#### Want to know more?

Contact us on [cpd@ipenz.org.nz](mailto:cpd@ipenz.org.nz) or call 04 495 1643 or visit the engineering calendar at [www.ipenz.org.nz/ipenz/nzecal](http://www.ipenz.org.nz/ipenz/nzecal) for a full list of events taking place around the country.



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