



IPENZ NEWS

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Support for Canterbury Engineers

Since the Canterbury earthquakes many of our Members in Christchurch have been under significant pressure, dealing with increased scrutiny and a tremendous workload, as well as concerns for their own homes and families. This pressure has been ongoing for 18 months and will continue as the Royal Commission hears further evidence and the rebuild gathers momentum.

With help from the IPENZ Foundation, the IPENZ Canterbury Branch, ACENZ, NZSEE and SESOC we are able to offer an independent, confidential counselling service.

Up to three independent sessions will be provided through EAP Services, free of charge. Members will contact EAP directly, and at no point will your details be shared with anyone outside of EAP.

Face to face counselling sessions with qualified experienced counsellors can be arranged at EAP's offices. Offices in Christchurch are in Mandeville Street in Riccarton, Bealey Avenue and Peacock Street in the city, St Albans, New Brighton, Rangiora and Kaiapoi. E-counselling or telephone counselling can also be arranged. As issues can impact on family life, you may choose to take your partner to sessions with you.

To access these services please call 0800 327 669 (0800 EAP NOW) and state you are using the IPENZ (Christchurch Membership) EAP scheme.

Dr Nicki Crauford

Deputy Chief Executive

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Engineers' Ethical Responsibility on Heritage Buildings

Some Members have asked whether IPENZ has a policy on the fate of significant heritage buildings in Canterbury. Although IPENZ recognises that heritage buildings are important community assets, it has no policy on heritage buildings.

However, it is important that engineers providing advice to building owners and community decision makers know they are guided by the ethical requirement to take reasonable steps to protect life and safeguard health. They are required to set out the technical merits or otherwise of strengthening or reconstruction to retain the valued elements of heritage buildings.

If, in an engineer's opinion, a sufficient level of protection cannot be reasonably provided, the engineer has an ethical responsibility to communicate his or her opinion to the relevant decision makers. In accordance with good engineering practice, engineers may wish to collegially debate the merits or otherwise of strengthening methods and their applicability prior to providing their advice to building owners and community decision makers.

IPENZ is required to separate its role as an advocate for preserving significant engineering projects and sites from the responsibility of its Members to provide professional advice. For further information on engineering heritage please visit the [website](#)

Dr Andrew Cleland

Chief Executive

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Obligations of the Profession: Learning from Lord Benson

What does Henry Benson, a British accountant born in 1909, have to do with the ethical considerations of practising engineers in New Zealand over a century later?

His obituary published in *The Independent* is fabulous reading, and makes you wonder how he packed so much into his 86 years, but the answer to my question lies in his speech to the House of Lords on 8 July 1992.

In that speech, Lord Benson (as he became), lays down the nine obligations of a profession, and whilst he relates these to the profession of accountancy they are no less relevant to engineers. Lord Benson met his demise in 1995 but he left a legacy that sets a useful framework for our professional welfare.

He professes that any profession which follows these nine obligations will have no need to fear what happens in the future – the Government can always be satisfied it is healthy.

Of the nine obligations, the one that stands out as particularly relevant is the third, stating that in order for a body to be “professional” it must set the ethical rules and professional standards which are to be observed by its members. They should be higher than those established by the general law.

All IPENZ Members are encouraged to read the IPENZ Code of Ethics and from time to time reflect on the obligations it imposes on them.

Lord Benson also makes five points in his speech, the fourth of which states that everybody makes mistakes and whilst negligence must be punished, mistakes are to be learned from. I recommend that everybody reads his speech and that we use the obligations to formulate our approach.

Charles Willmot

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Revised Wastewater Standard

Early this week Standards New Zealand (SNZ) released the 2012 edition of AS/NZS 1547 *On-site Domestic Wastewater Management*. The blurb on the SNZ website states that it provides the requirements for treatment units and their respective land-application systems to achieve sustainable and effective onsite domestic wastewater management, to protect public health and the environment. The Standard identifies the performance statements that cover the overall design and sustainable management of onsite domestic wastewater systems. These performance statements set performance objectives which are followed by performance requirements and then, when possible, performance criteria.

John Cocks MIPENZ represented the Institution on the revision project. He reports that the revision was contentious and the process took several years.

Wastewater projects have featured in several disciplinary cases. Sometimes the performance has disappointed the home owner who paid for the work, perhaps because the fall between the house and the effluent field was insufficient, or because effluent fields were flooded or provided inadequate soakage or inadequate treatment.

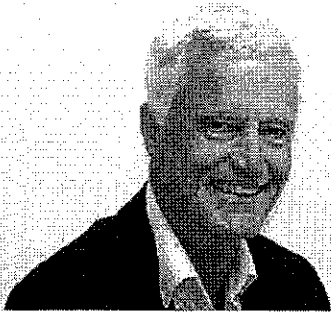
It is useful noting a legal judgement reproduced in IPENZ Practice Note 14: “... bearing in mind the function of codes, a design which departs substantially from them is prima facie a faulty design, unless it can be demonstrated that it conforms to accepted engineering practice by rational analysis”.

The previous entry for 1547 which appeared in the Compendium of Codified Knowledge has been updated.

Cameron Smart

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President's Message

Over my working life I have had much exposure to the challenges of managing workplace safety.

New Zealand's statistics in this area are not good. For example, in 2008 the New Zealand workplace fatality rate was 3.6 per 100,000 workers, whereas in Australia it was 2.8, and in some European countries it was just over one. Moreover, New Zealand is one of the few countries to have a deteriorating trend (that is, our rate is increasing). The National Occupational Health and Safety Advisory Council estimates the cost to New Zealand of workplace injuries and illnesses to be around \$5 billion per annum. This figure says nothing, of course, of the personal suffering and hardships that arise out of workplace injuries.

It is, therefore, appropriate the Minister of Labour has launched the Zero Harm Initiative, and many major New Zealand businesses are now participating in it. There is strong evidence to show that companies with exemplary safety performance also demonstrate superior productivity and profitability. This should not come as a surprise, as one talented Chief Executive said at a Zero Harm forum, "If you can't manage OHS, you can't manage".

New Zealand's poor performance begs the question, "How can this be so?" and you may also be questioning whether this is an engineering issue.

In my experience, the professional engineering community has not always been quick to realise it has a strong role to play in this field.

May I remind you of the IPENZ Code of Ethics:

"Part 1 - Values

Protection of Life and Safeguarding People

Members shall recognise the need to protect life and to safeguard people and in their engineering activities shall act to address this need.

Part 2 - Guidelines

- 1.1. Giving priority to the safety and wellbeing of the community and having regard to this principle in assessing obligations to clients, employers and colleagues.
- 1.2. Ensuring that reasonable steps are taken to minimise the risk of loss of life, injury or suffering which may result from your engineering activities, either directly or indirectly.
- 1.3. Drawing the attention of those affected to the level and significance of risk associated with the work.
- 1.4. Assessing and taking reasonable steps to minimise potential dangers involved in the construction, manufacture and use of outcomes of your engineering activities.

Part 3 - Minimum Standards of Acceptable Ethical Behaviour by Members

Take reasonable steps to safeguard health and safety

A Member must, in the course of his or her engineering activities, take reasonable steps to safeguard the health and safety of people."

As you can see, the Code of Ethics is quite explicit on our responsibilities. It does not take the matter lightly.

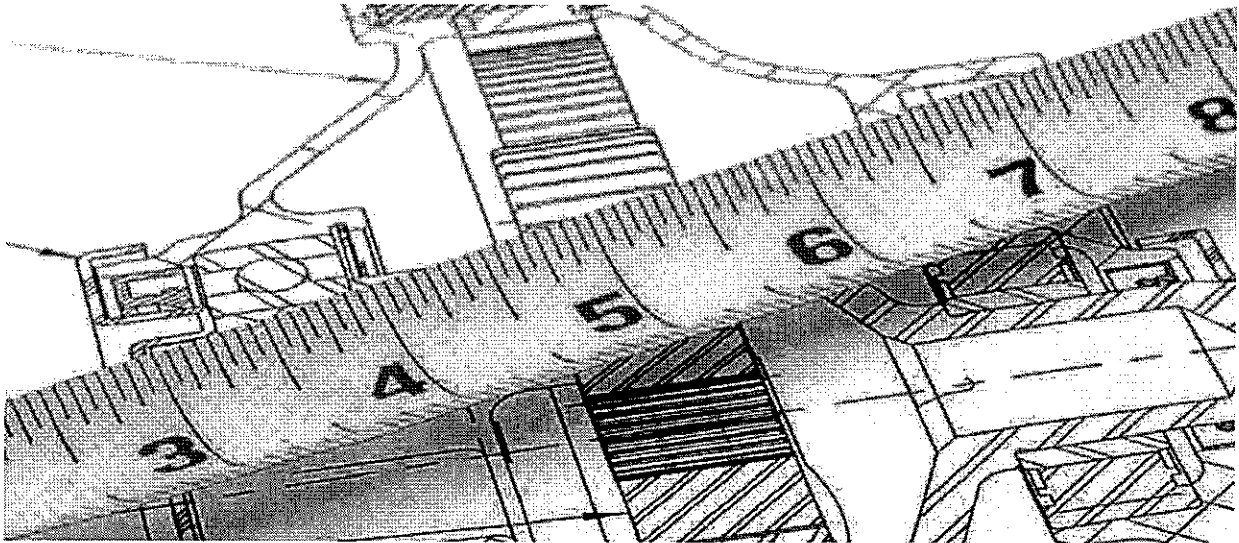
New Zealand's statistics in the area of workplace safety are not good.

Engineers have opportunities to exercise influence on workplace safety through the design process and the leadership roles they often fulfil as workplace managers and supervisors. Good engineering design process can capture a whole of life consideration that is cognisant of, and mitigates, construction, commissioning, operating and maintenance hazards. This is a great way of designing superior safety outcomes for users, customers, the public and clients.

Company Boards are becoming more demanding of their organisations to demonstrate best practice in safety management, and if the New Zealand professional engineering community is not seen as offering best practice in this domain there is a risk there will be pressure to engage professional services from those who do.

So, I would like to finish by asking how you think you are performing in this area of practice. Do you have ideas on how the profession can lift its performance and make the workplace safer? //

Regulatory Review – The Horns of a Dilemma



Practice Note O2 *Peer Review* includes a short section on Regulatory Review, the process often used by Building Consent Authorities to check that a proposed project meets legislated performance requirements. Building Consent Authorities (BCAs) commonly contract Regulatory Reviews out to engineering consultancies. The IPENZ and Chartered Professional Engineer (CPEng) Codes of Ethics require Members and CPEng registrants, regardless of whether they are employees or contractors, to take reasonable steps to inform other engineers of proposed reviews before starting, and to investigate the matters before commenting. These ethical obligations are jealously guarded, as shown by several disciplinary cases where engineers have been aggrieved at not being informed of impending reviews.

Does this obligation to inform apply to a Regulatory Reviewer?

Practice Note O2 states that the purpose of a Regulatory Review is to “assess whether the design complies with pertinent regulations, consent requirements and laws ... testing the outcome against regulatory parameters”. The Regulatory Reviewer must have access to the designer in order to identify areas of the design that need to be addressed. However, the practice note does not restate the obligation to inform the designer of the review.

The chair of an IPENZ Investigating Committee was of the opinion, “If the [Regulatory] Reviewer finds nothing

wrong, then normally there would not be a need to contact the designer”. Hence a designer who knows, or reasonably ought to know, that the design will be used to support an application for building or resource consent, could presume that the design will be subject to Regulatory Review. If Regulatory Reviewers find something they believe to be wrong, then they are ethically obliged to inform the designer.

Some BCAs, and good engineering practice, require the Regulatory Reviewer to go further and put significant queries to the designer. Practice Note O2 gives an example of the sort of question that may be asked by suggesting that the reviewer may find differences between the documentation and the design. This could occur if the calculations and the drawings appear to relate to different details, if the calculations are of a non-standard form, if simple calculations have been used but the reviewer believes a more onerous method is required to demonstrate compliance, if calculations are mathematically wrong, if a Producer Statement did not represent the true on-site situation, or for some other reason.

If the calculations are wrong because they were not checked before leaving the design office, a breach of ethics may have occurred. In a case in which the Regulatory Reviewer found many wrong calculations and inadequate responses from the designer, another engineer made a formal complaint to IPENZ. After due process, the Disciplinary Committee found the respondent manager negligent in failing to take reasonable steps to assure the quality of the work

for which he had overall and ultimate responsibility.

Other BCAs limit the interaction between the Regulatory Reviewer and the designer, presumably to limit costs. The Building Act, Section 50, requires a BCA to advise an applicant for building consent of refusal and the reasons for refusal. If the Regulatory Reviewer issues this advice, and the applicant is the designer, then the ethical obligation is fulfilled. What happens in the common situation where the applicant is not the designer?

The Regulatory Reviewer is then caught on the horns of an ethical dilemma. On one horn is the client BCA's instruction not to liaise directly with the designer unless approved by the BCA. On the other horn is the IPENZ and CPEng obligation to inform the designer.

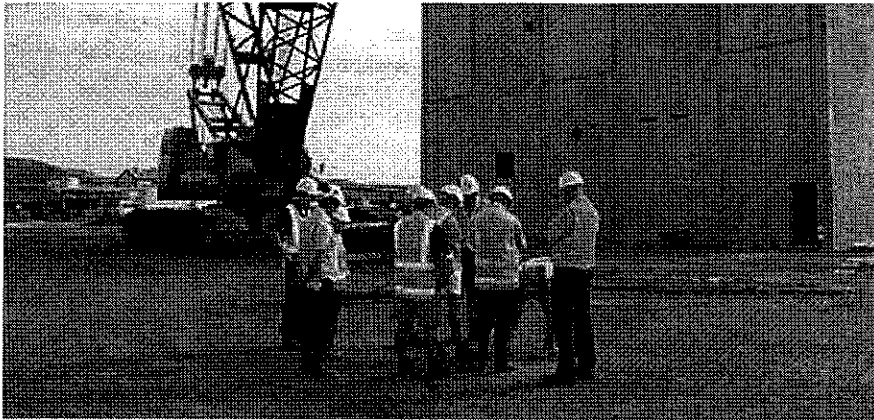
We find a path between the horns by observing one of the nine tests of a profession proposed by Lord Benn to the House of Lords. This test states that the governing body must set the ethical rules and professional standards which are to be observed by the members. These should be higher than those established by the general law.

Hence, the professional ethic of informing the designer takes precedent over the client BCA's instruction to limit the liaison between Regulatory Reviewer and designer.

In practice, this obligation need not be onerous if contractual arrangements recognise Practice Note O2's prerequisite that the Regulatory Reviewer has access to the designer.

Recognising Branch Volunteers

With the recent change of many Branch Chairs and Committee members, IPENZ would like to thank all those who volunteered their time over the past year.



Members of the Wanganui Branch on a site visit to the Open Country milk powder plant construction site.

Committee members organise meetings and events which provide IPENZ Members within a region the opportunity to make contacts, find mentors and take part in engineering and social activities.

The Branch Chairs communicate with the Branch members through monthly newsletters, keeping Members up to date with the latest news even if they can't make it to meetings and events. Chairs

also represent the Branch members at the annual IPENZ Engineering Profession Forum, where problems or ideas can be brought up – keeping IPENZ informed about what Members want at ground level.

IPENZ would like to thank those Members who have recently stepped down from Branch Chair and those who have taken on the role in the New Year, and all members of IPENZ Branch Committees.

Role of an Ethics Advisor

The role of the ethics advisor is to assist IPENZ Members who are the subject of a complaint to:

- understand the process by which complaints are heard and determined
- identify the essence of the complaint
- understand their own actions and their consequences with respect to their obligations as a Chartered Professional Engineer or a Member of IPENZ
- prepare for each stage of the complaint hearing and determination process
- respond appropriately at each stage of the process
- identify if dispute resolution would be useful.

The ethics advisor does not represent the respondent. Nevertheless, the ethics advisor cannot have:

- any personal or professional relationship with the complainant or the respondent
- any other conflict of interest.

In seeking an ethics advisor the respondent accepts that the consequences of the complaint and its hearing must be borne by the respondent, and therefore the respondent indemnifies the advisor, even if the advice of the advisor is followed by the respondent.

The ethics advisor undertakes discussion on matters around the complaint with the respondent. At his or her own discretion the advisor may choose to accompany the respondent to hearings, to make suggestions about how to present their evidence and to help him/her with managing their documents to ensure that accurate replies are given. Additionally, the advisor may give support at a more personal level if the respondent is under pressure. The advisor cannot directly give evidence or act as the representative.

The respondent accepts that IPENZ has no funds for the work of ethics advisors. The respondent must meet the reasonable costs involved, although reimbursement from Institution funds to the advisor of reasonable travel or communication expenses may be considered on a case-by-case basis if the respondent is unable to meet the costs.

Branch Chairs for 2010

Northland

Continuing Chair: Curt Martin MIPENZ

Auckland

Continuing Chair: Simon Hall MIPENZ

Waikato/Bay of Plenty

Past Chair: Brian Gabbitas FIPENZ

New Chair: Peter Armstrong MIPENZ

Tauranga

Past Chair: Nick Gurr MIPENZ

New Chair: Graeme Jelley MIPENZ

Taranaki

Continuing Chair: David McKay MIPENZ

Wanganui

Continuing Chair: Mark Frampton MIPENZ

Manawatu

Continuing Chair: Chris Charleston GIPENZ

Hawke's Bay

Continuing Chair: Jamie Cox MIPENZ

East Coast

Past Chair: Graham Mackey MIPENZ

New Chair: Helen Churton MIPENZ

Wellington

Past Chair: Yogesh Kumar MIPENZ

New Chair: Stephen Lee MIPENZ

Nelson/Marlborough

Continuing Chair: Dugald Ley MIPENZ

West Coast

Past Chair: Dougal Hiscock GIPENZ

New Chair: Theresa Allan GIPENZ

Canterbury

Past Chair: James Park MIPENZ

New Chair: Andrew Lamb GIPENZ

South Canterbury

Past Chair: Robin Donovan MIPENZ

New Chair: Andrew Dixon MIPENZ

Otago

Past Chair: Greg Leonard MIPENZ

New Chair: Bruce Conaghan TIPENZ

Southland

Past Chair: Chris Heaslip MIPENZ

New Chair: Chris Thomas GIPENZ

United Kingdom

Continuing Chair: Simone Beesley GIPENZ

IPENZ is currently seeking ethics advisors in the Central North Island. If you are interested in more information please contact the director of engineering on dir.eng@ipenz.org.nz or (04) 474 8932.

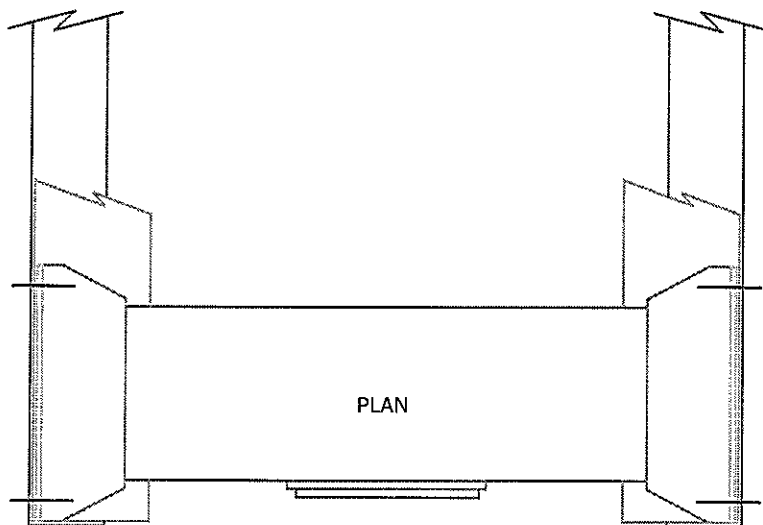
Complaint Upheld

A Chartered Professional Engineer (CPEng) Disciplinary Committee has upheld a complaint from a government regulator against two Chartered Professional Engineers and ordered that the decision, but not the names of those concerned, be published.

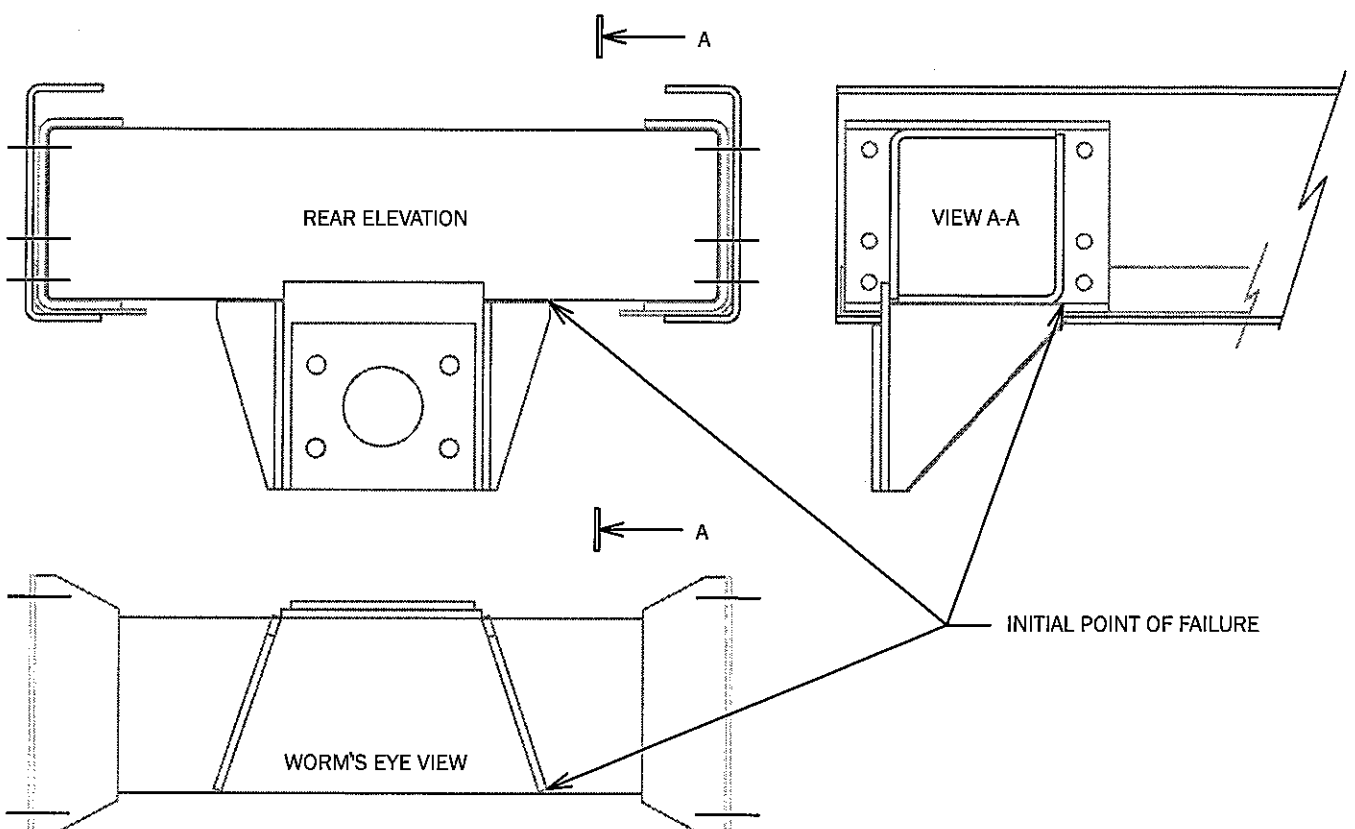
Background

One of the specialities of mechanical engineering is heavy road vehicles, and here we consider the connection between a heavy truck and its trailer. A drawbeam assembly is a welded steel cross-member which connects the chassis rails at the rear of the truck and provides some form of dropper bracket that supports a coupling device. A drawbar is another welded steel structure fastened to the trailer.

A Certifier, a person appointed by the Director of Land Transport, must issue a compliance certificate following manufacture and installation of each drawbeam. NZS 5446 *Heavy Vehicle Towing Connections – Drawbeams and Drawbars* applies.



One of the specialities of mechanical engineering is heavy road vehicles, and here we consider the connection between a heavy truck and its trailer.



History

The first respondent designed a drawbeam to be suitable for 30-tonne trailers in 1991 and manufactured and fitted this model to a number of heavy trucks. The second respondent joined the company in 1992.

At various times, including 2002, both respondents played parts in adapting the 1991 generic design to accommodate the dimensions of new trucks. At that time, neither questioned the 1991 stress analysis.

In 2005, a routine Certificate of Fitness (COF) inspection identified cracks in the welds between the dropper plate gussets and the cross-member on one truck. The first respondent reviewed the design, identified an oversight, and modified the design to remedy the oversight.

He considered recalling the vehicles but decided not to, and nor did he advise the owners, operators, or government regulator, who would have been able to alert the COF testing stations. The first respondent chose to rely on the COF inspections to identify cracks.

In 2007, a failure occurred in one of the 2002 adaptations in which the dropper bracket tore away from the cross-member, allowing the trailer to separate from the truck. The trailer came to rest without damaging other property and without causing injury to any person.

After investigating, the regulator laid a formal complaint with IPENZ, accusing both respondents of incompetence and negligence.

Investigating Committee

During the process of research and investigation, the Investigating Committee (IC) alleged that there was a second technical fault that the respondents had not recognised. The drawbeam featured end fittings that appeared to give a substantial degree of moment resistance at their connections to the chassis rails. The IC found that the chassis rails themselves had rather low stiffness against bending in the horizontal plane, and so were unable to develop a substantial resisting moment. Hence, the IC held that the drawbeam end connections were pinned rather than built-in, and so the moment at the point where the cracks started was greater than the respondents had calculated.

Disciplinary Committee

The 1991 design and its modifications had been done prior to the advent of the CPEng Act, and so were not in themselves matters that engineers registered under this Act could be held to account by a

CPEng Disciplinary Committee (DC). However, since new drawbeams required certification after the respondents became Chartered Professional Engineers, they should have been reviewing the design and satisfying themselves that it was appropriate.

The DC was concerned that the assumption of end fixity was selected to fit the existing design, and that the respondents had made no attempt to provide a numeric basis for the assumption. The respondents replied that they could choose the fixity on the basis of judgment and experience, and advised the DC that a value midway between completely fixed and completely pinned was appropriate. After deliberating, the DC disagreed, giving credence to the IC's calculations that showed that the chassis rails provided little or no end fixing.

The DC was also concerned at the first respondent's actions following the discovery of cracks in 2005. Having identified the first oversight in design, he then relied on the COF inspection process, but did not:

- alert the testing stations, nor
- locate and advise the current owners or operators, nor
- advise the regulatory authority.

After the 2007 failure, the respondents put considerable effort into locating the other in-service drawbeams of the generic 1991 design. Inspections showed that three of these were showing cracks up to 10 millimetres long, whilst the failed one showed evidence of cracks up to 35 millimetres long that preceded the final sudden failure. Routine COF inspections had found none of these.

The DC held that in circumstances involving the wider safety of the travelling public, the first respondent's actions had fallen short of the duty of care required of a professional engineer.

The DC quoted CPEng Act s21(1)(c) in ruling that the first respondent had performed engineering services in a negligent or incompetent manner, and in addition used CPEng Rule 43 in ruling that he had failed to take reasonable steps to safeguard the health and safety of people. The DC suspended him from the register for six months, imposed a fine, and a contribution to costs.

The DC similarly used s21(1)(c) in respect of the second respondent, as he had used another engineer's design without reviewing it to ensure that it complied with the Standard to which he had certified it, and imposed censure, a fine, and a contribution to costs.

Thirteenth Vibration Conference Hosted by New Zealand



The 13th Asia Pacific Vibration Conference (APVC) was held at the University of Canterbury in November 2009 – the first time the conference has been held in New Zealand.

The APVC is an international refereed biennial conference for mechanical and civil engineers – academics, practitioners and scientists – working on aspects of dynamics, control, sound and vibration, noise, condition monitoring, damping, and response to earthquake ground motions. The aim of the conference is to promote research, provide an opportunity to network, and strengthen links between researchers and practitioners.

Conference convenor, Professor **Athol Carr FIPENZ**, from the Department of Civil and Natural Resources Engineering at the University of Canterbury, says the event was very successful with delegates giving positive feedback to organisers.

“One of the highlights for me was the keynote address by Professor **Yoshihiro Suda**, Director of the Chiba Experiment Station at the University of Tokyo, who talked about developments in transportation, including personal transportation, where he showed work on new personal transportation devices, like miniature segway-type machines, but that are no wider than a person standing, for use on crowded footpaths and pathways such as those approaching subway station platforms in Japan.”

The conference was attended by 139 delegates from around the world and proceedings included 127 papers from 14 countries.



President's Message

Celebrating Excellence but Dealing with Poor Performance

Late last month, the fifth annual Engineering Excellence Awards were held in Wellington at a prestigious black-tie event. It was attended by senior politicians and very well received by all with whom I spoke. The diversity, ingenuity and success of the many projects and products was impressive and reinforces just how important our engineering innovation is to our economy, and just how great New Zealand engineers can be.

The Governing Board met the next day and one of the items on the agenda was how we can improve engineering practice – and where do the risks of poor practice lie?

One matter discussed was the currency and completeness of the codification of engineering knowledge – not just the formal standards published by Standards New Zealand, but also the plethora of codes of practice, guidance notes, best-practice guides, standardised documentation (etc) produced by our technical interest groups, collaborating technical societies, and like organisations.

To address this, a “compendium of codified engineering knowledge” is being produced by a team led by the IPENZ Director of Engineering, **Charles Willmot FIPENZ**. Although still a work in progress, the compendium is already a sizeable spreadsheet and discussions with Standards New Zealand show the need for such a tool. In due course, this resource will be available to Members and will hopefully reduce the risk of engineers using an outdated or inappropriate standard (or worse still, none at all).

None of this should discourage innovation – rather we should ensure we build on our previous collective experience.

Another matter discussed by the Board was the relatively low number of complaints of poor practice by Members or registrants received by IPENZ, despite occasional claims and rumours of continuing poor practice in two fields of practice (structural and fire). We investigate poor practice whenever it is brought to our attention, if necessary by the Chief Executive using delegated power from the Board to deem information received to be a complaint (in effect making IPENZ the complainant). However, it is the responsibility of all engineers to make complaints or pass to the Chief Executive information about apparent poor practice by another engineer when they come across it. A failure to do so puts all of our reputations at risk, and breaches your ethical undertaking as a Member of the Institution.

In addition, we have mechanisms to help improve this process. One of these is a completely confidential reporting mechanism by which learning experiences or mistakes can be presented so we can all learn from them – this is modelled on the blameless reporting systems used in the air industry. CROMIE – Confidential Reporting on Matters in Engineering – is available on the IPENZ web site.

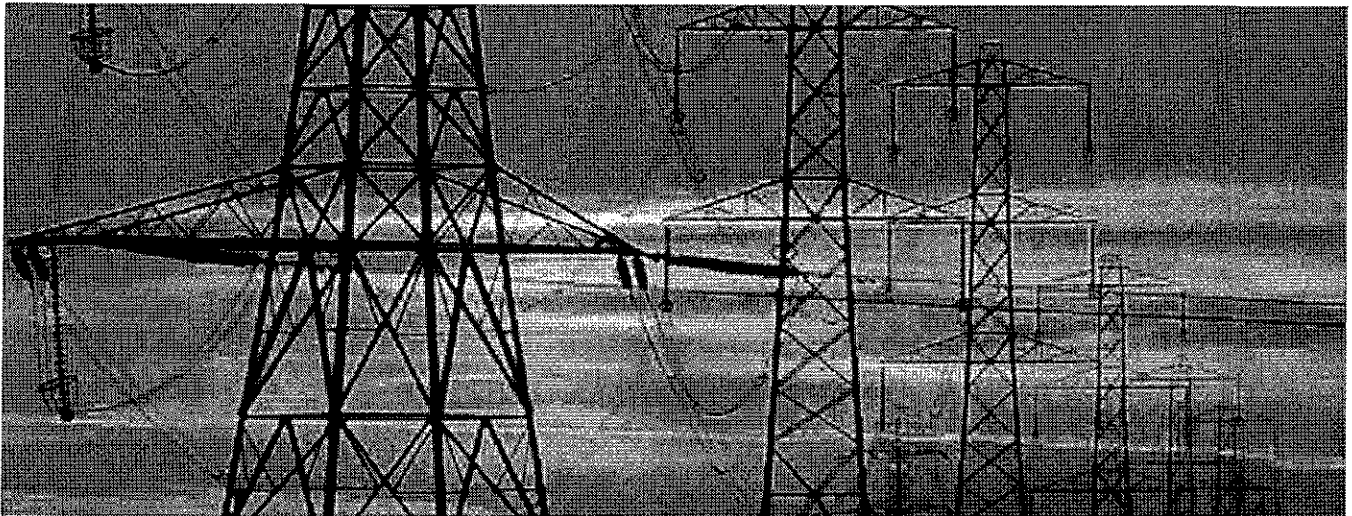
In many ways it is not part of the New Zealand culture to “pot” one’s colleagues, yet too much is at risk to allow any poor practice to continue. If we do not take ownership of our own performance we risk losing our self-regulating professional status and will become just like (heaven forbid) the real estate agents or even the audit accountants, both of whom Parliament has seen fit to impose a separate regulatory body to overview their performance.

If this were to happen innovation would be stifled, our profession would lose its prestige and future Excellence Awards would be superfluous.

Anthony Wilson
IPENZ President

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. 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 ₂ -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 (CO₂-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 CO₂-e emissions per person.

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The Engineering Practice Board

You may have heard reference to the Engineering Practice Board (EPB) in *engineering dimension* articles. But what is it and what does it do? **Charles Willmot**, IPENZ's Director – Engineering, explains.

Engineering practice is concerned with the day-to-day work of engineers fulfilling technical and related managerial roles – it is about how they use engineering knowledge in a responsible manner in fulfilling their duties to clients or employers.

The EPB consists of six to eight Members appointed by the Governing Board for their knowledge of engineering practice and who collectively cover a spectrum of engineering disciplines and employment sectors. Members are appointed for a two-year term. A Governing Board representative is also appointed annually to the EPB to serve as a conduit to ensure that any engineering practice issues are notified to both Boards, and appropriate means are put in place to address them.

The engineering profession is self-regulating and IPENZ and its Members want to see that it remains that way. The Governing Board has charged the EPB with a number of tasks.

1. Oversee the technical leadership role of IPENZ in the context of IPENZ acting as the hub of the self-regulating engineering profession.

This means that IPENZ takes the initiative to resolve issues of technical standard-setting, identifying suitable practice of its own volition, anticipating needs, rather than remedying failures.

A perfect example of this is the *Coldstore Engineering in New Zealand* practice note (see page 01).

2. Identify and monitor engineering practice issues and risks affecting, or potentially affecting, the profession, its clients and the public at large.

Work has been continued on structural engineering in association with Society of Structural Engineers (SESOC) and the Association of Consulting Engineers (ACENZ).

3. Monitor engineering practice, engineering knowledge and disciplinary programmes of work which are co-ordinated through National Office ensuring that the most important issues and risks are addressed in a timely and professional manner.

The EPB regularly reviews codification and codes of practice, and prioritises work programmes.

All Members are bound by the *Code of Ethics* and IPENZ is the regulatory authority for the Chartered Professional Engineers Act. Members voluntarily provide their skill, expertise and time to ensure that any complaints against a Member or a Chartered Professional Engineer are dealt with efficiently and effectively. The EPB monitors trends in those complaints and seeks to address any issues.

4. Convene the annual Engineering Practice Forum.

The Engineering Practice Forum brings together Technical Interest Groups, Collaborating Technical Societies and kindred bodies to workshop together on technical issues for the benefit of the engineering profession and develop the work programme for the coming year.

The EPB meetings may be held face to face, by teleconference or video conference, or electronically. The EPB seeks to reach agreement by consensus.

The EPB reports to the Governing Board on its activities and any decisions made under its delegated authority. The Governing Board representative ensures that the activities of the EPB align with the Institution's strategic and business plan.

Massey Student Cleaning Up the Streets



Kent Geary, a mechatronics student at Massey University, has come up with a novel way of keeping the streets of Palmerston North clean. Kent, a Student Member of IPENZ, helped to design and build a "scooter-vac" to pick up broken glass from gutters.

Two years ago the problem of broken glass was raised at a Green Hub – a local environmental group – board of trustees meeting. Broken glass is estimated to cost motorists \$350,000 in puncture repairs, while nationwide it results in \$3 million worth of claims to ACC annually.

As a Green Hub trustee, and the University Student Association's Environmental Officer, the project was ideal for Kent. With the direction and assistance of **Jonathan Hannon** of the Zero Waste Academy, and **Clive Davies** FIPENZ and technician **Stan Hyde**, from the School of Engineering and Advanced Technology (SEAT) at Massey, Kent started designing and building the scooter-vac.

The project was part-funded by a \$20,000 grant from the Packaging Accord (a voluntary initiative to cut down on wasteful packaging),

the Green Hub and SEAT. With these partners, the team could begin to test the possibilities.

Blueprints had to be drawn up in computer aided design and the team had to build a proof-of-concept vacuum cleaner to show that a small single-cylinder motor would do the job. The team had to work around measures put in place to make the scooter road legal: in this case a sign on the back, "caution, street cleaning, stops frequently", and a pole-mounted orange flashing light for night use.

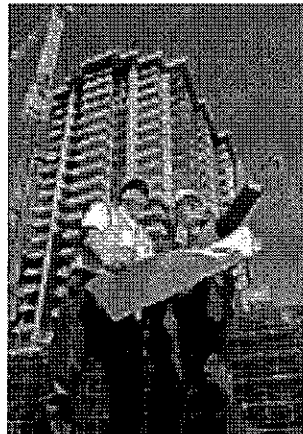
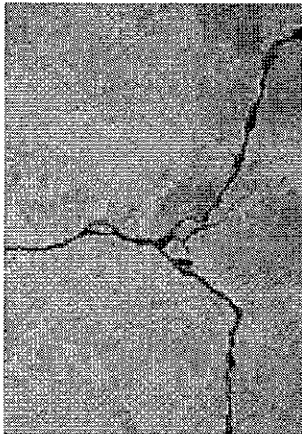
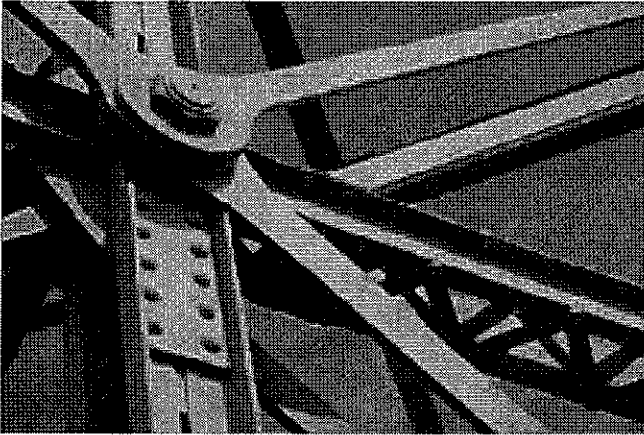
A programme will also be written for a GPS logging system, which provides Mr Hannon with the location of the broken glass so that the city council can start taking measures to tackle problem areas.

Kent hopes this multi-partner green project will be the precursor of others like it. The project provided an opportunity for practical experience for the students, but also positive gain for the community using the expertise of their local university.

"This is where the connection between Massey, the city, and the Green Hub starts to fuse really nicely," Kent says.

Ethics Talk

Cameron Smart, Engineering Practice Manager, focuses on the complaints process, providing examples of complaints against professional engineers that led to disciplinary action.



IPENZ's Engineering Practice Board has been reviewing sanitised reports of complaints, looking for trends or themes that might indicate risks to our profession. In the October issue of *engineering dimension*, we looked at the complaints history over the past 10 years, and showed that out of over 140 complaints laid, only six led to disciplinary action.

We now study those six with a view to discovering what actions, or inactions, have been held to be unacceptable engineering practice.

It is possible to analyse the complaints by field of engineering. The recognised practice fields are aerospace, bio, building services, chemical, civil, electrical, environmental, fire, geotechnical, industrial, information, management, mechanical, mining, petroleum, structural, and transportation.

The analysis shows that geotechnical engineering attracts more than its fair share of complaints, but when tested against the ethical requirements, no geotechnical engineer has yet been found wanting.

Structural engineering has attracted 60 complaints. Of those 60 complaints, five have been upheld by the Institution's disciplinary processes. It is also worth noting that 30 of the 60 complaints have been dismissed, 18 were otherwise resolved, and seven are in progress.

Complaints upheld

1. Private bridge

The complaint related to structural and geotechnical aspects of the design and construction of a private bridge. The complainant alleged the respondent had "overstepped his ability in a potentially dangerous way".

The respondent was a sole practitioner with recent immigrants as associates, making his first foray into bridge design.

The respondent had consulted the Heavy Engineering Research Association on a technical point, but the disciplinary committee (DC) held that this was inadequate as peer review. The DC found a large number of errors in calculations and an inadequate checking procedure, so found the complaint substantiated in part.

The DC recommended that respondent had a greater regard for the Code of Ethics, implement a quality assurance system for client engagement and design checking, find a mentor, and provide evidence to the IPENZ Chief Executive of the new quality and checking processes.

2. Producer statement PS4

The complaint concerned the foundations of a domestic building. The complainant was a building control official in a territorial authority (TA) who alleged that the respondent engineer had issued a construction review producer statement (PS4) without adequate verification of the works. It transpired that the design had been changed at the owner's request during construction. The respondent had issued a PS4 for the earlier design in an ill-advised attempt to help the client.

Territorial authority officers had inspected redesigned foundations, but the TA did not regard this as satisfying its requirement that the respondent certify his own inspection.

The DC found that the respondent had exercised insufficient care, so upheld the complaint, and imposed a fine and costs.

3. Concrete floor slab

The complaint concerned the concrete floor slab of an industrial building. The engineer and the client had a long-standing relationship, for which they thought a verbal contract sufficed. The engineer relied on geotechnical data obtained previously for a nearby site. The floor settled, causing damage to process equipment. The client then complained that the engineer had failed to carry out his engineering activities in a competent and careful manner.

The DC was concerned that the respondent had insufficient quality assurance and peer review processes in place, and held that he had not undertaken engineering activities in a competent and careful manner.

The DC upheld the complaint, and imposed a reprimand, admonishment, fine, and costs.

4. Council checker being used as peer reviewer

The complaint related to a commercial building. The complainant was a disinterested engineer who alleged the respondent was failing to conduct engineering activities to the standard expected of a chartered professional engineer. The complainant "looked over shoulder of" the council checker who had found technical errors and then found the respondent slow to answer queries.

The project had paused during design, then suddenly revived, with the client requiring building consent application before design checks had been done. The investigative committee found many technical errors, and also found that the respondent had treated the council check as a peer review.

The DC found lack of care amounting to negligence, and that there was no evidence that reasonable steps had been taken to safeguard the health and safety of people. The DC censured and imposed fines and costs.

5. Design office management

This case involved the same matter as the fourth, but against a second respondent, the senior director of the firm.

This second respondent had made a “commercial decision” to send documents to council without checking. The disciplinary committee found negligence in that the respondent had not taken reasonable steps to assure the quality of the work for which he had overall and ultimate responsibility. Both respondents had allowed commercial pressures on progress and time by client to be put before professional integrity.

The DC censured and imposed fines and costs, and recommended that the respondent introduce a quality assurance procedure.

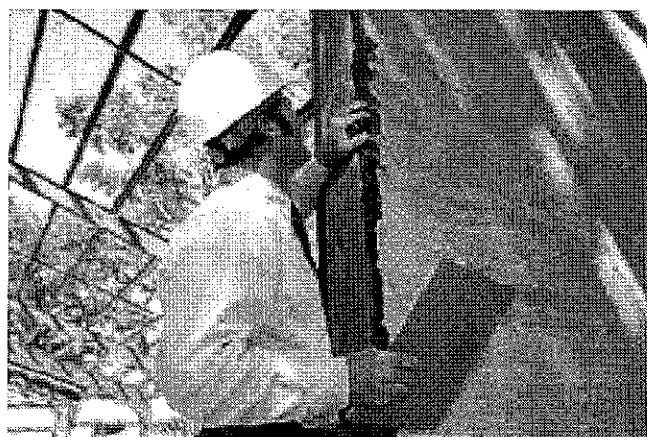
6. Criminal offence

The final complaint to have been upheld involved an engineer who had been convicted in a court of an offence not related to engineering activities - this automatically gives rise to disciplinary action.

Themes in upheld complaints

A theme common to all the upheld complaints is a lack of checking procedures and quality assurance schemes.

- A casual enquiry of an office colleague does not count as peer review, and nor does a more determined effort to consult an outside party.
- It is unacceptable to claim that a council check of a design or element of construction counts as peer review.
- Reviews and quality assurance schemes need to be recognised by the designer and by the reviewer for what they are, and treated with a degree of formality. *Practice Note 02 Peer Review* offers guidance.



At present there is no case history on whether peer reviews should be done internally or externally.

Similarly, there is no case history on how the financial liability should be shared by designer and reviewer.

It is notable that failing to stand up to an unreasonably demanding client attracts adverse attention from a DC. *Practice Note 06 Developing and Maintaining Client Relationships* offers guidance on this problem.

The lack of a checking procedure is a common theme in complaints that have attracted disciplinary action. What practices have been found to be only marginally acceptable? In the next issue of *engineering dimension*, we will look at some “near misses” to help in drawing a boundary between what is acceptable and what is not.

Foundation Scholarship Applications on the Rise

An increasing number of students are taking an interest in engineering, and this year the IPENZ Foundation has had a great number of applications for the Foundation Scholarships.

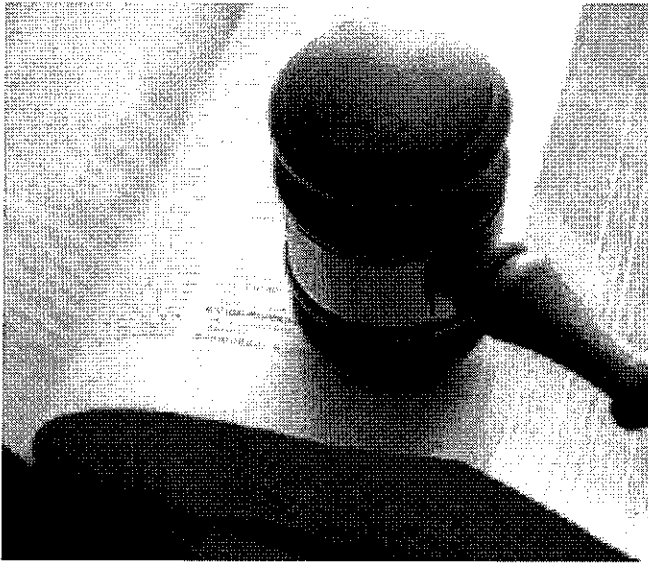
The IPENZ Foundation offers scholarships valued at \$5,000 each to assist Year 12 or 13 students undertake university study in engineering. Winners are chosen on the basis of their intent to pursue engineering as a career, motivation to succeed, academic merit and contribution to the wider community.

A total of 134 applications were received from Year 12 and 13 students from around the country, up 44 per cent from last year, where 75 applications were entered. Of the total number of applications, 71 per cent (96) were from male applicants. Twenty-nine per cent of applications (39) were received from female students, doubling the number of female applicants from last year’s scholarship round. Twenty-three per cent of applications (31) were from Dux or *Proxime Accessit* students.

A number of applicants mentioned their involvement with the Transpower Neighbourhood Engineers Awards and the influence of Futureintech ambassadors, both of which are initiatives of IPENZ, which encourage students to take part in engineering activities and consider engineering as a future career option.

Local Branch	Applications received
Auckland	34
Bay of Plenty	10
Canterbury	10
Hawke's Bay	6
Manawatu	7
Nelson-Marlborough	5
Northland	5
Otago	13
Southland	3
South Canterbury	2
Taranaki	7
Waikato	11
Wellington	21
Total	134

Ethics Talk



From the Engineering Practice Board

At a recent meeting of the Engineering Practice Board (EPB) the issue of the membership of Technical Interest Groups (TIGs) was discussed in regards to the perception of the public, or even the regulator, that this might infer competence-graded Membership of IPENZ. It was requested by the EPB that the situation should be made quite clear.

Rule 27.3.8 states clearly that membership of a TIG in itself does not confer the rights of Membership of the Institution. Furthermore, *Rule 27.10.2* states that in representing themselves in their own activities, outside the activities of the group, those members of the group:

- who hold a competence-graded Membership arising from one or more of *Rules 27.3.1, 27.3.2* or *27.3.10* and whose competence is aligned with the domain of activity of the group, may use the title of the relevant named class of Membership in relation to the Group
- other persons admitted under *Rules 27.3.1, 27.3.2* or *27.3.10*, may use the title member of the group
- other members may only use the title of affiliate member of the group, and may not imply by any means that they are Members of the Institution itself.

Such matters are particularly important in the use of producer statements and other commonly used forms where competence-graded Membership of IPENZ might be misconstrued by a regulator, by the inappropriate use of a postnominal.

The EPB felt that any member of a TIG who is not a competence-graded Member of IPENZ needs to make that fact eminently clear, particularly when dealing with matters where competence-graded Membership might be inferred inappropriately.

The message is quite clear. If you are not a competence-graded Member of the Institution that fact should be stated clearly and not to do so breaks the Code of Ethical Conduct which all members of a TIG must comply with as a condition of membership.

Robolympics at Massey University



Students test the recognition and precision shooting skills of their robot.

Massey's Palmerston North campus hosted this year's annual trans-campus "robolympics" competition. The event challenges School of Engineering and Advanced Technology students to design and build robots and then compete against each other in a series of tests.

Eighteen teams in their first year of study competed in this year's event, which challenged their creations in tests of speed, manoeuvrability and strength. Each team was allocated three minutes per challenge and must try and score the highest points to beat their opponents.



First-place team (from left) Austin Boyle, Callum Murton and Joyce Cristal.

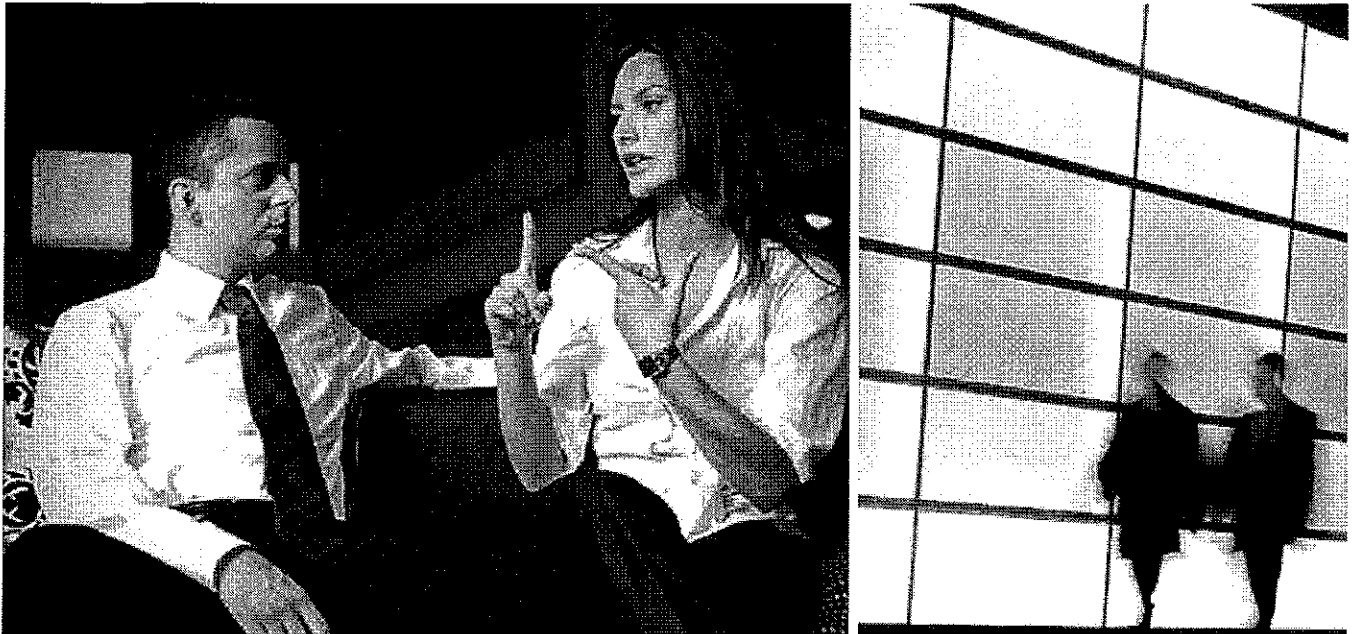
Second-year analogue and digital electronics students were invited to take part in a separate event in the preceding week - the annual "duck-for-cover" project. Students design and build their robots over the course of the year and then compete against each other in the competition, which is considered a highlight of the academic year.

The duck-for-cover competition consists of three challenges which test the entrants' skills in recognition, distance shooting and precision shooting. This year the Wellington teams won first and second place and took home the inter-campus duck-shooters' trophy.

Organiser and lecturer **Ralph Ball** says the annual event is designed to encourage students to think about problem solving and how to build a robot to complete specific tasks.

Ethics Talk

This month, guest writer **Neville Beach DistFIPENZ** looks at ethical dilemmas in the engineering profession where there is no clear solution and advice should be sought.



There is an area of ethical dilemma where the boundaries are not always clear. This covers such things as whistle-blowing and conflicts of interest. There is often no date which can be set when action or investigation should be initiated. Sometimes the problem will go away as circumstances change. If legal advice is sought, this will usually be designed by the lawyers to reduce the engineer's legal culpability rather than solve an ethical dilemma. These situations can arise from any of the Code clauses.

The issue of conflict of interest (Col) classically involves a private financial interest of someone involved in a transaction. For instance if an elected local body member is required to vote on a plan change that effects a property he or she might own or have an interest in, then that member can not be involved in the debate or the voting on this issue.

Conflict of interest for engineers is never as clear as the local body example, where precedent has been developed over many years.

Many years ago I was commissioned to prepare plans for protecting a community from flooding from a stream which flowed through it. The proposed solution involved constructing two detention dams above the township which would reduce peak storm flows.

One of the proposed dams was below a development designed by my firm. Because of this involvement the land owner was approached and agreed to the proposal which involved the periodic flooding of some of his land. I believed that there was no Col because the land above the dam received no benefit of relief from flooding, and in fact had the detriment of periodic flooding of some of it. A complaint was made by a member of the public that our client's land must have received a benefit from the flood protection scheme which had not been disclosed.

The Auditor General investigated the matter and found no wrongdoing after it had been explained. Nevertheless I was cautioned that the situation had not been handled in the best way, and uninformed members of the public could assume that there must have been some undisclosed benefit to our client. This case demonstrates that engineers sometimes work in a fish bowl and it is necessary to disclose all connections and relationships early to avoid complaints.

Whistle-blowing is another topic. Engineers may from time to time become aware of activities within the company that they work for that they are not happy about. If they were opposed to drinking any sort of alcohol they might be opposed to (say) working on the structural design of a new brewery. This is a non-engineering view and the work undertaken by the firm is legal and *bona fide*. Most employers would reschedule their staff so that no one was working on the brewery job who objected to it as a project. Here, there is no reason for a whistle-blow.

Generally the only cause to whistle-blow under the *Engineering Code of Ethics* would be if a Member was instructed to work to a sub-professional standard that lowered measures of safety and was not code-compliant.

There was a well-known case a few years ago when a Member considered that some aspects of structural engineering design and supervision being undertaken by the profession were not adequate. His views were distributed widely to the Prime Minister and others, and caused concern to other Members. IPENZ took the matter seriously and set up a committee to investigate it. My recollection is that there were some grounds for the complaint which were in alignment with the corrective action. What was not acceptable to many Members was the distribution of the allegations, rather than the allegations themselves.

The first step for any Member who might be in such a position is to recognize the situation and ask IPENZ for guidance. Such assistance will often be from senior Members of the profession who have experienced similar situations and will be able to offer some advice to the engineer. Usually it is the engineer concerned who must make the decision, but IPENZ can also decide to act if it thinks that the situation is sufficiently serious. Remember that IPENZ is a significant resource to assist Members who may think that they have an ethical problem and need advice.

Bounding Our Ethical Responsibilities

Over the last year or so, both through this publication and in the general media, Members will have read about challenges to self-regulation. Some occupations have got it wrong (such as financial planners and real estate salespeople) with dire consequences. We have consistently emphasised the importance of not letting engineering fall into similar disrepute. As my predecessor said on several occasions, we rely on Members to be the frontline, and take on the ethical responsibility to report poor behaviour, even if it is not comfortable to do so.

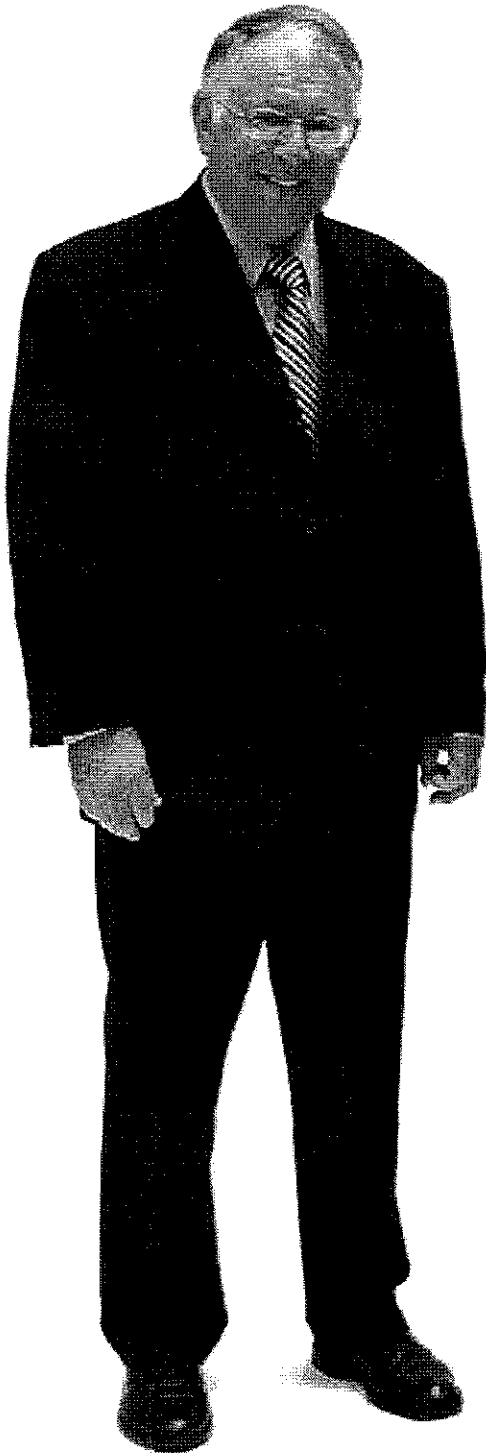
In this issue you will find reports on two case studies – one case dealt with under the CPEng regime, and the other dealt with under the Registered Architects Act. Each involved commercial issues in dispute. In the engineering case, the matter was over fees and ruled to be outside the code of ethics (as the contracting body for the fees was not a natural person, as is a CPEng), but in the architectural case the matter was over poor estimating of project price, and the individual registrant was judged to have obligations to estimate the price carefully and competently.

This illustrates a more general matter on which Members need to be clear – we restrict application of our ethical code to engineers carrying out engineering activities. What is perhaps not so clear is that there does not need to be a fee for service (or payment under an employment agreement) for engineering activities to occur. Whenever the engineering mindset is engaged the obligations apply. A few years ago we had an unfortunate case of a Member commenting over his fence to a neighbour about the stability of a retaining wall – asked by the neighbour if it looked okay he said yes. The wall subsequently failed and you can guess what happened next.

A recurring theme we face is that engineers often get into trouble by trying to be too helpful, inadvertently placing an ethical obligation on themselves (and sometimes a commercial liability through tort). Your friend who is a doctor will not give you medical advice in casual conversation, but engineers too often step in.

I bring this issue to your attention in my column this month to highlight the governing Board's ongoing commitment to keeping our house in order in matters of self-regulation, ethical responsibility, and the obligation to be competent and careful in all our engineering activities. The best way to deal with complaints is to stop them from happening by good behaviour. Failing to bound one's advice is a problem we need to address, but sadly it does mean turning off our "try to help" gene at times. The lesson is that if we do not do so, many of us will get trouble we do not think we deserve.

Bas Walker
IPENZ President



Ethics Talk

This month **ANDREW CLARK**, Manager – Ethics and Discipline, takes a look at the consequences of ignoring processes and procedures.

I would like to draw to your attention to two incidents that are unrelated and over 30 years apart, but have some disturbing similarities.

On 29 July 1967, in the Gulf of Tonkin off Vietnam, the *USS Forrestal* had been preparing to launch aircraft from her flight deck, when a Zuni rocket accidentally fired from an F-4 Phantom parked on the starboard side of the flight deck. The missile streaked across the deck, into a 1500-litre belly fuel tank on a parked A-4D Skyhawk. The ruptured tank spewed highly flammable JP-5 fuel onto the deck which ignited spreading flames over the flight deck and under other fully loaded aircraft ready for launch. Fuel from the leaking tank created a massive conflagration that burned for hours, killing 134 people, injuring 161, destroying 21 aircraft and costing the United States Navy \$72 million.

The electrical connection between the aircraft and ordnance is a plug commonly referred to as the pigtail. This would be connected when the aircraft was in position to launch but sometimes the ordnance failed to become live and the aircraft would need to be removed from the launch position, which caused delays in the launch of the other aircraft.

In order to save time it was suggested that the pigtail could be plugged into the ordnance when the aircraft is preparing to start up. In this instance, when the pilot switched from the ship-borne power unit to the aircraft's onboard power a voltage spike went through the aircraft's electrical system and fired the rocket.

Upon investigation it was found that the new procedure had been implemented without first going through the necessary approval process.

Thirty-two years later, in 1999, three workers were refining an enriched uranyl nitrate solution (18.8 per cent uranium 235) for a fast breeder research reactor in Tokaimura, Japan. They were pouring uranyl nitrate solution from a five-litre stainless steel beaker through a funnel into a sedimentation tank. When they poured the fourteenth dose,

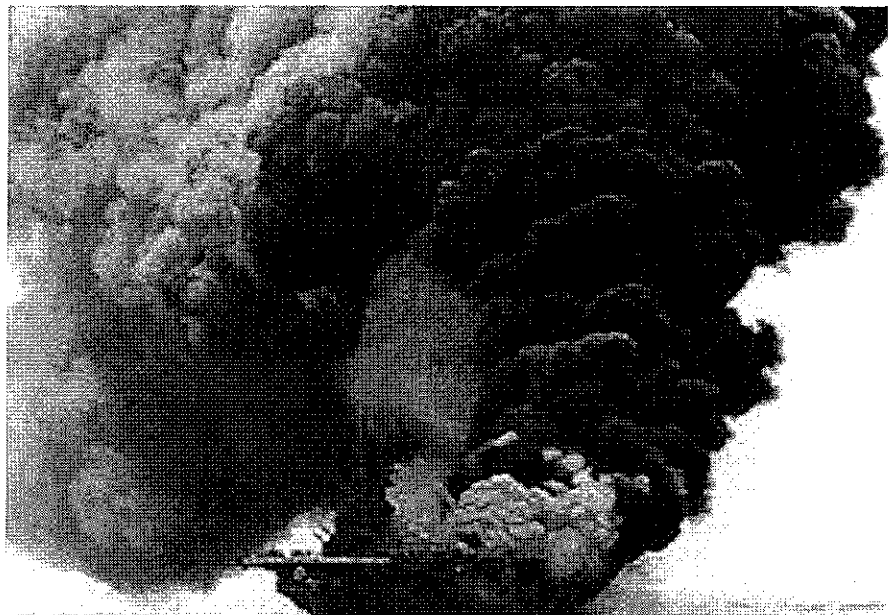


Image courtesy of USS Forrestal Museum Inc.

they saw a blue flash. All three workers were immediately hospitalised and two later died because of excessive neutron and gamma ray exposure. One-hundred-and-fifty other people received radiation exposure, but it was less than the maximum allowable annual dose.

The total amount of uranium poured was 16.8 kilograms, seven times larger than the maximum allowable quantity for the tank. The plant equipment had been designed with a critical safe slim geometry (117 millimetres in diameter and 3,500 millimetres high, giving a volume of 80 litres), which also inhibited "efficient" operation. But the roughly spherical sedimentation tank (450 millimetres in diameter, 600 millimetres high and 100 litres in volume) was an exception.

In order to save time, they had changed the process on their own and violated a legal requirement in the operation manuals, which the company had established a few years before.

This was a special operation and therefore required some special care. But no qualified

engineers were in charge of the operation and workers were not educated for the operation and accompanying risks partly because the company was in a difficult financial position.

In both the *USS Forrestal* and the Tokaimura incidents, a procedural change had been implemented with severe consequences. The changes were made to save time, but in doing so circumvented an approval process.

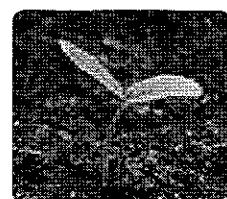
This demonstrates a need to ensure that everyone has an understanding of why there are procedures and that not following them constitutes unethical behaviour and can result in the death of others. It mostly falls upon the engineer to ensure that procedures are followed and more importantly that those that are involved in the process are trained and understand why it is necessary to follow a process. This is especially true when considering making a change to a process, no matter how simple the process may appear.

Making sense of the Building Act 2004?

IPENZ Building Act workshops

September: Wellington – Christchurch – Auckland – Taupo

Register today at www.ipenz.org.nz – key word: engineering calendar



Ethics Talk

ANDREW CLARK, Manager – Ethics and Discipline, talks about the reasons for a code of ethics.



As engineering rose as a distinct profession during the nineteenth century, engineers saw themselves as either independent specialists or technical employees of large enterprises. At that time a number of engineering societies began to form. Even so, ethics was viewed as a personal rather than a broad professional concern.

At the end of the nineteenth century, a series of significant structural failures occurred, such as the Tay Bridge disaster in 1879, and engineering societies began to develop formal codes of ethics. Furthermore, concerns for professional practice and protecting the public that were highlighted by these failures, provided impetus to set formal credentials as a requirement to practise. This involves meeting some combination of educational, experience, and testing requirements. In New Zealand this is the assessment for gaining Membership of IPENZ and registration as a Chartered Professional Engineer (CPEng). Underpinning IPENZ Membership is the IPENZ Code of Ethics, while CPEng has the Code of Ethical Conduct.

Once you become a Member or CPEng registered your behaviour is measured against the code of ethics with expected minimum standards of behaviour. One aspect of the IPENZ Code of Ethics is the expectation that an engineer will perform their engineering activities in a responsible manner and take appropriate action when they are aware of a matter of concern.

The extent to which actions are taken to address a concern of the engineer is very much a personal decision. In severe cases there is always the threat of loss of employment or a professional career. This is where the guidelines within the IPENZ Code of Ethics can offer some help with the process of making others aware of the possible consequences of not following advice. This would ensure that the engineer has followed an accepted process and has met their professional obligations. These are outlined as follows:

Part 2 – Guidelines

Professionalism, integrity and competence: Members shall undertake their engineering activities with professionalism and integrity and shall work within their levels of competence.

2.2 Giving engineering decisions, recommendations or opinions that are honest, objective and factual. If these are ignored or rejected you should ensure that those affected are made aware of the possible consequences. In particular, where vested with the power to make decisions binding on both parties under a contract between principal and contractor, acting fairly and impartially as between the parties and (after any appropriate consultation with the parties) making such decisions independently of either party in accordance with your own professional judgement.

2.10 Upholding the reputation of the Institution and its Members, and supporting other Members as they seek to comply with the Code of Ethics.

Part 3 – Minimum Standards of Acceptable Ethical Behaviour by Members

General professional obligations

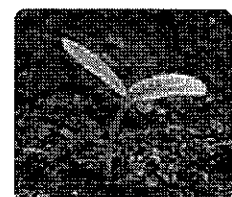
6. Inform others of consequences of not following advice
 1. A Member who considers that there is a risk of significant consequences in not accepting his or her professional advice must take reasonable steps to inform persons who do not accept that advice of those significant consequences.
 2. In this context, significant consequences means consequences that involve:
 - a) significant adverse effects on the health or safety of people; or
 - b) significant damage to property; or
 - c) significant damage to the environment.

This is also covered under Rule 48 of the Chartered Professional Engineers of New Zealand Rules (No 2) 2002.

Making sense of the Resource Management Act?

A Practical Understanding for Professional Engineers
One-day course: Auckland – Wellington – Christchurch

Register today at www.ipenz.org.nz – key word: engineering calendar



Ethics Talk

ANDREW CLARK, Manager – Ethics and Discipline, takes a closer look at the fifth value of the IPENZ Code of Ethics.

Sustaining Engineering Knowledge

Members shall seek to contribute to the development of their own and the engineering profession's knowledge, skill and expertise for the benefit of society.

Under this clause you should have due regard to:

- sharing public domain engineering knowledge with other engineers so that the knowledge may be used for the benefit of society
- seeking and encouraging excellence in your own and others' practise of engineering
- contributing to the collective wisdom of the profession
- improving and updating your understanding of engineering

and encouraging the exchange of knowledge with your professional colleagues

- wherever possible sharing information about your experiences, particularly successes and failures

This value of the IPENZ Code of Ethics outlines the requirement for the engineer to contribute to the profession for the benefit of society.

The value of sustaining engineering knowledge encourages the professional engineer to continuously look for opportunities to gain further engineering knowledge and to use this knowledge accordingly.

In the first instance, engineering knowledge may be gathered for commercial advantage,

but it may then be used to improve the wider engineering profession, such as in the development of engineering standards and practices.

Engineering knowledge is usually disseminated through presentations at workshops and conferences, and in articles. While these usually showcase success stories, information about failures must also be shared. Talking about failures is understandably more difficult but it should be viewed as an important process for developing engineering knowledge.

Sharing all engineering knowledge – successes as well as failures – benefits society, and the ability to talk constructively about such matters should be regarded as a required ethical behaviour for any engineer.

► From the IPENZ Code of Ethics:

(The Chartered Professional Engineers of New Zealand Rules (No 2) 2002, Part Three – Code of Ethical Conduct (Rules 45, 46 and 57) uses similar wording):

3. Act with honesty, objectivity, and integrity

A Member must act honestly and with objectivity and integrity in the course of his or her engineering activities.

4. Not misrepresent competence

A Member must—

- a) not misrepresent his or her competence; and
- b) undertake engineering activities only within his or her competence; and
- c) not knowingly permit engineers whose work he or she is responsible for to breach paragraph (a) or paragraph (b).

5. Not misrepresent Membership status

A Member must not (in connection with a business, trade, employment, calling, or profession) make a false or misleading representation, or knowingly permit another person to make a false or misleading representation, that services are supplied by a Member of the Institution.

Confidential Reporting Update

To date, we have received 15 reports concerning engineering matters. A panel has been established to review the reports. Once the review has been completed the panel's views will be reported in a Confidential Reporting on Matters in Engineering (CRoMie) newsletter.

In the meantime, here are two cases from a recent United Kingdom Confidential Reporting on Structural Safety (CROSS) newsletter.

CONCRETE HALF JOINTS

Half joints in concrete structures have been used successfully over many years, notably in bridges and buildings. They can offer great advantage in terms of construction and design although their performance depends on good design and detailing, and maintenance. Failures in half joints can happen if reinforcement is not detailed properly. Recently the reporter's firm came across a half joint in some precast beams with a very poor reinforcement detail. The beams were erected as planned. However, due to one of the defective joints failing, a collapse was initiated which caused the subsequent collapse of a series of beams and precast slabs. The investigation revealed that the position of the steel dowels (for shear) and reinforcement in the beams was incorrect and not sufficient to withstand even dead loads.

CROSS comments

Half joints can be satisfactory in buildings but are not now recommended in external situations where they may be subject to weathering. The Highways Agency says that half joints in bridges pose a risk as they cannot be maintained properly due to access difficulties. This is in addition to risks that may exist from design or construction defects. In buildings, in many cases the thickness of the nib will be small which means the position of the reinforcement is not ideal. Joints should, so far as is possible, be positioned so that they can be inspected and then maintained if necessary. (Report 088)

DEMOLITION COLLAPSE

Another report is of an incident that occurred recently in a United Kingdom city when a floor suffered a structural collapse during the demolition of a reinforced concrete building. Three small excavators

fell down at least one floor and one of the site personnel was injured while three others were rescued. The cause is still to be ascertained.

CROSS comments

It is not known in this instance whether the collapse was due to a shortfall in the design, or in the manner of demolition adopted. After the collapse, one column protruded through the floor slab which may indicate shear failure around the column head. Both reports reinforce the fact, which is backed by Health and Safety Executive statistics, that demolition risks are amongst the highest in construction activities. A review of proposed demolition procedures by a structural engineer should always be carried out. Notice should also be given to the local authority whenever demolition is planned. (Report 090)

Ethics Talk

ANDREW CLARK, Manager – Ethics and Discipline, takes a closer look at the fourth value of the IPENZ Code of Ethics.

Sustainable Management and Care for the Environment

Members shall recognise and respect the need for sustainable management of the planet's resources and endeavour to minimise adverse environmental impacts of their engineering activities for both present and future generations.

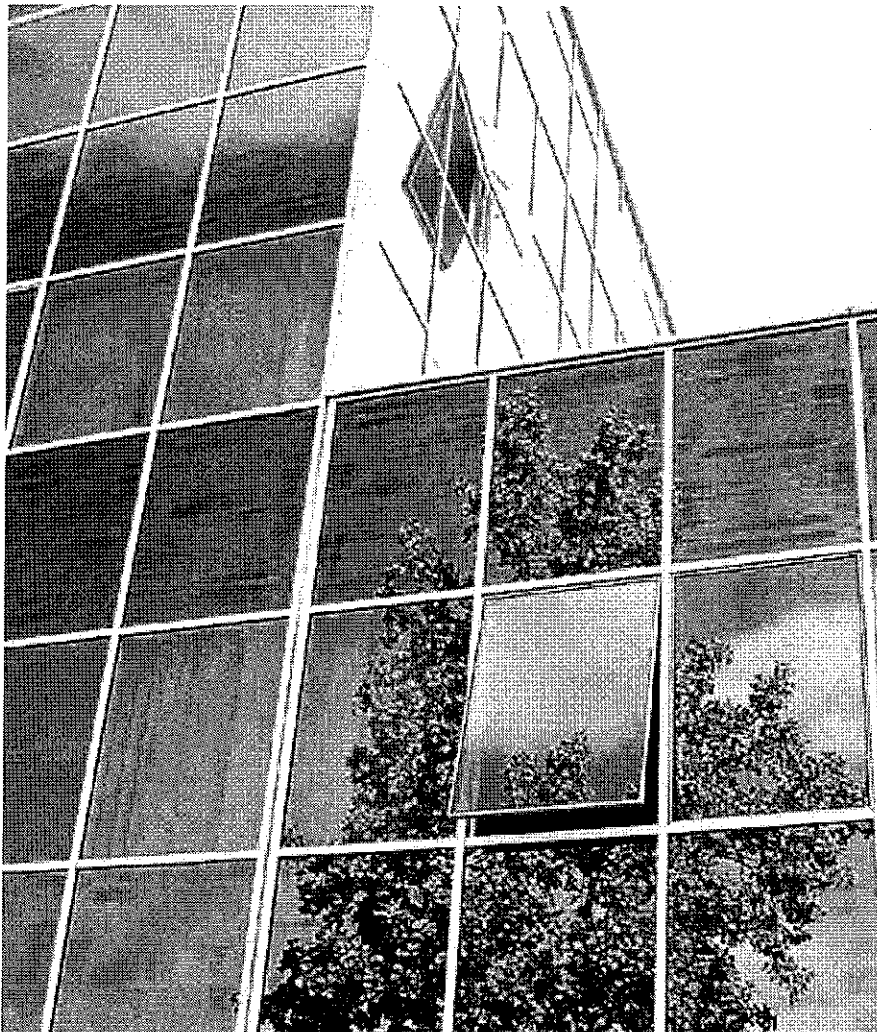
Under this clause you should have due regard to:

- Using resources efficiently.
- Endeavouring to minimise the generation of waste and encouraging environmentally sound reuse, recycling and disposal.
- Recognising adverse impacts of your engineering activities on the environment and seeking to avoid or mitigate them.
- Recognising the long-term imperative of sustainable management throughout your engineering activities. (Sustainable management is often defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs.)

This value of the IPENZ Code of Ethics outlines the requirements for the engineer to consider the effects of their engineering activities on the environment and the planet's resources.

The engineer should understand the ongoing effects of the engineering activity and operation over the lifetime of the activity, and any residual effects. There is also a need to consider the consumption of resources during manufacturing or construction activities, especially the ongoing operation of a manufacturing process.

The fulfilment of this obligation can be tested against Part Three of the IPENZ Code of Ethics, Clause Two: Have regard to effects on the environment, Clause Six: Inform others of consequences of not following advice, and Clause 11: Not review other engineer's work without taking reasonable steps to inform them and investigate. See the sidebar to the right for details.



› From the IPENZ Code of Ethics:

(The Chartered Professional Engineers of New Zealand Rules (No 2) 2002, Part Three – Code of Ethical Conduct (Rules 44, 48 and 53) uses similar wording):

2. Have regard to effects on environment

- (1) A Member must, in the course of his or her engineering activities,—
- a) have regard to reasonably foreseeable effects on the environment from those activities; and
 - b) have regard to the need for sustainable management of the environment.

- (2) In this context, sustainable management means management that meets the needs of the present without compromising the ability of future generations (including at least the future generations within the anticipated lifetime of the end products and by-products of activities) to meet their own reasonably foreseeable needs.

6. Inform others of consequences of not following advice

- (1) A Member who considers that there is a risk of significant consequences in not accepting his or her professional advice must take reasonable steps to inform persons who do not accept that advice of those significant consequences.

- (2) In this context, significant consequences means consequences that involve—
- a) significant adverse effects on the health or safety of people; or
 - b) significant damage to property; or
 - c) significant damage to the environment.

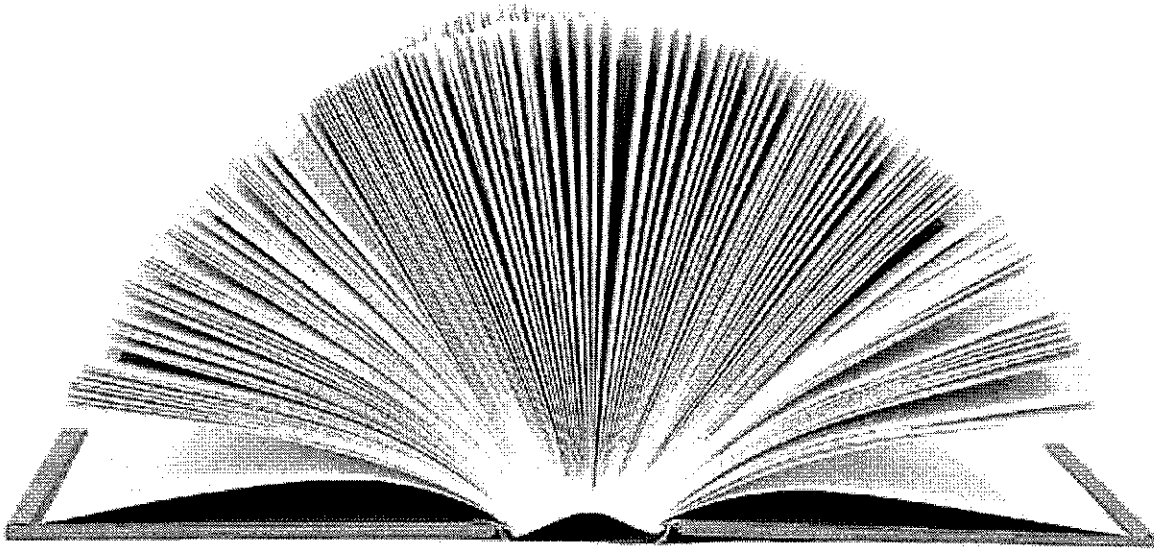
11. Not review other engineers' work without taking reasonable steps to inform them and investigate

- (1) A Member who reviews another engineer's work for the purpose of commenting on that work must take reasonable steps to—
- a) inform that engineer of the proposed review before starting it; and
 - b) investigate the matters concerned before commenting.

- (2) Subclause (1) does not apply if taking those steps would result in there being a significant and immediate risk of harm to the health or safety of people, damage to property, or damage to the environment.

Ethics Talk

ANDREW CLARK, Manager – Ethics and Discipline, takes a closer look at the second value of the IPENZ Code of Ethics.



Professionalism, integrity and competence: Members shall undertake their engineering activities with professionalism and integrity and shall work within their levels of competence.

Under this clause you should have due regard to:

- Exercising your initiative, skill and judgement to the best of your ability for the benefit of your employer or client.
- Giving engineering decisions, recommendations or opinions that are honest, objective and factual. If these are ignored or rejected you should ensure that those affected are made aware of the possible consequences. In particular, where vested with the power to make decisions binding on both parties under a contract between principal and contractor, you should act fairly and impartially and (after any appropriate consultation with the parties) make such decisions independently of either party in accordance with your own professional judgement.
- Accepting personal responsibility for work done by you or under your supervision or direction and taking reasonable steps to ensure that anyone working under your authority is both competent to carry out the assigned tasks and accepts a like personal responsibility.
- Ensuring you do not misrepresent your areas or levels of experience or competence.
- Taking care not to disclose confidential information relating to your work or knowledge of your employer or client (or former employer or client) without the agreement of those parties.

- In providing advice to more than one party, ensuring that there is agreement between the parties on which party is the primary client, and what information may be shared with both parties.
- Disclosing any financial or other interest that may, or may be seen to, impair your professional judgement.
- Ensuring that you do not promise to, give to, or accept from any third party anything of substantial value by way of inducement.
- Informing another Member before reviewing their work and refraining from criticising the work of other professionals without due cause.
- Upholding the reputation of the Institution and its Members, and supporting other Members as they seek to comply with the Code of Ethics.
- Following a recognised professional practice (model Conditions of Engagement are available) when communicating with your client on commercial matters.

And similarly in the Chartered Professional Engineers of New Zealand Rules (No.2) 2002:

Act with honesty, objectivity, and integrity: A Chartered Professional Engineer must act honestly and with objectivity and integrity in the course of his or her engineering activities.

This value relates to the professional conduct of the engineer performing his or her engineering activities and their duty-of-care in conducting these engineering activities. This must be considered in conjunction with the duty-of-care to work within in the engineer's area of competence.

This may be an issue when a client engages an engineer without finalising the scope of the specific services that will be provided by the engineer. The scope of the services usually includes the provision of Producer statements PS1 Design, PS2 Design Review, and PS4 Construction Review, and the fees associated with the completion of each.

For example, at the completion of the project, the client may object to the additional fees and refuse to pay the final account. This usually results in the engineer withholding the PS4 until the final account is settled. Although withholding the PS4 is ethical, it would not be professional to begin an engagement without confirming with the client the tasks and the likely fees that the tasks would incur.

Another potentially challenging scenario is reviewing another engineer's work. Failing to contact the engineer to investigate the circumstances surrounding their design decisions would mean that there was a failure to act with objectivity. This could develop into an issue when an unfavourable review is passed on to an external party, especially if it is done without the engineer's knowledge. It is an ethical obligation to contact the engineer whose work is being reviewed and it should be considered normal professional behaviour.

The fulfilment of this obligation can be tested against Part 3 of the IPENZ Code of Ethics (Clause 11: Not review other engineer's work without taking reasonable steps to inform them and investigate) and the Chartered Professional Engineers of New Zealand Rules (No.2) 2002 Code of Ethical Conduct (Rule 53: Not review other engineer's work without taking reasonable steps to inform them and investigate).

see over for Code of Ethics

Ethics Talk

ANDREW CLARK, Manager – Ethics and Discipline, takes a closer look at the third value of the IPENZ Code of Ethics.

Commitment to Community Well-being
Members shall recognise the responsibility of the profession to actively contribute to the well-being of society and, when involved in any engineering activity, shall endeavour to identify, inform and consult affected parties.

Under this clause you should have due regard to:

- Applying your engineering skill, judgement and initiative to contribute positively to the well-being of society.
- Endeavouring to identify, inform and consult parties affected, or likely to be affected, by your engineering activities.
- Recognising in all your engineering activities your obligation to anticipate possible conflicts and endeavouring to resolve them responsibly, and where necessary using the experience of the Institution and colleagues for guidance.
- Treating people with dignity and having

consideration for the values and cultural sensitivities of all groups within the community affected by your work.

- Endeavouring to be fully informed about relevant public policies, community needs and perceptions which affect your work.
- As a citizen, using your engineering knowledge and experience to contribute helpfully to public debate and to community affairs, except where constrained by contractual or employment obligations.

This value of the IPENZ Code of Ethics outlines the expected behaviour of an engineer when contributing to engineering activities in the wider community and the effects of engineering activities on the wider community.

There is a requirement for the engineer to identify the effects that the engineering

activity may incur on the community and consult with those parties that are most likely to be affected.

At a personal level the engineer is obliged to understand the issues concerning the work being performed. This would ensure that the work contributes to the well-being of the community and the work is appreciated by that community.

The engineer is encouraged to participate in the development of the community by using their engineering knowledge in a constructive manner and offering guidance as how a community project should proceed. This ethical value provides the basis of how an engineer can conduct themselves in a community project and provide leadership to ensure that a community project is successfully completed.



> From the IPENZ Code of Ethics:

(The Chartered Professional Engineers of New Zealand Rules (No.2) 2002, Part 3 – Code of Ethical Conduct (Rules 43, 44 and 45) uses similar wording):

- 1. Take reasonable steps to safeguard health and safety**
 A Member must, in the course of his or her engineering activities, take reasonable steps to safeguard the health and safety of people.
- 2. Have regard to effects on environment**
 - (1) A Member must, in the course of his or her engineering activities –
 - a) have regard to reasonably foreseeable effects on the environment from those activities; and
 - b) have regard to the need for sustainable management of the environment.
 - (2) In this context, sustainable management means management that meets the needs of the present without compromising the ability of future generations (including at least the future generations within the anticipated lifetime of the end products and by-products of activities) to meet their own reasonably foreseeable needs.
- 3. Act with honesty, objectivity and integrity**
 A Member must act honestly and with objectivity and integrity in the course of his or her engineering activities.

Ethics Talk

ANDREW CLARK, Manager – Ethics and Discipline, takes a closer look at the first value of the *IPENZ Code of Ethics*.

Protection of Life and Safeguarding People: Members shall recognise the need to protect life and to safeguard people, and in their engineering activities shall act to address this need.

To give effect to this value you should:

- give priority to the safety and well-being of the community and consider this principle when assessing obligations to clients, employers and colleagues
- ensure that reasonable steps are taken to minimise the risk of loss-of-life, injury or suffering which may result from your engineering activities, either directly or indirectly
- draw the attention of those affected to the level and significance of risk associated with the work
- assess and take reasonable steps to minimise potential dangers involved in the construction, manufacture and use of outcomes of your engineering activities

These obligations are not merely restricted to the activities in which an engineer is commercially engaged. It also applies to the outcomes of his or her engineering activities and should consider the entire life of engineering products.

A recent matter involved the importation and use of scaffolding that failed to comply with New Zealand's health and safety standards. An engineer involved in such an activity should immediately have the equipment removed from use, but is it ethical to recover financial losses by attempting to sell the equipment through a third party? Would it be acceptable if the engineer instructed the third party to only sell the parts for shelving, or would it be necessary to indelibly stamp the equipment as "not suitable for use as scaffolding"? Or could the engineer simply not supply some critical parts that prevent its use as scaffolding? Any action must clearly uphold the first value in the *Code of Ethics* and ensure it is impossible to use the equipment unsafely in the future.

The fulfilment of this obligation can be tested against Part 3 of both the *IPENZ Code of Ethics*, Clause 1: Take reasonable steps to safeguard health and safety, and the *Chartered Professional*

Engineers of New Zealand Rules (No 2) 2002, Code of Ethical Conduct, Rule 43: Take reasonable steps to safeguard health and safety.

Another example is a process plant designed and sold to the client at an agreed price. While procuring the equipment, however, the client decides to use cheaper alternatives. The cheaper alternatives are of lesser quality and do not meet the upper limit of the process system specification. Consequently, the equipment may fail when the process operates under the most stringent control measures, causing harm or death. A single item or procedure failure can often lead to accumulated or cascade effects that cause a catastrophic failure.

The engineer has an ethical obligation to assess the potential dangers and draw the client's attention to these dangers. The engineer must demonstrate that he or she has taken all reasonable steps and acted to fulfil the ethical obligation to "protect life and safeguard people".

Each situation should be tested against Part 3 of either the *IPENZ Code of Ethics*, Clause 6: Inform others of consequences of not following advice, or if applicable, the *Chartered Professional Engineers of New Zealand Rules (No 2) 2002, Code of ethical Conduct*, Rule 48.

If any action requires you to review another engineer's work, you should inform the engineer before starting and investigate the matter concerned before commenting. Only if there is immediate and significant risk of harm to the health or safety of people, or damage to property or the environment can this requirement be waived under *IPENZ Code of Ethics*, Clause 11(2), or the *Chartered Professional Engineers of New Zealand Rules (No 2) 2002, Code of Ethical Conduct*, Rule 53(2).

The challenge is recognising when such a situation is developing and then taking appropriate action. This action may range from verbally informing parties of the situation, producing a written notice outlining your concerns, or refusing to continue work.

As an individual engineer and a member of the engineering profession it is imperative that you remain aware of the different engineering activities that are going on around you. It is up to all of us to act in a responsible manner and ensure that the practice of engineering is contributing to the well-being of New Zealand society.

➤ From the *IPENZ Code of Ethics*:

(The *Chartered Professional Engineers of New Zealand Rules (No 2) 2002, Part 3 – Code of Ethical Conduct* (Rules 43, 48 and 53) uses similar wording):

Part 3 – Minimum Standards of Acceptable Ethical Behaviour

1. Take reasonable steps to safeguard health and safety

A Member (or Chartered Professional Engineer) must, in the course of his or her engineering activities, take reasonable steps to safeguard the health and safety of people.

6. Inform others of consequences of not following advice

(1) A Member (or Chartered Professional Engineer) who considers that there is a risk of significant consequences in not accepting his or her professional advice must take reasonable steps to inform persons who do not accept that advice of those significant consequences.

(2) In this context, significant consequences means consequences that involve –

(a) significant adverse effects on the health or safety of people; or

(b) significant damage to property; or

(c) significant damage to the environment.

11. Not review other engineers' work without taking reasonable steps to inform them and investigate

(1) A Member (or Chartered Professional Engineer) who reviews another engineer's work for the purpose of commenting on that work must take reasonable steps to –

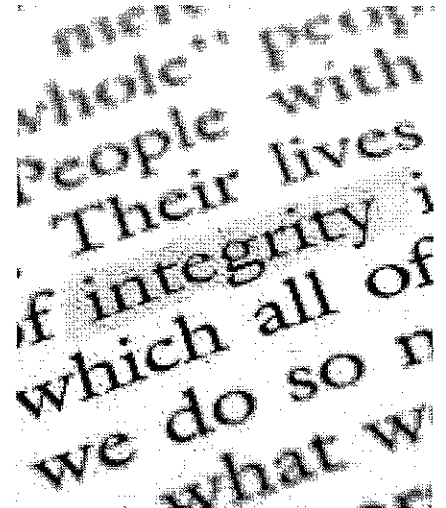
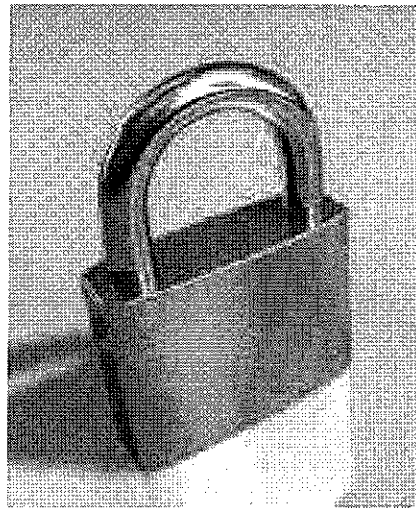
(a) inform that engineer of the proposed review before starting it; and

(b) investigate the matters concerned before commenting.

(2) Subclause (1) does not apply if taking those steps would result in there being a significant and immediate risk of harm to the health or safety of people, damage to property, or damage to the environment.

Ethics Talk

This issue of *engineering dimension* introduces a new feature on ethics. IPENZ Manager – Ethics and Discipline **ANDREW CLARK** will be exploring the IPENZ Code of Ethics and relating its values, guidelines and minimum standards to everyday engineering situations.



As a Member of IPENZ you are obliged to comply with IPENZ's Code of Ethics. The Code of Ethics is written in three parts that outline values, guidelines and the minimum standards of acceptable ethical behaviour expected of IPENZ Members.

The values in the Code of Ethics describe the fundamentals of the professional behaviour expected of an IPENZ Member in the delivery of their engineering services to society.

The five values underpinning the IPENZ Code of Ethics are as follows:

Protection of Life and Safeguarding People
Members shall recognise the need to protect life and to safeguard people, and in their engineering activities shall act to address this need.

Professionalism, Integrity and Competence
Members shall undertake their engineering activities with professionalism and integrity and shall work within their levels of competence.

Commitment to Community Well-being
Members shall recognise the responsibility of the profession to actively contribute to the well-being of society and, when involved in any engineering activity shall endeavour to identify, inform and consult affected parties.

Sustainable Management and Care for the Environment
Members shall recognise and respect the need for sustainable management of the planet's resources and endeavour to minimise adverse environmental impacts of their engineering activities for both present and future generations.

Sustaining Engineering Knowledge

Members shall seek to contribute to the development of their own and the engineering profession's knowledge, skill and expertise for the benefit of society.

Each of the values represents a cornerstone of the foundation of good engineering practice. By adhering to these values engineers will not only act in a professional manner but contribute to the engineering profession for the benefit of society. This isn't merely achieved through the work that is done by individual engineers but also through developing the engineering profession's knowledge and expertise gained from this work.

However, as with anything that is open to interpretation, the Code of Ethics can sometimes be misused. This can happen in situations where there is a dispute between two parties. When a client is unhappy with the work that has been performed by an engineer he or she may approach another engineer to finish the work. Is it unethical for the engineer to take on the work?

Applying ethical principles requires judgement. Is it ethical to design to a minimum standard when you know the minimum standard would not be adequate for the given situation? Is it ethical to change the parts specified for a project after the client has agreed to the design and costs? Is it ethical to not inform your client you will be charging separately for the issue of a producer statement? Are you in breach of the Code of Ethics if you hinder innovation either in private or in public?

Actual case studies will be used to discuss these dilemmas and the interpretation of the Code of Ethics in future issues of *engineering dimension*.



- > You can read the full version of the IPENZ Code of Ethics on the IPENZ website
www.ipenz.org.nz/ipenz/who_we_are/ethics_inc.com
- > IPENZ Practice Note 08 "Engineers and Ethical Obligations" also offers guidance to practising engineers and can be viewed in the Member Area of the IPENZ website
www.ipenz.org.nz/ipenz/members/practice-notes/default.com

President's Message



Getting it Right the First Time

In 2004 IPENZ ran a Members' poll in *engineering direct* on the issue of ethical standards in engineering practice. The results indicated that while 32% of Members thought there was no change in standards, 40% thought there was a decrease. While hardly scientific research, it was useful commentary on our profession.

Accompanying the mass deregulation of the last two decades there has been a growing concern that in order to save costs our profession is increasingly being asked to cut corners. Whilst we would like to think that any drop in standards has not included IPENZ Members, we cannot be certain this is the case.

In the building and construction industry a common perception is that the quality of project design documentation has declined significantly over the last 15 to 20 years. In Queensland this concern precipitated the formation of a whole-of-industry task force to present a plan of action for overcoming the problem. The results were presented in May 2005 (download the report from www.qld.engineersaustralia.org.au). In New Zealand, the Building Act 2004 is expected to lead to improvements, but until it is fully implemented in 2009 the extent of improvement will be hard to ascertain.

While some progress is being made to improve standards, engineers still find it difficult to learn from past mistakes; recently there has been a spate of structural failures in Europe, particularly of large span roofs, with consequential loss of life.

In the United Kingdom, failure to learn from failures has prompted the Standing Committee on Structural Safety to introduce CROSS, a scheme that allows engineers to learn from past mistakes and eliminate potential problems while maintaining confidentiality. This scheme, similar to those used in the aviation and shipping industries, has an independent organisation to collect and analyse reported concerns, identify trends and publish findings using real examples. The scheme does not publish details of the individuals who reported their concerns, the employer, the location of the project or any other material which would compromise the confidential nature of the scheme. CROSS is not a charter for whistle-blowers but encourages those who do have safety concerns to report them.

Here in New Zealand, as a result of an open letter to IPENZ, the Institution formed a structural taskforce in 2002 to inquire into the state of practice in structural engineering. The taskforce reported back in 2003 with specific recommendations.

The IPENZ Board has received further feedback that the state of structural engineering is still "of concern", a view supported by some members of our profession. Unfortunately, and despite efforts to the contrary, there is some evidence that bad practices on New Zealand construction sites are continuing.

The IPENZ Board discussed these issues and used the structural taskforce's original recommendations as a starting point for determining the way forward.

Our initial considerations noted that some of the structural taskforce's recommendations are yet to be completed. Of the seven recommendations, six relate specifically to matters in the Building Act, and the implementation timetable is insufficiently advanced to see hard evidence of whether the new measures will work.

At first, the Board thought a taskforce along similar lines to that formed in 2003 would be the best approach. However, after discussion with the Department of Building and Housing, we separated the wider industry issues covered by the Building Act from those that the original taskforce described as "unacceptable practices" and can be dealt with by IPENZ acting either as a professional body or as the Registration Authority under the CPEng Act.

The Board is now finalising a course of action to deal with these unacceptable practices. One idea is the establishment of a taskforce of practitioners to provide comprehensive practice notes – similar to the Heavy Engineering Research Association's notes that are used in the steel industry. Other possible initiatives include more stringent assessment of structural engineers' competence, continuing advocacy for requiring stronger involvement of designers during the construction process (under the Building Act), and introducing a New Zealand form of the CROSS system.

If you share these concerns we welcome your feedback. In the end, lowering standards will lead to loss of life – a situation no one wants to see.

Roly Frost
President

Ethics Advisers – a New Initiative to Assist Members

In several recent disciplinary cases, the Members involved have commented that IPENZ seems to turn against them when they are the subject of a complaint by acting as judge rather than their primary support. This is a serious concern and one which has been addressed by introducing Ethics Advisers.

Staff roles

National Office assigns three staff to work on complaints, all of whom are professional engineers: Engineering Practice Manager Andrew Clark; Director – Engineering Charles Willmot; and Chief Executive Andrew Cleland. Members who need ethical advice are welcome to contact any of these staff for advice. However, once a complaint is made, they have assigned roles within the disciplinary process; their concern is ensuring proper process is followed to protect the interests of both the engineer who is the subject of the complaint ("the respondent") and the complainant. In effect, staff act as "clerks of court" by advising committee members to ensure that there is no procedural irregularity.

Given this role, other than non-specific advice on process it is inappropriate for staff to talk to respondents about how best to defend a complaint. The governing Board has therefore decided that the Institution will meet its responsibility to support respondents by appointing senior Members to act as Ethics Advisers.

Continued overleaf >>

<< Continued from page 1

Ethics Adviser role

The role of the Ethics Adviser is to assist respondents to understand the disciplinary process, identify the essential matters of the complaint, understand their own actions with respect to their obligations as a CPEng or a Member of IPENZ, and prepare for each stage of the process. The Ethics Adviser does not act as a liaison with National Office, or represent the Member, but is a friendly person who can mentor and guide the engineer through a difficult experience.

About a dozen senior Members of the Institution, each with considerable relevant experience, have agreed to take on the role of Ethics Adviser. We will endeavour to run training sessions during 2006 to update Ethics Advisers on current disciplinary regulations in both CPEng and IPENZ contexts but in the meantime they are willing to get on with the role.

Appointing Ethics Advisers

In all cases, IPENZ immediately advises respondents in writing when complaint is received. In the future, this letter will include an offer to appoint an Ethics Adviser to assist the respondent. If the respondent chooses to take up the offer, IPENZ will identify an Ethics Adviser who lives as close as possible to the respondent. Once an Ethics Adviser without a potential conflict of interest is chosen, the respondent will be required to provide a written statement that he or she indemnifies the Ethics Adviser, even if their advice is followed. This ensures that the respondent understands the Ethics Adviser is a collegial support mechanism, not a professional service.

IPENZ cannot fund the work of Ethics Advisers but reimbursement of reasonable travel or communication expenses may be considered on a case-by-case basis if the respondent is unable to meet the costs.

Ethics Advisers and the disciplinary process

Once an appointment is made, the respondent is then free to contact the Ethics Adviser to discuss the complaint. What the Ethics Adviser does will depend on the particular circumstances, however, the Ethics Adviser would normally ask the respondent for the complete document file and any responses the respondent has

already made. Usually, the respondent and Ethics Adviser will try to identify the "essence" of the matter – often this is not clearly understood by the respondent, and the clarification that can result from such a discussion is very valuable. The Ethics Adviser may then discuss the content of any further submissions and might agree to review any written responses made by the respondent.

If an Investigating or Disciplinary Committee wishes to hear evidence from the respondent, the Ethics Adviser may accompany the respondent to make suggestions about how to present evidence and help the respondent manage their documents to ensure that he or she gives accurate replies. Additionally, the Ethics Adviser may give support at a more personal level if the respondent is under pressure. It is important to note that the Ethics Adviser cannot directly give evidence or act as the respondent's representative.

If an Investigating Committee decides to forward the complaint to the Disciplinary Committee, the Committee's proposed decision is sent to the respondent for any further submission before it is finalised. The Ethics Adviser can help the respondent interpret the decision and formulate a supplementary submission.

At the Disciplinary Committee stage, the primary role of the Ethics Adviser is to ensure that the respondent is well aware of what could happen at the hearing. After the hearing, the respondent is sent the Disciplinary Committee's determination and the orders made (if any). The Ethics Adviser can discuss the determination and its implications with the respondent to ensure that he or she fully understands any finding.

If the respondent is considering making an appeal, the Ethics Adviser can help the respondent weigh the pros and cons and identify the grounds for any appeal. However, it is not envisioned that the Ethics Adviser would be involved in making an appeal because this may be best left for legal counsel.

As with any new initiative, we expect that the role of Ethics Adviser will evolve as we learn from experience. However, Members can now be assured that their Institution will be there to support them if they are the subject of a complaint.

Making Student Membership Work Better

At present there are about 2,000 Student Members of IPENZ. There is no fee for this class of Membership which means that students who become IPENZ Members are effectively subsidised by other Members, particularly those in the Professional Membership grade. New Graduate Members also enjoy some subsidy, so the net effect is that those paying the highest subscriptions – Professional Members – are also providing the biggest subsidies, and are most inclined to complain about lack of value for money and perhaps even resign. This would be bad news for both IPENZ and students in the longer term.

In setting subscriptions the governing Board of IPENZ has adopted the principle that, in general, costs should be borne by beneficiaries and, where subsidies are given, these need to be acknowledged and accepted by the subsidising Member groups. We are therefore concerned that, as we try to make Student Membership more meaningful, we are increasing the subsidy and may be reaching the point where any further subsidy cannot be justified.

When we look to other similar bodies we see a mix of models for student membership. Some like IEEE and the New Zealand Institute of Management charge a student membership fee and have strong student-related activities. Others, for example Engineers Australia, have maintained free student membership and provide a significant subsidy.

During 2006 we will be engaging with student engineers to obtain their views on reshaping IPENZ's Student Membership. One possibility we may consider is two types of Student Membership – a "free" version that provides modest levels of service, and a fee-paying version that provides higher levels of service, for example, copies of IPENZ publications, more support for student activities and

wider access to web services. Students could then make their choice, and if, after a period of time, it became clear that one or other form of Student Membership was heavily favoured then we might stop the other. If a paying Student Membership class was introduced in 2007 it would probably be priced at about \$35.00 per year.

One principle is not negotiable: we only want students to join IPENZ as Student Members if they are committed to finding out what a self-regulated profession is and how it works. In a "true" profession the members of the profession – not the employers or government – collegially set the acceptable standards of competence and ethical behaviour. IPENZ performs these functions in New Zealand by setting accreditation and competence standards and disciplining poor performers.

We want prospective Student Members to reach an objective decision about whether they want to be involved with their peers in the profession on an ongoing basis. In our view every student who joins must therefore show a level of commitment to us by personally completing the application form on the IPENZ website www.ipenz.org.nz

At this stage we have a completely open mind about the shape of any new model for Student Membership – we want to find out what services Student Members want, and what they are prepared to pay.

We hope to make a final decision by July 2006 for implementation in 2007. We invite all interested Members to contact Kavita Kansara on 04 474 8980 or email kkansara@ipenz.org.nz to let us know your views.

Understanding Our Disciplinary Processes

Under Rule 4 of the Institution's Rules, IPENZ Members have four obligations: the Membership obligation to abide by the rules, the ethical obligation, the competence obligation and the good character obligation. Members can be disciplined for a breach of any of these. Chartered Professional Engineers, under Part 2, Section 21 of the CPEng Act, can be disciplined on four grounds: conviction; negligence or incompetence; a breach of the CPEng code of ethics; and providing false or misleading information supporting an application.

IPENZ operates both the CPEng and IPENZ complaints processes. Although they have a lot of similarities there are important differences as demonstrated in the table below. Each process has three main stages:

- 1) an initial investigation by a Complaints Research Officer
- 2) an enquiry by an Investigating Committee to determine if the complaint needs to be addressed further
- 3) the determination of appropriate disciplinary actions by a Disciplinary Committee

The IPENZ process includes an internal appeals provision, whereas CPEng appeals are heard by the Chartered Professional Engineers Council. Where an engineer

is both an IPENZ Member and a CPEng, the complaint is processed within the CPEng process first. The IPENZ process includes a short-cut for determining any Membership-related outcome based on the determination under the CPEng process or in a Court of Law.

Obligation on Members to complain

It may surprise Members that under Rule 11 of the Institution's Rules there is an inferred obligation to report on substandard work by engineering peers. Members have an obligation to support the health of the profession by making complaints and providing evidence when they consider that another engineer has acted unethically, or has failed to maintain reasonable standards of competence and care in their engineering activities.

Many Members mistakenly believe that National Office should act on their behalf if they anonymously "drop in" a name to a staff member. National Office staff have a primary duty to ensure proper process; recognising that the engineer complained about has rights as well. Staff cannot act on innuendo or rumour, but only on hard evidence or written complaints made by named engineers or other complainants.

Process Stage	CPEng Process	IPENZ Process
Receipt of complaint	IPENZ assists complainant to make complaint in writing or IPENZ may enquire into a matter of its own volition.	IPENZ assists complainant to make complaint in writing or Chief Executive may deem a matter to be a complaint if in receipt of information.
Immediate referral to Disciplinary Committee	Not available.	Possible if matter already determined in CPEng regime, or by a Court or tribunal.
Stage 1		
Complaint research	IPENZ appoints a Complaints Research Officer who performs an initial investigation and reports to the Chair of Investigating Committee.	IPENZ appoints a Complaints Research Officer who performs an initial investigation and reports to the Chair of Investigating Committee.
Decision to proceed to Investigating Committee	Chair of Investigating Committee rules as to whether there are grounds to dismiss the complaint under Rule 57.	Chair of Investigating Committee rules as to whether there are grounds to dismiss the complaint under Clause 8 of the Disciplinary Regulations.
Stage 2		
Investigating Committee	IPENZ appoints an Investigating Committee to perform investigation and make a decision to refer to a Disciplinary Committee or to dismiss the complaint under Rule 57.	IPENZ appoints an Investigating Committee to perform investigation and make a decision to refer to a Disciplinary Committee or to dismiss the complaint under Rule 11.
Dispute resolution process	Investigating Committee can ask parties to explore alternative dispute resolution.	Investigating Committee can ask parties to explore alternative dispute resolution.
Stage 3		
Disciplinary Committee	Disciplinary Committee hears the matter and makes any orders as it sees fit.	Disciplinary Committee hears the matter and makes any orders as it sees fit.
Subsequent actions		
Making appeals	Any party may appeal a decision to the Chartered Professional Engineers Council at any point in this process.	Appeals only possible against Disciplinary Committee decisions.
Hearing appeals	Council hears appeals according to its procedures. IPENZ must disclose all information it holds and may be called upon to give evidence at the discretion of the Council.	IPENZ appoints an Appeal Committee which decides if there are sufficient grounds to hear an appeal, and if so hears it. The Committee may reverse or vary an order of the Disciplinary Committee.
Role of the Courts	Appeals against decisions of the Council may be heard by the District Court, and from there the High Court.	Courts may only be approached for judicial review or an injunction.
Enforcement of orders	Backed by statute.	Backed only by adherence to IPENZ Rules and penalty payments only recoverable as a civil debt.
Public record of disciplinary action	On register for three years and as otherwise decided by order of Disciplinary Committee.	By publication according to the order of the Disciplinary or Appeals Committee.

Hints on how to respond to a complaint

Members who are the subject of a complaint will be informed in writing. To minimise distress, and facilitate the process Members should:

- Research and fully understand the relevant rules and obligations.
- Identify what we term "the essence of the matter" ie the specific nature of the alleged breach. IPENZ only has jurisdiction over the types of matter described above (in paragraph one) in each of the IPENZ and CPEng disciplinary processes.
- Discuss the matter with a colleague. Colleagues often see matters more clearly, particularly if the complaint arises from a dispute in which you have been involved. Later in 2005 National Office will make ethics advisers available to Members who are the subject of complaints.
- Collate and supply the Complaints Research Officer with copies of all documents held in your file in relation to the matter. Ensure that these are dated and in chronological order.
- Supply a written chronology of events.
- Prepare a statement which explains your own actions in relation to the rules or obligations. Do not engage in criticism of others – just state how you consider that you met your obligations under the IPENZ and/or CPEng Rules.

IPENZ Staff



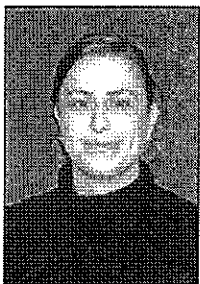
IPENZ warmly welcomes **Jenny Ang** who has joined the team as the new Director – Operations.

Jenny's role is to manage service relationships with IPENZ subsidiary organisations such as technical interest groups. She is also responsible for the operational and administrative systems that make IPENZ tick, including Membership administration, human resources, information technology and finance.

Jenny says that while there is a lot to learn she is "looking forward to being able to meet the needs of stakeholders and provide customer-focused and value-added services".

Jenny has previously held senior positions in both the public and private sectors. Before joining IPENZ, Jenny worked as a contractor in the areas of financial and management accounting, internal and external audit, assurance and risk management and information technology. Now that Jenny's children have left home she doesn't "have to juggle so much" and has been able to take on a permanent full-time position.

Jenny was born in Malaysia but has lived in New Zealand for the last 30 years, completing her education at the University of Canterbury. After hours, Jenny enjoys tramping, socialising and reading. She loves music and tries to go to the opera every now and then. "Work hard but play hard – that's me," she says.



And welcome to **Shelley Pope** our new policy advisor. Shelley is looking forward to assisting Members by providing an engineering perspective on matters of national importance. This includes researching key issues, publishing papers and *Informatory Notes*, making submissions and generating public debate. By providing up-to-date information, Shelley keeps Members informed of current issues and encourages Members participation in the public policy process. She is also enjoying the challenge of coming up with poll questions for the IPENZ website each week.

Shelley commutes to work from the Wairarapa but says she doesn't mind the hour-long train ride, especially after living in London. It also gives her an opportunity to catch up on her studies. She is currently finishing her arts

degree part-time at Victoria University, having already completed papers in journalism, law and politics.

Before joining IPENZ, Shelley managed the Wairarapa community radio station. In her spare time Shelley likes to attend the Wairarapa car club where she is a member, and also enjoys snowboarding and (attempting) surfing.

Member Services

JobHunt

The IPENZ JobHunt service (sponsored by Career Engineer) is the premier job finding and recruitment site for engineers and technologists. It enables jobseekers to efficiently search for employment online by personalising their search criteria. Employers may also advertise a position using selective criteria. Visit the JobHunt website www.jobhunt.co.nz for more information and to browse the listings.

Employment Issues

IPENZ, through an experienced employment advisor, provides advice to Members on employment-related issues including contracts, dismissal and redundancy. The general guideline is that IPENZ pays for up to one hour's professional advice though Members may choose to purchase additional hours. Contact Claire Auger for details on 04 474 8948 or email employment@ipenz.org.nz

Engineering Practice Support

IPENZ encourages Members to follow recognised professional practices in their day-to-day engineering activities. To assist Members in doing so IPENZ, together with ACENZ, has developed some standard contractual documents for use in selling consulting services. Documents include: short and long form contractual agreements, guidelines for consulting engineers and clients, PS1, PS2 and PS4 forms. These are available for free download from www.ipenz.org.nz/ipenz/practicesupport/EndorsedInfo or in hardcopy for a small fee.

To discuss the use of these documents contact our Engineering Practice Manager Andrew Clark on 04 474 8986 or email practicemanager@ipenz.org.nz

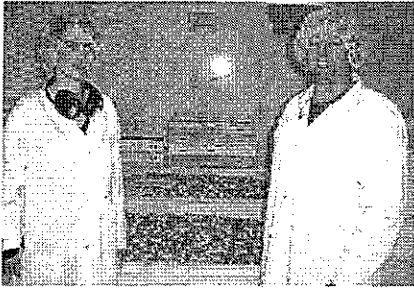
IPENZ Technical Interest Groups

Members can also join IPENZ Technical Interest Groups which provide a programme of activities and services associated with a particular engineering specialty or discipline.

The groups inform Members of national and international developments and issues, contribute to knowledge development, support the identification of good engineering practice, prepare informed comment on public policy issues and create a national network amongst Members with similar technical interests by regular communication.

For more information on IPENZ Technical Interest Groups visit www.ipenz.org.nz/ipenz/who_we_are/organisation/technical_groups.cfm or phone Bub Konia on 04 474 8937.

<<Continued from page 1



South Auckland Facilitator Gay Watson (R) with food technologist Jenita Higgs at Pascall Lollies.

Studying the Ruru

David Henry School in Tokoroa used Futureintech's contacts to enhance its technology programmes. With the help of Futureintech Facilitator Margaret Brunton, the school enlisted a series of outside experts to help the students with their Ruru (Morepork) project.

Jan Hoverd of Biodiversity Waikato visited the class to explain the characteristics of the Ruru, while basic engineering principles were used to help the students build homes for the birds.

According to teacher Emily Trainer, both she and the students now have a much better idea about what

an engineer does and how structures work.

The students loved having new people in the classroom, and the school is now looking to use an engineer to help with their school-wide electronics and control theme.

Futureintech's Wellington projects

Recent links forged between industry and schools saw Futureintech Ambassador Scott Abernethy help students with an information science project at Wellington High School.

A software engineer with Stratex New Zealand, Scott's session covered not just the technical programming language, but also workplace culture and the importance of teamwork in ICT projects.

It was a valuable learning experience for the students, and a chance to see how lessons learnt in school are used in real careers.

Futureintech's VIP scheme

Software engineering, highway safety and industrial fermentation are among the projects in this year's Futureintech Visiting Industry Professionals (VIP) scheme.

The VIP scheme provides funding for engineering, technology and/or science professionals to spend

time in a tertiary institute sharing their knowledge with staff and students. Six projects from around New Zealand have been selected to receive up to \$5,000 each. In each project the industry professionals help with guest lectures and tutorials, advise on research projects and/or develop new courses.

The aim of the VIP Scheme is to build closer links between academia and the private sector, to help improve the quality and relevance of teaching and learning, and give students a better idea of what to expect in the workforce.

The next round of applications for the VIP Scheme funding has opened – if you are interested in taking part or would like more information telephone Futureintech on 04 473 2026 or email enquiries@futureintech.org.nz

The deadline for applying is 25 November 2005.

Futureintech is an initiative of IPENZ Engineers New Zealand and is funded by New Zealand Trade and Enterprise. Futureintech's aim is to promote careers and lift tertiary enrolments in technology, engineering and science.

www.futureintech.org.nz

IPENZ Sponsors Student Symposium

Wellington will again play host to the Student Engineering Symposium (SENS) from 8 to 11 July. SENS brings together engineering students from tertiary institutions around the country for three days of industry tours, engineering-based games and speaker sessions. The event enables students to network, share information and meet potential employers.

Many of today's engineering students will become the engineering leaders of

the future. As the professional body representing the engineering profession in New Zealand, IPENZ is providing support for the event with sponsorship and administration assistance. Sponsorship opportunities may still be available if your organisation also wishes to support SENS 2005. For more information, please contact Kevin Dwyer kevindwyer2261@yahoo.com or Emma Bould emma_bould@ihug.co.nz

Are You Committed to an Ethical Profession?

High profile cases such as the Challenger disaster, the Kansas City Hyatt-Regency Hotel walkways collapse, and the Exxon oil spill have all increased awareness for the need to practice ethical engineering.

So how familiar are you with the IPENZ Code of Ethics and if you have CPEng accreditation, the CPEng Rules? Are the values within the Code and Rules an integral part of your everyday work in the profession?

Members of a true profession use their skills to serve the wider community. At the same time they operate at the cutting edge of knowledge. Sometimes Codes of Practice may not be developed for a particular activity or situation. In these instances a Code of Ethics provides guidance for practitioners and protection for the greater community. Members of a profession should collegially determine the Code of Ethics and ensure that it is adhered to. The function of IPENZ follows this model. From time to time complaints about engineering practice are submitted to IPENZ. Many of these complaints would be avoided if Members acted with professionalism and integrity by applying the values of the IPENZ Code of Ethics and CPEng Rules to their practices.

The high profile failures mentioned above also occurred because practitioners

knowingly deviated from Codes of Practice (and in some cases withheld knowledge), hence causing a breach in ethics. Significant factors contributing to these failures were a lack of training and a lack of commitment from the organisations to the values espoused by the codes.

To assist Members in becoming familiar with the Code of Ethics and CPEng Rules, IPENZ offers a one-day course which introduces the ethical values in the Code and CPEng Rules and the obligations stemming from them.

More specifically the course covers:

- the nature of ethics in the profession
- the moral obligations engineers are under in terms of the engineer's role and the client/professional relationship
- how the Code of Ethics and CPEng Rules should be interpreted
- decision-making tools and ethical skills
- the relevance of ethics to leadership

We received good feedback from our April courses and further courses will be held in July. Check the Engineering Calendar for details: <http://www.ipenz.org.nz/ipenz/nzecal/ks.cfm>



IPENZ News

Is the Risk of Engineering Failure Acceptably Small in 2005?

In last week's *engineering direct* we informed Members of a series of questions we asked the Army concerning their engineering competence, and their response. Comments received by Members over the last two weeks have been variable – from calls for IPENZ to take decisive action critical of the Army, to others who want us to work closely with the Army, and those who think IPENZ has been grandstanding and publicity seeking which causes them discomfort.

So what can we surmise overall? First, many engineers are unhappy for us to be speaking out on media issues. In fact, we only communicated to our Members, other than to confirm that communication between IPENZ and the Army existed when approached by the *NZ Herald*.

Second, there are opportunities for IPENZ and the New Zealand Defence Force to work more closely on professional development of engineers in the Armed Forces. We will pursue this further. We have received feedback describing a variety of personal experiences, and we will convey a synopsis of this feedback to the Army.

Third, as the Registration Authority for CPEng we are the government agency charged with maintaining engineering standards and disciplining poor performers. Whether or not our Members wish us to speak up, we are required to as the Registration Authority if there are matters of public interest around application of professional engineering standards.

We have a responsibility to work with regulators to ensure that only currently competent professional engineers (CPEng), who can be held accountable by the profession's disciplinary process if they fail to perform reasonably, are permitted to perform safety-critical work. The CPEng Act is designed to protect the public of New Zealand from poorly performing engineers, and we have to exercise the public good responsibilities entailed.

So if there was a similar incident to the Berryman case in 2005 how would the process be different?

Back in the mid-1980s the Crown was apparently exempt from the building control system. However, now the provisions of the Building Act 2004 would place obligations on the relevant Building Consent Authority to ensure that the design was properly done, checked and quality assured. It is likely (but by no means certain) that the relevant local authority would require a CPEng to do the design, and good practice would suggest that the CPEng would observe the construction to ensure that the bridge was built as designed.

By 2007 the designer and construction supervisor, whether New Zealand Defence Force personnel or not, would need to be licensed building practitioners, and to sign off that they had done or supervised the work to appropriate standards.

Most significantly in the 1980s the only complaint system using a Disciplinary Committee methodology to investigate the work of engineers was IPENZ's internal process against Members. It did not have jurisdiction in this particular case, and an engineer could avoid the process by resigning from IPENZ.

Now in 2005 if a complaint is made about the engineering work done by a CPEng then IPENZ would have jurisdiction over the complaint under the CPEng Act, and the engineer cannot escape the disciplinary process by resigning from the CPEng register.

The disciplinary process would follow our three stage process – Initial Investigation, Investigating Committee, Disciplinary Committee. Key questions about the work of the engineer could then be asked. These questions are likely to be different to those of other tribunals looking at the overall consequence of the matter because our

concern is wholly with the work of the engineer. The essence of the matter from our viewpoint might come down to a relatively small set of questions:

- Did the engineer work beyond his or her competence?
- Did the engineer perform engineering services in a negligent or incompetent manner (eg was the design adequately done, did the engineer agree to the use of unsuitable materials?)
- Did the engineer act ethically in respect of his or her obligation to take reasonable steps to safeguard life and protect health? (eg did the engineer take reasonable steps to ensure that key structural components would be maintained in sufficiently durable condition?)

Ultimately, those and any other relevant questions would be asked of the engineer concerned (not the engineer's employer) by a Disciplinary Committee consisting of three engineers and two lay people. They would make relevant disciplinary orders against the engineer. The lay people can issue dissenting opinions if they think the engineers are acting to protect the good name of the profession against the facts of the case. The decision and orders could be appealed to the CPEng Council, the District Court and even the High Court on matters of process.

The finding and the disciplinary action against the engineer concerned might be used as evidence on another matter for example, in consideration of breach of contract, commercial redress for losses and overall allocation of blame between contracting parties. Those matters would not be our concern.

The question now is whether New Zealanders are better protected in 2005 than 20 years earlier? Yes, better, but by no means perfectly. Until we get all safety-critical engineering work restricted to people who can be held to account in a transparent disciplinary system then we cannot be fully confident that all reasonable steps have been taken by us as a profession.

All professional engineers and not just IPENZ National Office therefore have a responsibility to accept and promote the CPEng quality mark as the benchmark for all critical engineering work. We need to ensure that all local bodies and national regulators are adopting it and using it for all work that involves significant risk to safety or of substantial economic loss if there is a failure.



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Dr Andrew Cleland

Chief Executive

acleland@ipenz.org.nz

Part-time Director of Engineering Appointed

Hugh Railton has been appointed Temporary Director – Engineering at IPENZ National Office in Wellington this week. Hugh will be working approximately twenty hours a week until September when a permanent Director will be appointed.

Hugh has spent the past three years in Bangkok working as Deputy Executive Director of the Asia Pacific Telecommunity (APT). Prior to that, he was Manager Spectrum Planning at the Ministry of Economic Development.

Hugh was a Member of the Information Telecommunication Union (ITU) Radio Regulations Board from 1999 to 2002. He has held a number of elected positions in the international telecommunications sector including office bearer at the ITU World Radio Communications Conference 1997, 2000 and 2003 as well as Vice Chairman of the APT from 2000–2002.



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Dr Andrew Cleland

Chief Executive

acleland@ipenz.org.nz

Board approves changes to IPENZ Code of Ethics

At a meeting on 30 November 2004 the Board approved changes to the IPENZ Code of Ethics which will apply from 1 January 2005. The Code of Ethics has the power of regulations as set out in Rule 22 of the Institution, and Members are obliged to comply with the terms. Rule 22 also requires that changes of Regulations be brought to the attention of Members by either posting a notice to all Members or by publication in the official journal of the Institution (*engineering dimension*) of the full regulations or a summary thereof. In view of the length of the Code, only a summary is presented here. Members can read the full revised Code at www.ipenz.org.nz/ipenz/who_we_are/ethics_inc.cfm

The previous Code, approved in 1996, consisted of a Preamble, five ethical principles or values statements, and guidelines to assist Members in interpreting the five principles. The concept was that Members should aspire at all times to adhere to the five principles/values, and if a complaint was made against them they would be judged for sufficient adherence in a practical sense. The material below is paraphrased from the new Code.

Preamble

The Code consists of three Parts. The first is a set of five fundamental ethical values. These values are intended to inform Members of the high ideals of professional life. Part II provides expanded guidelines. These guidelines are not exhaustive – they are offered as a guide to the understanding and intentions of Part I. They should be read with Part I as a whole and given a free and liberal meaning. They range from exhortations to excellence to prescriptive directions as to what constitutes ethical professional behaviour. Part III sets out the minimum standards of behaviour against which the behaviour of Members will be judged in terms of deciding if they have reasonably complied with the requirement in Rule 4 of the Institution to behave ethically.

Members will find in the three Parts, assistance in deciding the proper response to most of the situations they will meet in their professional life. In the final analysis, the judgement of the Member's peers as to what the "reasonable professional" would have done when faced with the same situation, and applying the same provisions in Part III will prevail.

Part I – Values

Protection of Life and Safeguarding People: Members shall recognise the need to protect life and to safeguard people, and in their engineering activities shall act to address this need.

Professionalism, Integrity and Competence: Members shall undertake their engineering activities with professionalism and integrity and shall work within their levels of competence.

Commitment to Community Well-being: Members shall recognise the responsibility of the profession to actively contribute to the well-being of society and, when involved in any engineering activity shall endeavour to identify, inform and consult affected parties.

Sustainable Management and Care for the Environment: Members shall recognise and respect the need for sustainable management of the planet's resources and endeavour to minimise adverse environmental impacts of their engineering activities for both present and future generations.

Sustaining Engineering Knowledge: Members shall seek to contribute to the development of their own and the engineering profession's knowledge, skill and expertise for the benefit of society.

Part II – Guidelines

The guidelines for only one of the five Values are shown to illustrate the form of the Code.

Protection of Life and Safeguarding People: Members shall recognise the need to protect life and to safeguard people and in their engineering activities shall act to address this need.

Under this clause you should have due regard to:

- 1.1 Giving priority to the safety and well-being of the community and having regard to this principle in assessing obligations to clients, employers and colleagues.
- 1.2 Ensuring that reasonable steps are taken to minimise the risk of loss of life, injury or suffering which may result from your engineering activities, either directly or indirectly.
- 1.3 Drawing the attention of those affected to the level and significance of risk associated with the work.
- 1.4 Assessing and taking reasonable steps to minimise potential dangers involved in the construction, manufacture and use of outcomes of your engineering activities.

Part III – Minimum Standards of Acceptable Ethical Behaviour by Members

General obligations to society

1. **Take reasonable steps to safeguard health and safety**
A Member must, in the course of his or her engineering activities, take reasonable steps to safeguard the health and safety of people.

SGM puts new Rules in place

At the SGM held on 30 November 2004 new Rules of IPENZ were approved. These come into effect as soon as they are registered with the Registrar of Incorporated Societies. The new Rules are posted on our website at www.ipenz.org.nz, "Who We Are", "Our Rules".

The actual Rule changes were set out in the Notice of the SGM in the October 2004 edition of *engineering dimension*, and are not repeated here. The main practical effects of the Rule changes on Members are as follows:

1. The obligations on Members are now expressed as four specific obligations: the Membership obligation to obey the Rules, the competence obligation to perform engineering activities to a reasonable standard (not Companions, Affiliate Members, Student Members), the ethical obligation to obey the Code of Ethics, and the good character obligation to be a fit and proper person to be a Member of IPENZ. Members should be aware of all four of these obligations. A Member can be disciplined for a breach of any of them.
2. Complaints against Members will now be processed in accord with Rule 11 and the Disciplinary Regulations described in the article "New Disciplinary

Regulations to take effect in the New Year". It is now possible for IPENZ to initiate an investigation against a Member of its own volition. Hence if we receive disquieting reports about a Member we can act by deeming the matter to be a complaint.

3. If a complaint is made against a Member who is also a CPEng registrant the new Rules and Regulations now allow that either the complaint is heard simultaneously in the IPENZ context and the CPEng context, or that it is heard first in the CPEng context, and then an abbreviated IPENZ process is undertaken after the CPEng process is complete.
4. A wider range of penalties is made available to Disciplinary Committees, particularly the ability to make suspensions, or to impose professional development requirements. These will enable disciplinary outcomes to be more positive for both the complainant and the engineer concerned.

The other changes were more technical in nature or empowering. The Members who attended the SGM are thanked for their participation. ☺

2. Have regard to effects on environment

- (1) A Member must, in the course of his or her engineering activities:
 - (a) have regard to reasonably foreseeable effects on the environment from those activities; and
 - (b) have regard to the need for sustainable management of the environment.
- (2) In this context, sustainable management means management that meets the needs of the present without compromising the ability of future generations (including at least the future generations within the anticipated lifetime of the end products and by-products of activities) to meet their own reasonably foreseeable needs.

3. Act with honesty, objectivity, and integrity

A Member must act honestly and with objectivity and integrity in the course of his or her engineering activities.

*General professional obligations***4. Not misrepresent competence**

A Member must:

- a) not misrepresent his or her competence; and
- b) undertake engineering activities only within his or her competence; and
- c) not knowingly permit engineers whose work he or she is responsible for to breach paragraph (a) or paragraph (b).

5. Not misrepresent Membership status

A Member must not (in connection with a business, trade, employment, calling, or profession) make a false or misleading representation, or knowingly permit another person to make a false or misleading representation, that services are supplied by a Member of the Institution.

6. Inform others of consequences of not following advice

- (1) A Member who considers that there is a risk of significant consequences in not accepting his or her professional advice must take reasonable steps to inform persons who do not accept that advice of those significant consequences.
- (2) In this context, significant consequences means consequences that involve:
 - (a) significant adverse effects on the health or safety of people; or
 - (b) significant damage to property; or
 - (c) significant damage to the environment.

7. Not promise, give, or accept inducements

A Member must not:

- (a) promise or give to any person anything of substantial value intended to improperly influence that person's decisions that relate to the Member's activities; or
- (b) accept from any person anything of substantial value intended to improperly influence his or her professional engineering decisions.

*Obligations to employers and clients***8. Not disclose confidential information**

- (1) A Member must not disclose confidential information of an employer or client without the agreement of the employer or client.
- (2) Subclause (1) does not apply if:
 - a) the failure to disclose information would place the health or safety of people at significant and immediate risk; or
 - b) the Member is required by law to disclose that information.

9. Not misuse confidential information for personal benefit

A Member who obtains another person's confidential information in connection with one purpose in the course of his or her engineering activities must not use that information for another purpose that is to his or her own personal benefit.

10. Disclose conflicts of interest

A Member must disclose to an employer or client any financial or other interest that is likely to affect his or her judgement on any engineering activities he or she is to carry out for that employer or client.

*Obligations owed to other engineers***11. Not review other engineers' work without taking reasonable steps to inform them and investigate**

- (1) A Member who reviews another engineer's work for the purpose of commenting on that work must take reasonable steps to:
 - (a) inform that engineer of the proposed review before starting it; and
 - (b) investigate the matters concerned before commenting.
- (2) Subclause (1) does not apply if taking those steps would result in there being a significant and immediate risk of harm to the health or safety of people, damage to property, or damage to the environment.

New Disciplinary Regulations to take effect in the New Year

At the Board meeting on 30 November 2004, the new IPENZ Disciplinary Regulations were approved and will take effect from 1 January 2005 replacing the IPENZ Regulations for Hearing and Determination of Complaints Against Members. The Disciplinary Regulations have the power of regulations as set out in Rule 22 of the Institution, and Members are obliged to comply with the terms. Rule 22 also requires that changes of Regulations be brought to the attention of Members by either posting a notice to all Members or by publication in the official journal of the Institution (*engineering dimension*) of the full regulations or a summary thereof. In view of the length of the Regulations, only a summary is presented here. Members are invited to read the full Regulations at www.ipenz.org.nz/ipenz/finding/complaints.

The Regulations set out the processes for the hearing and determination of complaints including the following:

- The procedures for making complaints, and the process by which the Institution can deem a matter to be a complaint and proceed with the matter.
- The way in which a complaint on a matter which has already been heard by a CPEng disciplinary process, or by the Courts, may be fast-tracked to the Disciplinary Committee stage.
- The process for appointing a Complaint Research Officer who performs an initial investigation of the complaint and reports to the Chair of an Investigating Committee.
- The grounds on which a complaint may be dismissed by the Chair of an Investigating Committee.
- If not dismissed, the processes for the formation of an Investigating Committee, and the powers of that Committee in conducting its investigation.
- The grounds by which an Investigating Committee may dismiss a complaint, and the possibility that the Committee might refer the matter to dispute resolution.
- The processes for formation of a Disciplinary Committee, including lay membership, and the powers of that Committee to use in conducting its hearing, other activities and reaching its determination.
- The penalties available to Disciplinary Committees and the matters they must consider in imposing penalties or making other orders.
- The grounds and process for the lodging of appeals against decisions or orders made.
- The processes for the formation of an Appeals Committee and the powers of that Committee to decide whether to hear an appeal, and if heard, the powers to use in determining the appeal.
- The notification of the outcomes to the governing Board.
- The implementation of any disciplinary orders made, including notification of the Membership or wider audience.
- The requirements for natural justice to be observed at all stages in the process when decisions are being made.
- The processes by which the governing Board may appoint persons to roles, or revoke those appointments.
- The indemnification by the Institution of persons fulfilling roles under the regulations.

Engineering Practice portfolio revamped

With a new Engineering Practice Manager recently appointed, the opportunity is being taken to completely rewrite the management processes for the engineering practice portfolio. This will provide a mechanism to identify, prioritise and monitor all engineering practice related issues.

One such issue is ethics. Members were reminded in a recent article in *engineering direct*, of the IPENZ Code of Ethics. We would like Members to revisit the Code from time to time in order to keep the context of the Code in mind when conducting their everyday engineering affairs. The Code can be found on the IPENZ website at www.ipenz.org.nz/ipenz/media_comm/ethics_inc.cfm

Apart from the Licensed Building Practitioner Regime, the BIA/Department of Building and Housing is currently consulting on Dam Safety Regulations, new building code, earthquake prone structures and product accreditations, as well as the overall regulations covering the consultation process. In addition to these tasks, we are also working with the BIA to write a code of practice for the acceptance of producer statements, and updates for practitioners on technical issues.

Additionally, the new Building Act is generating a considerable range of policy activities to monitor, and consultation meetings to participate in. While there is a peak of activities now, the new Act has a five-year implementation period and there will be many issues that we will need to cover in the future – not the least being educating the profession on related changes. We have proposed to ACENZ and SESOC to form a joint task force to provide a strategic overview of these activities. From the IPENZ perspective, this task force will report to the Engineering Practice Board.

The next meeting of the Engineering Practice Board is scheduled for Wednesday 1 December 2004.

Reminder

Notice of Special General Meeting

5.00 pm – Tuesday 30 November 2004

Lecture Theatre 1, Victoria University of Wellington Law School,
Old Government House, Lambton Quay, Wellington

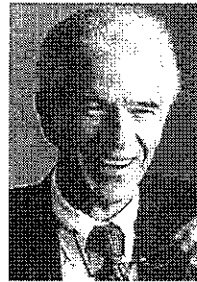
Agenda

Confirmation of Notice of Meeting

Apologies

Changes to the Rules of the Institution: Notice of Motion

President's Message



Investing for growth

October is a month of transition for IPENZ when new programmes funded in the new financial year are initiated by the staff at National Office. The good news for Members is that the expansion of this year's programmes is not funded through increased subscriptions. Rather, our staff have procured contract income for many activities that are consistent with our overall strategy. Having non-members fund these activities is good news for the Institution and its Members.

In spite of no increases in Membership subscriptions for the second year in a row, income will rise to about \$5.2m. Subscription-related income is down to about 40% of total income from 70% four years ago. These contracts assist in paying overheads, meaning that more subscription income can be freed up for new activities. Ultimately, the growth does mean that we have more staff, and occasionally I hear grumbles that National Office is now too big, but these people are working hard on your behalf. We certainly could not be as effective nationally if we were reduced back to the 16 staff we had in 2000, relying on Members volunteering to do most of our professional work. Those days have gone. Additionally, the present situation of demand for engineers exceeding supply is likely to continue for several years, meaning that our Members' time is more committed to work and they are less available for voluntary roles.

This year there are several new initiatives I wish to bring to the attention of Members. Firstly, our government-funded project, Futureintech, which aims to increase tertiary enrolments in engineering, technology and science, moves from its initial start-up phase to full scale via the appointment of three more facilitators. These facilitators will be trained and ready to work in schools in 2005. We will have six staff out in schools fulltime (supported by two staff at National Office), working under the guidance of Futureintech Director, Angela Christie. The facilitators' role is to make connections with teachers to assist them in curriculum delivery, and provide learning experiences that motivate young people towards engineering, technology or science-based careers. Angela's team needs Branches to work with them so we can ensure our collective efforts are channelled effectively and cohesively to achieve the goals we all share.

The Board has recognised the continuing importance of the voice of the engineering profession being heard on regulatory and public policy matters by creating the concept of IPENZ Visiting Fellows. This title, and some remuneration, can be bestowed on a Member who makes a substantial time commitment to assist Deputy Chief Executive John Gardiner's team in developing our responses on particular matters. There are a growing number of matters, particularly around the Building Act (and associated licensing), climate change and energy, growth and innovation, and education, on which we wish to be heard. The Visiting Fellowship title will not be used to recognise the regular ongoing commitment of Members who assist in developing and peer reviewing submissions, but rather for those putting aside their day-to-day activities to take the lead on research and development of a particular item of considerable magnitude.

Additionally, the Board has agreed to boost the support for our Branches. A

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IPENZ News



Code of Ethics reminder

As a Member of IPENZ you are required to follow the principles of the Code of Ethics and be familiar with those principles. The ethics and guidelines are available for you to read on the IPENZ website and to keep in mind during your engineering activities.

The respect which society accords the engineering and technology professions is earned and maintained by its members demonstrating a strong and consistent commitment to ethical values. These commitments are additional to the obligations, which every member of society is required to observe, such as obeying the law, and reflect the additional responsibility expected of all professionals.

It therefore follows that this Institution must maintain an appropriate Code of Ethics, to publish it for the information of the public and to enforce it impartially. This Code must be responsive to the changing expectations of both society and the profession and the global standards to which the Institution subscribes. The Code of Ethics is based on the five fundamental ethical values set out in the Rules of the Institution. The Code is a set of principles to guide Members in achieving the high ideals of professional life.

Members are reminded of the five ethical values:

1. Protection of Life and Safeguarding People
2. Professionalism and Integrity
3. Society and Community Well-being
4. Sustainable Management and Care of the Environment
5. Promotion of Engineering Knowledge

To view the full document including guidelines use the hyperlink below.

http://www.ipenz.org.nz/ipenz/media_comm/ethics_inc.cfm



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Andrew Clark

Engineering Practice Manager

aclark@ipenz.org.nz

CPEng Annual Fees

It's that time of the year when Members receive invoices for their membership and registration fees. While every effort is made to ensure Members are provided with good information on the basis for fees, additional explanation can be helpful. Last year we received a number of queries about the CPEng Annual fees. Unfortunately, the Act we were given to implement gives us no discretion – there is no ability to do other than collect re-assessment fees from all registered persons on an on-going basis.

The CPEng Rules, which are statutory regulations, therefore require that all CPEng registrants pay the annual fee of \$250 + GST each year. This fee covers the cost of setting up and administering the register, payment of the annual CPEng Council levy, the on-going assessment costs for continued registration and other costs associated with managing the complaints and disciplinary processes.

The IPENZ Board made an early decision that the cost relating to setting up and running CPEng was to be on a cost recovery basis because registrants do not have to be IPENZ Members and Members fees should not be used to cover the costs of CPEng. Part of the annual fee covers the on-going assessment for continued registration and is separately identified for accounting purposes. This component is \$100 + GST. All registrants must pay this fee, although if the person is also registered on other registers requiring current competence assessment for



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President's Message



It's about professionalism

I was part of a panel at the recent ACENZ Conference in Wellington which addressed the question, "Consulting Engineering, Business or Profession?" It was suggested to the panelists that in preparation for the discussion, they might consider questions such as the importance of ethics in business today, and whether operating a business might compromise professionalism. These are very valid

concerns. It occurs to me as I travel around the country talking to IPENZ Members, that to achieve awareness of the role of the Institution, there needs to be ongoing discussion on the key issues of:

- what it means to be an engineering professional
- the role of IPENZ as the learned society
- the professional and competence brands that IPENZ maintains

Firstly, engineering professionals work at the forefront of knowledge. They break new ground in the design of structures, use of materials and application of analysis techniques. What is right and what is wrong is not black or white – it is a matter of judgment. The two key elements that are often misunderstood are:

- the profession rather than the employer decides acceptable standards from both ethical and competence perspectives;
- the professional has responsibilities to society at large that may transcend those of the employer.

These special collegial responsibilities are best exercised through a collegially governed professional body – in our case IPENZ. An engineer's acceptance into the professional body, their acceptance of its role as the standard-setter and gatekeeper, and their personal contribution to the collegial activities through interaction with colleagues are the true signs of a professional engineer.

The post-nominals MIPENZ, FIPENZ etc. are therefore promoted by IPENZ as the mark of professionalism – important to employers and clients, and just as important to engineers. They represent recognition by peers that the holder of these marks engages with colleagues both for the advancement of the profession and for personal growth and development. On the other hand, what we used to call "Registration" serves a different purpose today. Registration as CPEng, or on the international register as IntPE, is a mark of current competence as a practitioner, administered by IPENZ.

The point I wish to stress is that the role of the Institution has changed from not only upholding ethics and competence issues, but to also becoming the regulator of the profession under the CPEng Act. These functions are managed through the complaints process, where complaints are made either by peers or others outside the profession, normally our clients.

This last month has seen some significant events in relation to IPENZ and public confidence in engineers. Media attention late in August focussed for a day or so on whether structural engineers were doing work of adequate quality. This followed the placement of newspaper advertisements in July by a Bay of Plenty company, to publicise what they considered poor ethical practice by an engineering consultancy.

On 24 August the Board received report of a disciplinary action taken against a Member by the Institution, through application of its Regulations for Hearing and Determination of Complaints. This matter is described in a separate article in this issue. This is the first disciplinary action for several years. In addition we have several matters before Investigating Committees (the process stage before a Disciplinary Committee is formed, but after initial screening of complaints by a Complaint Research Officer). These are all matters in the context of IPENZ, i.e. the engineer concerned is an IPENZ Member and was not a CPEng at the time of the matter to which the complaint refers. The first complaint against a Chartered Professional Engineer has also been received, and a decision made on the matter.

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Responding better to complaints IPENZ Rules, Code of Ethics, and Disciplinary Regulations

Staff are in the last stages of revision to three key underpinning documents of the Institution, following considerable effort by a working party of Members. It is intended that these revisions be approved on 30 November 2004. This article sets out the proposed changes and invites comments from Members, this being the final stage of consultation on these matters.

IPENZ Rules

Changes are proposed to Rules 4 and 11. The former will set out the obligations on Members and the latter is an enabling Rule under which the Disciplinary Regulations are prepared.

Rule 4 will set out the four obligations on Members as follows:

- Membership obligation (the agreement by Members to obey the Rules and Regulations of the Institution)
- Ethical obligation (the obligation to obey the Code of Ethics)
- Competence obligation (the obligation of Graduate, Associate, Technical and Professional Members, and on Fellows and Distinguished Fellows to perform engineering activities competently and carefully in a manner commensurate with their Membership class)
- Good character obligation (the requirement to be a fit and proper person to be a Member)

Rule 11 empowers the establishment of the various processes for hearing and determining complaints. The proposed changes to this Rule include the fast tracking of complaints against Members who have already been disciplined as CPEng, and extending the range of penalties to include requirements to undertake professional development.

IPENZ Code of Ethics

The present Code of Ethics has five principles or values statements, and a set of guidelines. When a complaint is heard, the "test" is against one or more of the principles, and is informed by the guidelines. The proposal is that the Code will change to have three Parts:

- Part I – the five principles with some rewording to create greater clarity
- Part II – guidelines to assist Members, also reworded to improve clarity
- Part III – a set of statements stating the minimum standard of acceptable ethical behaviour that will be used as the basis of the "test" in hearing complaints.

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The complaints procedure is a key process for building and maintaining public confidence and maintaining standards. We must be seen to deal effectively but fairly with Chartered Professional Engineers who perform poorly, and make the results of our disciplinary orders public. We must also ensure that complaints are made when justified. We are encouraging regulators who see a succession of poor quality work from a particular engineer to make complaints, and all engineers must take on the responsibility for raising matters of poor performance (whether ethical or competence-related) with National Office. We must also receive frank and honest referee statements about candidates for CPEng registration. Regrettably, there are still too frequent rumours of poor performers whom no-one is prepared to complain about in writing.

Improvements to the process, which are underway, involve clarifying the IPENZ Rules, Code of Ethics, and Regulations for Hearing and Determination of Complaints against Members (to be renamed the Disciplinary Regulations). Additionally we are commencing consultation on small changes to the CPEng process for hearing complaints. These changes are described in detail in another article in this issue. The goal is to make the obligations on Members for both competence and ethical behaviour very clear, and to have effective and efficient processes for handling complaints. These processes must be unambiguous so that our various Investigating and Disciplinary Committees do not inadvertently infringe the Regulations, laying their decisions and actions open to appeal. We also need to have suitable means to deal with complaints laid simultaneously against an engineer in the CPEng and IPENZ regimes.

The Board intends that there will be a Special General Meeting on 30 November 2004 to approve some changes to the IPENZ Rules to apply from 1 January 2005. Additionally, the Board expects to approve changes to the IPENZ Code of Ethics, the Disciplinary Regulations and the CPEng Rules, on the same day. This will update the underpinning systems and processes. The confidence of the public will then depend on our fair application of the tools available to each and every Member.

Ian Parton
President

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Part III was developed by translating the CPEng code of ethical conduct into the IPENZ context. This means that the ethical test on Members who are also CPEng is exactly the same in the two contexts.

The change is to move away from decisions based on compliance to the aspirational values statements of Part I, to tests against 11 specific statements expressed as "must" or "must not" statements in Part III. It is expected that decisions will then become more clearcut.

Members should aspire to the behaviours described in the five principles of Part I and in this be guided by Part II, but are expected to adhere to the minimum requirements of Part III.

IPENZ Disciplinary Regulations

There are two sets of changes proposed in addition to changes that arise consequentially from the IPENZ Rule changes. The first are changes to maintain as much process commonality as possible with the CPEng procedures (see page 4). The second set of changes are intended to improve the appeals stage. There is no appeals stage in the CPEng Rules (as appeals pass outside our jurisdiction to the CPEng Council), so the appeals stage is only in the IPENZ context. The proposals include clarifying the grounds on which appeals can be made, and introducing a preliminary hearing for appeals to decide whether there are sufficient grounds for an appeal to be heard.

Your chance for final submissions

As the proposals become available they will be posted in the Member-only area of the website, and notification of such postings will be made in *engineering direct*. The first postings (the proposed IPENZ Rule Changes and the proposed revisions to the IPENZ Code of Ethics) are likely to be posted in early September, and the Disciplinary Regulations by the end of September.

If Members wish to comment on the proposed IPENZ Rule changes they should make their comment to the Chief Executive (acleland@ipenz.org.nz) by 17 September. Comments on the Code of Ethics or the Disciplinary Regulations should be made by 18 October 2004. ☺



Hume Fellowship

Applications are now open for the Hume Fellowship, which funds overseas study by graduates in civil engineering and related disciplines. Here we profile a former Fellow, Robert Swears MIPENZ, in the first of a series of articles.

Robert was awarded the Hume Fellowship in 1999, and used it to study at the University of New South Wales, a goal that he says "simply would not have been possible" without it.

Robert answered IPENZ's advertisement for the Hume Fellowship with a proposal to study for a Master of Engineering Science (Transportation). He was the first recipient of the Fellowship who was married with children at the time of commencing study, and the move to Sydney for a year of full-time study turned the family's lives upside down. He credits much of his success to their support.

Robert chose an "all coursework" option, thinking that he would benefit more from greater variety, rather than the narrow focus of a single research project. He completed courses in pavement, traffic engineering and road safety engineering, transport systems, and project management.

He found the workload "enormous", but the research component of the assignments proved challenging and extremely satisfying. Stretching his academic capabilities was also rewarding – exceeding the standards he had previously set for himself.

Robert has applied what he learnt at UNSW to his work as a transportation engineer in a variety of ways. They have included promoting ideas for travel

demand management on a section of a congested network; critical analysis of pavement design parameters; and being readily able to create a transportation simulation model for a resource consent hearing. He is convinced that the benefits of post-graduate education extend far beyond specific applications. "It has given me a wider range of technical solutions to apply, and an appreciation of different approaches to transportation engineering."

He stresses that the benefits are not just professional and academic – "I learnt as much from the experience of being a full-time student in a foreign country as I did from the study itself." Although Sydney is hardly "foreign", to Robert's surprise most of his fellow students were not from Australia, but from countries such as Indonesia, Bangladesh, Taiwan, Sri Lanka and Hong Kong. Friendships made among them have sharpened his awareness of world events, and his appreciation of New Zealand.

"While it is difficult for me to quantify the impact on my engineering career of being awarded the Hume Fellowship, I consider that it has been of enormous benefit for me, both personally and professionally. I was challenged intellectually, emotionally and socially, and have had the opportunity, since returning to New Zealand, to use many of the skills and much of the knowledge I gained during my year of postgraduate coursework study".

He urges anyone interested in postgraduate study overseas to apply for the Hume Fellowship and chase this "life-changing" opportunity.

Further details can be obtained at www.ipenz.org.nz/hume. Applications close on Wednesday 1 December. ☺

DISCIPLINARY ORDER

made against a Member

A complaint was made against a Member (X) on 1 April 2003 by a complainant (Y) in respect of the behaviour of that engineer. The matter was investigated by an Investigating Committee which reported in December 2003 that the matter should be referred to a Disciplinary Committee in respect of an alleged breach of the IPENZ Code of Ethics. A further complaint was lodged by Y in November 2003 alleging that X had failed to perform his engineering activities in a careful and competent manner as required by Rule 4.3 of the Institution. A second Investigating Committee was formed, reporting in February 2004, and recommending that the matter of competence be referred to a Disciplinary Committee. A Disciplinary Committee heard both matters at a hearing on 15 March 2004, and reported its determination on 8 April 2004. That determination was appealed by X on 5 May 2004 and an Appeals Committee heard the matter on 12 July 2004. The Appeals Committee decision is binding and final according to Regulation 25 of the IPENZ Regulations for Hearing and Determination of Complaints Against Members.

The decision of the Appeals Committee was reported to the Board on 24 August 2004, and acting according to Regulation 26, the Board resolved to implement the order of the Appeals Committee which stated that "the details of the case should be published, for the benefit of other practitioners, but that the names of the individuals involved should not be released".

The finding

X was fined \$400.00 for a breach of Principles 2 and 3 of the IPENZ Code of Ethics. X was admonished and advised to seek assistance from appropriate colleagues on improving risk management procedures for dealing with client relationships within his practice. There was no finding that X was technically incompetent. X was required to pay \$1000.00 towards the costs of the Disciplinary Committee hearing, and a further \$1000.00 towards the Appeals Committee hearing.

The matters concerned

The complainant (Y) is a homeowner living in a rural area in which treatment of domestic sewage must be on-site. Y had been advised by the responsible Territorial Authority (Z) that the site was suitable for a particular type of treatment, and purchased and installed equipment accordingly. The plant subsequently did not work, and the authority undertook to provide assistance to remedy matters. Z engaged X (through a verbal contract) to visit the site, make an assessment and make recommendations. In May 2002, X visited the site and made recommendations which were presented to both his client Z, and to Y. Over the subsequent few weeks, changes were made to the plant but X did not revisit the site. In March 2003, Y contacted X and told X that the plant was still not working. Y asked that X prepare a report stating the changes required to remedy the plant. Y claims that it was made clear that X's report was to form part of a case being prepared by Y against Z for the costs required to achieve a workable on-site treatment system. X prepared a report and submitted it to both Y and Z, and sent Y an invoice for the costs involved.

The first finding against X is that he was in breach of the Code of Ethics in that he allowed himself to be conflicted, and then broke confidentiality in respect of Y who thought X was acting for him. X claimed that Z continued to be his primary client throughout the matter. In fulfilling his duties to Z he was asked to correspond with Y in respect of sharing his technical advice, but his primary responsibility was to Z. In taking instruction from Y and then writing his report of 18 March 2003 and invoicing Y for the costs he had allowed a conflict of interest

to arise. Because X believed that Z was his client he had a duty to inform Y that this was the case. Instead, he allowed a situation to develop in which Y believed that the client relationship had shifted, that Y was now the client, and that X owed a duty of confidentiality to Y.

The second finding was to the effect that X had not taken sufficient care. At the time of his visit in May 2002 he had focussed his attention on the primary and secondary elements of the system, and not systematically evaluated the tertiary element. He had not visited the site for nine months when he wrote the report of 18 March 2003. A number of changes had been made either under his instruction since the time of the last visit, or by others, and presumably X relied on any description given by Y of the changes and their effect. X's report prepared on 18 March 2003 suggested that the primary and tertiary elements would provide adequate treatment. However, in May 2003 at an on-site meeting he agreed with other engineers to a different recommendation, and only at the time of that visit did he examine the tertiary elements in detail. In the words of the Appeals Committee in summing up this aspect "this does not represent a lack of technical competence, but rather a failure by a very senior engineer to recognise all the dimensions of a complex situation and undertake investigations in sufficient detail to ensure the advice he provided was soundly based".

Some lessons for other Members

X was advised by the Appeals Committee to seek assistance from appropriate colleagues on improving risk management procedures for dealing with client relationships in his practice. In the case concerned, the reliance on inadequately clarified verbal contracts between X and Z and then between X and Y was a major difficulty. For many years IPENZ, with ACENZ, has made available the so-called short form contract as a simple way of forming contracts for small matters. Such contractual forms, and the discipline which comes from using them regularly, may have assisted X to avoid the situation that developed. In any case, professional engineers should exhibit the competence to deal with the complex commercial and legal realities that often accompany disputes on technical matters. This should be seen in the context of the CPENG competence element relating to managing complex engineering activities.

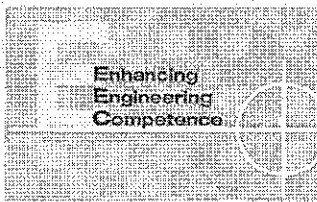
A second lesson is the need to investigate and evaluate all relevant matters and to make no assumptions in conducting investigative work. Many engineers can recount circumstances when they were asked to investigate, and some time after their visit wished they had either paid more attention to what at the time seemed peripheral areas, or had checked that what seemed to be obvious detailing, had in fact been installed correctly.

The costs

Although it is not part of the finding by the Appeals Committee, the Board has resolved that the costs to the profession of this matter be publicised. The two Investigating Committees involved six Fellows of the Institution for several hours each, the Disciplinary Committee involved five people, three of who are Members, and two of whom were lay people. Each of these contributed more than a day, and the Chair much more. The Appeals Committee comprised two past-Presidents and a Barrister – each of these spent more than two days. Three senior staff each spent several days on the matter, and advice had to be sought from the Institution's lawyers. There were also travel and accommodation costs. The direct costs to be borne out of Membership subscriptions are likely to be more than \$20,000, and the cost of Member time, if compensated, would have been of similar magnitude. e

Wellington Watch

- Policy staff made a written submission on the government's Draft Digital Strategy.
- Senior IPENZ staff made a written submission on the 'Distinctive Contributions of Tertiary Education Organisations: a TEC Consultation Paper'.
- Policy staff represented IPENZ at the Ministry for the Environment Consultation Forum on the Draft New Zealand Urban Design protocol.
- IPENZ staff met with affiliated organisations to discuss the implications of the proposed licensing of building practitioners regime.
- Senior staff involved with senior officials on development of flood mitigation protocols.
- Staff met with affiliated organisations to discuss on-going responses to infrastructure audit and "buildability" audit.




Ethics for Professional Engineers

IPENZ has recently run the first of a series of short courses in ethics. Ethics has become increasingly important for business, industry and the profession. In particular it concerns IPENZ Members, since adherence to the IPENZ Code of Ethics is a fundamental requirement of Membership. CPEng registration also requires a commitment to abide by ethical principles; and a reputation for ethical integrity underpins the value of both these brands.

This two-day course, entitled Ethics for Professional Engineers, provides an overview of professional ethical values and obligations, and detailed consideration of the IPENZ Code of Ethics, relevant CPEng Rules, IPENZ disciplinary regulations and complaints procedures. It also covers avoiding ethical failure and legal liability, and helps participants develop ethical reasoning and judgment, and strengthen their dedication to excellence. For CPD purposes the components of the course are linked to Competence and other Standards. The course concentrates on the principles underlying ethical conduct, and will retain its relevance when the changes to the IPENZ Rules, Code of Ethics and Disciplinary Regulations contemplated for 2005 are implemented (i.e. changes will affect the detail of the relevant procedures, but not their underlying principles).

Feedback from participants was enthusiastic, emphasising its practical value – "relevance to day-to-day operation of engineering consultancy", "real situational tools", and "links to the relevant codes". They also liked its structure, presentation and value for money, and one summed it up as "very enjoyable and thought-provoking – surprisingly useful".

The introductory course is to be repeated in several centres – keep an eye on the IPENZ calendar. 

PROPOSAL

The Chartered Pr

Notice is hereby given of the intention to make changes to the CPEng Rules in respect of the procedures for assessing candidates for registration or continued registration, and in respect of the procedures for hearing and determination of complaints. This article describes the rationale for the proposed changes; the actual changes are detailed in the accompanying article page 6. The numerical codes below match those in the accompanying article. There is no explanation for Rules 1 and 2 which allow for title and commencement date.

Submissions on the proposed changes are invited and must be made by 18 October 2004. Submissions must be in writing and should be sent to:

CPEng Rules Consultation
IPENZ Engineers New Zealand
PO Box 12 241
Wellington

or emailed to cpeng@ipenz.org.nz

A. Rationale for changes in relation to assessment

3. Rule 9 – the present Rule allows that the supply of a 'competence self review' is optional, whereas assessment panels have found this extremely useful. The change is to make the supply of this self review compulsory.
4. Rule 9A – applications with incomplete information have no time limitation on the applicant to provide information. Being able to 'lapse' an application if the applicant fails to supply the required information within six months of the request will not only provide an incentive to the applicant but will also reduce the administrative overheads involved in handling these applications. If the applicant has not made a response after six months, all documentation will be returned and part of the fee may be refunded if the work performed is sufficiently small. Thus, if the portfolio of evidence has not been forwarded to the assessment panel, a refund equal to 50% of the application fee will be made.
5. Rule 11 – two changes are proposed here. The first is to add the word "independent" before referee to ensure that the referee's statements are as reliable as possible. The second is a technical change to move the making of recommendations outside the subclause dealing with assessment actions. The new wording requires the recommendations to only be made at the end of assessment.
6. Rule 13 – this is amended to be more practical; the candidate needs to be given the relevant information, being the reasons and the documents supporting those reasons. The candidate does not need to be sent all the information on which the proposed decision is based, which would include the application itself supplied by the candidate.
7. Rule 23 – the change here is identical in intent to that in 3., but applies for the case of assessments for continued registration.
8. Rule 25 – the change here is identical in intent to that in 5., but applies for the case of assessments for continued registration.
9. Rule 35 – the change here is identical in intent to that in 6., but applies for the case of assessments for continued registration.
10. Rule 42 – there is no provision for the retention of any of the applicant's



IPENZ News

Potential for Dangerous Buildings and Ethics

Many Members will have seen or heard media reports on 23/24 August in respect of the effectiveness or otherwise of the new Building Act in addressing concerns in the construction sector. There were interviews with John Scarry MIPENZ and the Minister responsible, John Tamihere in both radio and television media. In addition, the President of SESOC, Dr Barry Davidson FIPENZ and myself were interviewed. One matter traversed on Radio New Zealand's Morning Report was whether there are in fact buildings that can be identified as dangerous. To quote the transcript:

PRESENTER: ANDREW CLELAND, A FINAL QUESTION TO YOU. ARE YOU THEREFORE SAYING THERE ARE NO MAJOR BUILDINGS WHICH HAVE BEEN IMPROPERLY CONSTRUCTED IN NEW ZEALAND AT PRESENT?

CLELAND: NO, I'M NOT SAYING THAT. WHAT I'M SAYING IS THAT WE HAVE ASKED PEOPLE, WHERE THEY KNOW OF BUILDINGS THAT POSE A RISK, TO NOTIFY THOSE TO THE BUILDING OWNER OR TO MAKE COMPLAINTS AGAINST THE ENGINEERS CONCERNED, AND WE HAVE NOT BEEN NOTIFIED OF ANY SPECIFIC BUILDINGS WHERE THERE ARE SUFFICIENT CONCERNS THAT ENGINEERS HAVE TAKEN THOSE STEPS.

A little later the presenter asked Barry Davidson whether he considered there are buildings in existence right now that are prone or potentially prone to failure in a large earthquake. Barry replied that he considered there might be, and he thought that many other engineers would share his views.

It would be a matter of real concern if engineers can identify specific buildings which they consider pose a significant and immediate risk but have taken no action. I wish to reiterate the advice given to all Members over a year ago, at the time when the practice review resulting from the Scarry open letter was in process: if you can identify a specific building that you consider poses a significant and immediate risk then ethically you should take reasonable steps to notify the building owner. If the building owner fails to respond within a reasonable timeframe you may need to consider further actions to protect building users – these further actions will depend on the particulars of each case.

Additionally, if you consider that an engineer has performed structural engineering work of such low quality that a specific building poses a significant risk you should make a complaint to IPENZ National Office about that engineer.

To date, I have had only one engineer contact me for advice – he considered there was a building that may be a risk, but that he did not know enough about the building to decide either way. He suggested, and the engineers at National Office agreed, he had an ethical responsibility to advise those engineers with responsibility for the building design (whom he knew) that in his view the building design should be reviewed to establish if there was a risk. This was not a case of poor practice, but of new knowledge leading to review of what had previously been regarded as acceptable practice.

It is important that all Members carefully consider their ethical responsibilities in respect of buildings. The decisions you may need to make may not be easy, and the engineers at National Office will give advice to the best of their ability.

On the positive side, I do consider that through the CPEng quality mark, and our activities to persuade Territorial Local Authorities to insist on it, we are making good progress in ensuring that all building design work is done by competent people.

Dr Andrew Cleland

Chief Executive

acleland@ipenz.org.nz

Call for Applications: Director – Learning and Assessment

The Institution of Professional Engineers New Zealand is the professional body representing the engineering profession and the registering authority under the Chartered Professional Engineers Act. As one of four Directors reporting to the Chief Executive, the Learning and Assessment Director is a team leader, with responsibility for our programmes in engineering education and accreditation, competence assessment and the registration and professional development of professional engineers. The Director also takes responsibility for maintaining New Zealand's membership of international mutual recognition agreements and maintaining key relationships with industry.

We are committed to outcomes-based measurement of competence, and modern methods of assessment in both education and professional development. We seek applicants with relevant knowledge of education and accreditation processes, competence assessment of professionals or professional development, (not necessarily engineering-related). The successful candidate will exhibit strong leadership, strategic, communication, relationship and team management skills and the ability to develop and implement policies and procedures. The appointee will be expected to manage a group of six staff, and co-ordinate the efforts of many contractors and volunteer assessors working for the Institution.



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For more information on the position please contact the Chief Executive, Dr Andrew Cleland (04 474 8935, acleland@ipenz.org.nz) in confidence. Applications should be sent to vacancy@ipenz.org.nz no later than 23 August 2004.

Members Poll

Last week's poll saw an interesting response. 41% of Members who voted felt that ethical standards in engineering practice in New Zealand are in decline and 57% felt that they are not (30%) or that they are about the same (27%). You can view these results and results from previous polls by clicking on 'view past results' at the bottom of the poll. Thank you to all Members who voted and those who provided further feedback via email. Thanks also to Murray Isdale for providing the poll question.

This week's poll asks whether you agree with the Government's decision to compensate Genesis in the event it is unable to secure the gas needed to run its proposed \$520 million combined cycle gas turbine plant. To cast your vote and see what other Members think, log into the Member-only area of the website at www.ipenz.org.nz



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Claudine Dupuy

Policy Advisor

policy@ipenz.org.nz

From 'CPD Approval' to 'Current Competence'

The introduction of the Chartered Professional Engineers Act (CPEng) 2002 signals a paradigm shift for professionals.

Consumers, as represented by Government, are no longer satisfied that evidence of participation in professional development is sufficient proof of current competence.

They demand a much tougher test for professionals as a way of minimising risk and thereby protecting public health, safety and wellbeing.

Consumers of professional services want to know that a professional whose services they engage has been proven to be currently competent to perform those services. Consumers also know that they have insufficient knowledge to make this competency assessment and must rely on the professional's peers to make this assessment.



So what does this mean for the engineering profession?

The fundamental change is that engineers who are successful in gaining entry to any Government-backed register will need to undergo regular assessments (normally every five years) to demonstrate their current competence. At present, under the CPEng Act 2002, this current competency requirement only applies to professional engineers. However, in the future, further registers may be developed for engineering technologists and technicians that will have a current competence expectation.



What does this mean for IPENZ Members?

IPENZ Membership is evidence of a commitment to ongoing learning and development – through declaring adherence to the IPENZ Code of Ethics a Member not only commits to "continue to develop their own knowledge" but they also commit to developing and sharing "the profession's knowledge, skills and expertise in the art and science of engineering". The standards of any profession will only be maintained if there is a strong, vibrant and outward-focused professional group that provides mechanisms whereby knowledge can be shared and individuals supported in their endeavours to enhance their competence. However, IPENZ Membership, on its own, will not provide evidence of current competence.



How does this impact on the IPENZ Continuing Professional Development Policy?

The IPENZ CPD policy has had to be fundamentally changed to reflect the paradigm shift from evidence of CPD participation to evidence of current competence. Although the CPD guidelines remain basically unchanged, the 'auditing' of CPD records is no longer valid for most classes of Membership. A Member's

CPD records will now be a critical part of their evidence to demonstrate competence when they undergo an IPENZ Initial or Current Competence Assessment. Members are now expected to be reflecting on how their CPD activities are linked to their performance using the relevant IPENZ Competency Standard as a benchmark.



Do I still need to keep a record of my professional development activities?

Yes. All IPENZ Members are still bound by the IPENZ Code of Ethics which explicitly states that: "Members shall continue to develop their own and the profession's knowledge, skills and expertise in the art and science of engineering." So whether an IPENZ Member is currently on the CPEng register or not, in terms of exhibiting good practice, they should still be keeping records of their professional development. Just through keeping a record, Members will thereby spend some time reflecting on their performance, identifying possible learning needs and they will generally be more proactive in planning their ongoing professional development.

For those on the CPEng register, a significant part of the current competence assessments will be providing assessors (peers) with evidence "that they have taken reasonable steps to maintain the currency of his or her professional engineering knowledge and skills within his or her current practice area". (CPEng Rules 2002, Section 20 (b) p13). So CPD records will still be important, yet just part of the evidence that an engineer presents to demonstrate their current competence.



Should my CPD records still show around 50 hours of participation per year?

IPENZ has now developed a set of 'Professional Development Good Practice Principles and Guidelines'. One of the guidelines is that CPD records should show at least 50 weighted hours of CPD activity per year, however this now has less emphasis than demonstrating the outcome or benefit.



So what are the other CPD Good Practice Principles and Guidelines?

All Members should refer to the draft Professional Development policy to see whether or not the suggested guidelines are sensible. Some of these guidelines are:

- that a Member's professional development activities should show a balance between passive and interactive activities

- networking and dialogue with other engineering professionals should be an integral part of all Members' professional development
- a significant proportion of CPD activities, for senior professionals, is likely to fall under the heading of 'Services to the Engineering Profession' or 'Services to the Broader Community'
- at least 50% of CPD activities should be closely aligned to the Member's current area of engineering practice.



Do I still need to send in my CPD records to IPENZ National Office for approval?

No. CPD records are part of the evidence that an engineer provides when undergoing an IPENZ Initial Competence Assessment or, in the case of CPEng, a Current Competence Assessment. The test of one's CPD will be: "Do these records demonstrate that you have taken reasonable steps to maintain/enhance your competence?" Some questions you could ask yourself are:

- Are your CPD activities aligned to element/s of the relevant IPENZ Competency Standard?
- Is there sufficient evidence that you have taken active steps to keep up to date with current good practices in your area of engineering practice?
- Is there evidence that you are engaging with your profession by networking at branch events, contributing to the development of standards or codes of practice, reading, or mentoring other members of the profession and that you are therefore part of a 'community' of engineering practitioners?
- Is there evidence that you, at least once a year through participation in an external conference, course or seminar, take some time out of your day-to-day work environment to reflect on your development and performance?

IPENZ National Office, as a Member service and on request, will provide advice and guidance as to whether or not a Member's CPD records meet the IPENZ CPD Good Practice Guidelines.



Change in career path and work role – how will this effect my CPD?

Members will be expected to be much more proactive in planning and developing their careers. Their CPD records, over time, should provide evidence of this planning. The Professional Development Good Practice Guidelines state that "it would be unlikely that a significant change in an engineering role could be successful solely through experiential learning". As an example, if an engineer was trained as an engineering technician and then wished to move into a professional engineering role, their CPD records would be expected to show some evidence of formal learning aimed at

– what does this mean for IPENZ Members?

enhancing their understanding and application of the engineering principles underpinning complex engineering activities. Similarly, if an engineer was to significantly change their area of practice then there would be an expectation that some of the activities on their CPD records reflected this planned change.



What will be the expectation of Graduate Members?

The IPENZ Professional Development policy has been broadened to include the expectation that IPENZ Graduate Members, within the first four years of their experiential learning, should be participating in an IPENZ Competency Development Programme. This means they should be able to provide evidence of:

- recording their work experience and analysing their progress in acquiring the competencies expected of competent engineering practitioners using one of the IPENZ Competency Standards as a benchmark
- having a mentor to support them through this period of their experiential learning
- maintaining CPD records – recording professional development activities that fall outside of their day-to-day experiential learning.

IPENZ, in the Member-only area of the IPENZ website, has a web-based system for each of the above records. When Graduate Members apply for an IPENZ Initial Competence Assessment for entry into one of the competency-based membership classes (AIPENZ, TIPENZ, MIPENZ/CPEng), they will be expected to provide the above records as part of their portfolio of evidence.



If I am a Professional Member (MIPENZ) but not CPEng what will be my CPD expectations?

You are still bound by the IPENZ Code of Ethics, however, you will not be audited for compliance to the Professional Development Good Practice Guidelines and nor will you undergo current competence assessments. Of course, nor will you carry a quality mark of current competence which will increasingly be expected of those undertaking work as a professional engineer.



What will be the expectation of Associate Members (AIPENZ) and Technical Members (TIPENZ)?

At this stage there are no public registers for engineering practitioners working as an engineering technologist or engineering technician. IPENZ will, therefore, continue the practice of auditing, as a quality assurance measure, up to 15% of Associate Members and Technical Members per year for adherence to the IPENZ Professional Development

Good Practice Principles and Guidelines. On request these Members will be expected to submit their CPD records for review.



I am fully retired. Am I supposed to be keeping CPD records?


No.



What services does IPENZ provide to support me in developing and maintaining my competence?

IPENZ divides its professional development services into three categories:

- **Competency Development:** those activities aimed at supporting engineers, mainly graduates, through their initial professional formation period. Services include the web-based competency development recording systems (work history and responsibility summary); mentoring log; CPD recording system as well as mentoring services; IPENZ Quality Marking of Employer; cost-effective EEC courses tailored specifically to the needs of engineers; opportunities to engage with the profession; and information seminars.
- **Competency Maintenance or Enhancement:** those activities aimed at supporting engineering practitioners who, having gained formal, peer recognition of their professional competence, are continually reflecting on, and taking active steps to maintain or enhance their competence throughout their working lives. Services include CPD recording system; the IPENZ Competency Standards as a way of externally benchmarking their competence; cost-effective EEC (Enhancing Engineering Competence) courses tailored specifically to the needs of engineers; CPD Accreditation as a way of identifying quality professional development events; publications; and networking opportunities.
- **Career Development:** those services aimed at supporting Members as they plan their career paths so that they have maximum opportunity and satisfaction working as an engineering professional. Services include career planning and advice; employment contract advice; remuneration survey; job vacancies; and access agreements if pursuing career opportunities overseas.

A copy of the revised draft IPENZ Professional Development Policy is available in the Member-only area of the website. 



IPENZ is seeking your comments on a revised version of its Professional Development Policy. Although the policy document itself is not large, the appendices are substantial, collating all professional development systems, procedures, services and membership expectations into one document.

As a way of highlighting the key issues encompassed in the policy document and appendices, Virginia Burton, Director – Learning & Assessment has developed a briefing document in the form of questions and answers. Feedback on these key issues is welcomed. A discussion forum has been set up in the Member-only area where Members share their views. Alternatively Members can email vburton@ipenz.org.nz.

Feedback will be collated and taken into consideration by the IPENZ Standards and Accreditation Board when they develop a final draft of the Professional Development Policy. Feedback will need to be received by 15 July.

National Historic Heritage Workshop – “Engineering Heritage”

IPENZ is joining with the Department of Conservation and the New Zealand Historic Places Trust to hold a workshop on the topic of engineering heritage. Anyone interested in engineering heritage – engineers, other heritage agencies, council planners, consultants, community group representatives – is invited to join and contribute.

When: 3–4 August 2004
Where: National Library,
 Molesworth Street,
 Wellington

For full information go to
<http://www.ipenz.org.nz/heritage>
 and open Heritage Workshop pdf

President's Message

Searching for Sustainability

Choosing to focus on sustainability as President this year now seems a particularly appropriate decision. As Harold Wilson famously said, "There is nothing so powerful as an idea whose time has come". My Engineers Australia counterpart Doug Jones is also to be congratulated for taking up the sustainability challenge in his EA magazine cover story last month.



I was fortunate to attend a one-day conference in Canberra last month – it happened to coincide with the EA Council and Congress meetings – entitled "In Search of Sustainability: First Steps" (If you would like a summary, send me an email at president@ipenz.org.nz). This conference gave me a snapshot of where the movers and shakers in this area are at in Australia. People like Dr Graeme Pearman, Chief Scientist of CSIRO, and Professor Ian Lowe of Griffith University are respected for their views which often highlighted humanity's lack of knowledge. According to Dr Pearman our general lack of knowledge is enormous (for example, we don't know how the thermohaline circulation works), but we still have enough knowledge to give warnings about unsustainable practices. And Professor Lowe said that we "cannot even in principle manage natural systems" let alone change them.

This was in sharp contrast to an earlier dinner I attended in New Zealand, where the Danish "skeptical environmentalist" Bjorn Lomborg was speaking as a guest of the Business Round Table. His general approach was "Don't worry, we can carry on with business as usual". His solution to global warming seemed to be that it would solve itself – humanity would run out of fossil fuel.

A more recent IEE workshop by three widely different UK technical experts ran the gamut from Nick Goodall expounding the benefits of wind energy to Michael Gibbons, a coal advocate whose talk was entitled "Sustainability – just blowing in the wind?" A message of hope, counterbalanced by yet another business-as-usual scenario.

Another ISOS conference speaker, Dr Colin Butler from the National Centre for Epidemiology and Population Health, Australian National University, said that "denial is the best way to deepen a crisis". My views have hardened as I see the magnitude of the task before us. I too believe that the next 50 years will be critical. How we balance the forces driving us towards unsustainability of population, affluence and technology will be the key.

Another Canberra speaker, Richard Sanders, the founder of Quest 2025, says, "We need to abandon the Brundtland concept of 'sustainable development'" – a theme also echoed by others. We must start to live within ecological limits. "Tightening the ecological budget drives innovation". Which is where engineers come in again. The production-oriented side of technology may be a driver towards unsustainability, but with some smart thinking, engineers can also lead the drive to a more sustainable world.

It is amazing how necessity can drive invention. Nick Goodall told us that the UK will have 3.1 GW of wind-derived energy (8% of demand) by 2010 – not bad considering that there were more wind farm consents in March this year than the entire 1990s! Things can change rapidly in response to an act of political will, even using existing technologies, rather than waiting for some much-heralded "hydrogen economy" still largely based on natural gas conversion.

There may be some additional spinoffs of a political nature from my President's Task Committee on Sustainability. It may be a good time, for example, to float the idea of a national "sustainability summit" in New Zealand, with perhaps even a Minister of Sustainability. After all, the previous Labour Government created a Minister of Disarmament and Arms Control, and sustainability is arguably even more important.

The message in all this is that change is inevitable, like entropy. How we manage it is up to us. So how will you answer your great grandchildren when they ask you, "What did you do when you knew you were using up everything and not leaving anything for us, e koro?" I know what I'll say.

Gerry Te Kapa Coates
President

Ethical breaches – your views

The present IPENZ Code of Ethics was approved in 1996. Few complaints since that date have led to disciplinary action against a Member, and none since 2000. The CPEng Act, passed in 2002, distinguished three quite separate grounds for disciplinary action:

- breach of the code of ethical conduct (which covers only matters that are essentially moral)
- performing engineering services negligently
- performing engineering services incompetently

It is highly desirable that, if a person who is both a Member and a CPEng is the subject of a complaint, the investigation and consequences should be consistent in the two contexts. That is not to say that the penalty need be the same, but rather that the finding in one context should not be in any way contradicted in the other.

In order to achieve consistency, changes need to be made in the IPENZ Rules to make it clear that there are three separate grounds on which complaints can be made, matching the CPEng grounds cited above. The pre-2002 IPENZ Rules allowed for only ethical breaches, and the post-December 2002 Rules allow (via Rules 4 and 11) for breaches on matters of competence or ethics, but not negligence.

A rule change is proposed so that Rule 4 will specify both that Members must conform to the code of ethics, and that Members in the classes Distinguished Fellow, Fellow, Professional Member, Technical Member, Associate Member and Graduate Member are expected to perform their engineering activities in a careful and competent manner, commensurate with their membership class in the Institution. Complaints could then be made on the basis that a Member has allegedly acted either in breach of the Code of Ethics created under Rule 4, or in contravention of the requirement to perform engineering activities carefully and competently as stated in Rule 4. The working group charged with reviewing the Rules in this respect would be interested in feedback on this issue.

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Additionally, case law has shown that the structure and working of the present IPENZ Code of Ethics is having unintended consequences. For example, the second principle states that Members shall undertake their duties with professionalism and integrity and shall work within their levels of competence. This has the unexpected effect that the definition of a "duty" can have huge consequences. The CPEng code of ethical conduct refers to "engineering activities" rather than duties.

The working group has concluded that the IPENZ Code of Ethics should have three parts:

Part I Values: these would equate to what are now called the five principles, but reworded taking into account what we have learnt from experience of complaints, and to achieve consistency with the CPEng code. They would be called "values" to make it clear they are aspirational statements.

Part II Guidelines for acting ethically: these would advise Members about the kind of behaviour that is considered to comply reasonably with the aspirations expressed in the values.

Part III Minimum requirements to be met at all times: in effect these would be the minimum standard against which complaints on ethical grounds would be tested. It has been suggested that Part III should comprise the CPEng code (minimally reworded to fit the IPENZ context), plus four further elements to ensure coverage of all five values. The proposed additional elements include a requirement to hold the Institution and profession in good standing; a requirement to have regard for the need to share public domain engineering knowledge with other engineers for the ultimate benefit of society; a requirement to consider the effect of engineering activities on society; and a requirement to assist and support other engineers in performing their engineering activities and developing their engineering competence, when so requested.

In effect the extra elements in the Code of Ethics represent the responsibilities associated with being a Member of a professional body rather than just a person registered by Government. Mirroring the CPEng requirements to be competent and avoid negligence should present no difficulty.

The proposed wording for revised Rules 4 and 11, and the revised Code of Ethics, are available in the Member-only area of the website. Comments should be sent to the Chief Executive (acleland@ipenz.org.nz) by 22 January 2004. ☺

Chief Executive's end of year message



If I asked the staff who work on your behalf what they most remembered about 2003 it would undoubtedly be the workload. National Office has handled more work this year than any

previous year. That work comes largely from you, the Members, especially as you have met (or are still meeting) the challenge of CPEng registration.

The time needed to make a CPEng application is not small, and sadly the uneven flow of applications into the system, and the delays caused by the natural justice requirements, have meant that the average processing time has also been long.

The staff have done their best, and so have the Members. In many ways it has been a year of heroic effort – from the many volunteers who hold office in or perform functions for the various Branch, Technical Interest Group, Special Interest Group or Collaborating Technical Society Committees; from those who serve on the governing Board and subsidiary Boards of

IPENZ; from those who served on the Structural and Sustainability Taskforces; from those who peer reviewed submissions to Government on public policy issues; from John Scarry who pursued excellence so persistently through his open letter on the state of structural engineering; from the editor of and contributors to *engineering treNZ*; from those who provided ideas or copy for our various publications; from staff who often worked late; from the volunteer Practice Area Assessors and Staff Assessors who often worked at inconvenient times for little reward to process CPEng applications; from the Members who worked hard to meet the CPEng application submission timetable; from Accreditation Panellists; and from Members who just took the time to put forward a smart idea to help IPENZ go forward. I could go on, and I apologise to those I have failed to recognise because they assist in so many roles.

As we end 2003 I thank all of you, for you represent the very essence a professional body – a collective of people who act jointly to set and maintain standards for their profession, so that it meets its unwritten social contract with society at large. ☺

Wellington Watch

- The Chief Executive attended the Foundation for Research, Science and Technology's stakeholder meeting on their Performance and Achievement Report and made suggestions for improving their strategy.
- Three senior staff met with the Minister of Commerce to brief her regarding the release of the final Structural Engineering taskforce report.
- The President and Chief Executive met with Hon Nick Smith to discuss the impact of the Building Bill on the CPEng Act and make arrangements for hosting of the annual IPENZ hospitality event in Parliament's Grand Hall.
- The Policy team represented IPENZ at the Ministry for the Environment's Professional Associations Liaison meeting and discussed issues including the RMA, standards and the Ministry's Govt3 project.
- The Chief Executive of the Ministry for the Environment met with the IPENZ Board to discuss how IPENZ can better interact with the Ministry. ☺



President's Message

Ethics matter



Our professional ethics will matter more as we submit to the competence assessment processes of the Chartered Professional Engineers Act. I have just finished a tour speaking to Branches around the country and, in passing, I would ask each gathering how many had read the IPENZ Code of Ethics recently – say in the last five years. The response was usually about 20%, which is low, although I suspect it might have been higher had I asked how many were aware of what was in the Code.

The point of my query was to see how many engineers were aware that our Code includes a specific fundamental ethical value regarding “sustainable management of the planet’s resources” and minimising “adverse environmental impacts” of engineering works. Whilst some might see these goals as merely aspirational, the CPEng Rules—a much more enforceable document—also require that engineers “have regard to effects on the environment”.

How else do ethics apply to competence? First, the assessment process itself requires referees to be honest in their assessment of candidates. This means that referees may have to decline to act for someone who is in their opinion not fully competent. There is no honour in easing the standards just because you find it hard to say no.

Secondly a CPEng must “not misrepresent his or her competence”. This means that, although there are no practice areas attached to the CPEng appellation, you must only work on engineering activities within your competence. This does not mean you can’t try something new or different, but you may do so only as long as you can argue that you disclosed this intention to your client and they still preferred to use you, rather than anyone else.

The CPEng Code of ethical conduct was arrived at by a different process from the present IPENZ Code. We found it impractical to convert the present IPENZ Code into a minimalist “thou must” type of code. So the CPEng Code was derived from older rule-based IPENZ Codes. However, this approach and some recent complaints have shown up some areas in the current IPENZ Code that need updating.

One of these is language. The IPENZ Code talks about an engineer’s “duties” interchangeably with “work done by you” and “all your work”. The CPEng rules use the term “engineering activities”—perhaps a more precise definition. Secondly it now appears that the issue of what constitutes competence can be separated from the moral issues of how that competence is applied to engineering activities.

It thus seemed timely to do a minor review the Code of Ethics. The Board has set up a committee for this purpose, and draft changes will be put out soon for comment. The main changes envisaged involve separating the code into three parts:

- Part I listing the five fundamental ethical values, which will change only in minor detail
- Part II giving the Guidelines, which again will stay basically the same
- Part III which lists “Minimum Standards of Acceptable Ethical Behaviour,” essentially mirroring the CPEng Code.

The main danger is that Part III will be seen as all that really matters, while the aspirational parts of the code will be seen as idealistic, and not realisable or enforceable. On the other hand some Members mindful of insurance and litigation saw the present IPENZ Code as “constructing some

Building Bill submissions process

As reported in a recent *engineering direct* IPENZ has hosted a meeting of engineering-based organisations who have an interest in submissions for the Building Bill. Submissions close on 31 October, leaving a very short time in which to develop submissions on a very important piece of legislation for the profession. Representatives were present from the Association of Consulting Engineers of NZ, Structural Engineering Society, Institute of Refrigeration, Heating, Air Conditioning Engineers, NZ Society on Large Dams, Society of Fire Protection Engineers, NZ Geotechnical Society, NZ Society of Earthquake Engineers, Timber Design Society, Chartered Professional Engineers Council and Engineering Associates Registration Board. Apologies were received from representatives from BRANZ, and the Energy Management Association.

The purpose of the meeting was to identify issues and develop a co-ordinated set of high quality submissions from the engineering profession. The meeting was useful, and each group came away with a clear view of where their submissions would fit into a critique of the Bill as a whole.

For example IPENZ will take the lead on licensing/registration issues, promoting the view that self-certification is the best approach. ACENZ will focus on commercial risk and liability aspects, consumer protection, warranties and bonds, pushing the concept of proportional liability. NZ Society on Large Dams will lead on dam safety issues, and treatment of suspect dams. The NZ Geotechnical Society will focus on defining natural hazards etc, risk transfer and longer-term reassessment issues.

The Society of Fire Protection Engineers is interested in clarity on defining acceptable solutions (i.e. baseline or conservative), and transparent and consistent TA processes. IRHACE and EARB are interested in the registration and licensing of building practitioners, the definition of amenity and sustainability, maintenance issues and the building Warrant of Fitness process. This list is by no means exhaustive.

It is expected that submitters will make available “first cuts” of their submissions by 17 October; they will be placed in the Member-only area of the IPENZ website for feedback.

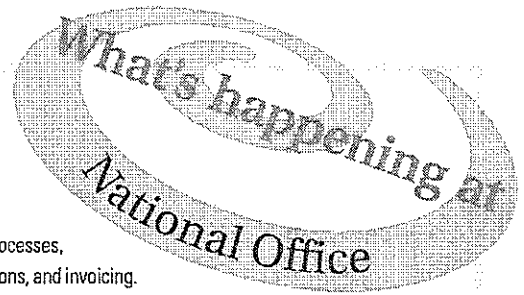
If you’d like to contribute to the submission process please contact either Murray Isdale misdale@ipenz.org.nz or Claudine Dupuy cdupuy@ipenz.org.nz. There are bound to be views that are not covered by those of the groups represented, and IPENZ will pick up some of these issues. ☺

very high ground against which lawyers can see us silhouetted against the sky". They would prefer to have a Code that says very little beyond what common law requires. Such fears seem to have proved groundless, but some caution against proclaiming engineers as would-be paragons is still probably wise, without sacrificing our values.

It has been said before that those who really *need* a Code of Ethics will not benefit from one. The vast majority of engineers will continue to be competent and ethical. A greater task perhaps is to educate the younger engineers in what it means to be ethical in today's society, where free rugby test tickets may not seem like corruption – although they can certainly soften one's opinions of the giver. Is accepting them ethical? My old firm's founder said "If you can eat it, drink it, or smoke it in a day, then it's not a bribe!" But that was 30 years ago. Is it still acceptable?

Other feedback received from Branches during my visits included overwhelming approval for the idea of IPENZ facilitating and brokering short courses for CPD. And ethics was seen to be a fruitful area for some short courses. In the end, ethics do matter; ethical conduct will lift the game of the whole profession – and make all of us proud to be Members.

Gerry Te Kapa Coates
President



- Held two meetings of senior IPENZ Fellows regarding our public policy development processes.
- Completed end-of-financial-year processes, calculation of 2003/2004 subscriptions, and invoicing.
- First meeting of Consultation Group for AIPENZ and TIPENZ Competency Standards held on 2 September.
- Accreditation visit conducted to review the Bachelor of Engineering Technology degree offered at Massey University (Wellington).
- IPENZ Engineering Education Forum held on 30 September, with more than 60 attendees from tertiary institutions and ITOs.
- National Office staff visited 10 organisations that employ engineering professionals to gain insight into the learning needs of engineering professionals.
- Represented at Competenz (ITO) meeting to discuss the NDE (Mechanical).
- Represented at Civil Engineering Consortium Advisory Group (for Diploma in Civil Engineering) meeting.
- Review of IPENZ professional development activities and services undertaken to ensure appropriate support for Members' professional development at all stages of their career.
- Preparations begun for review of IPENZ's accreditation policies and procedures next year, in fulfilment of one of its obligations as a signatory to the Washington Accord.
- Applications for student membership continue, due to recent developments in services for student members, including a student job search facility. ☺

Hunting heritage photographs

The National Committee for Engineering Heritage is endeavouring to locate, date and name old group (usually conference) photographs of this institution. We have approached the Alexander Turnbull Library regarding the possibility of their acquiring our photos (we would have copies made for IPENZ) so that they could be cared for in a suitable archival environment.

Unfortunately these historic photographs are mostly unnamed and some are undated. While we can identify the more prominent members of the engineering profession there are a lot of unknown faces, and as the years pass the chance of anybody recognising these people diminishes.

As part of our heritage work we are trying to acknowledge the many people who contributed to engineering in New Zealand, so we are requesting help in identifying the people in these photos (see list). We would appreciate it if anyone can send us a list of names, or any other information regarding the photos. If any older or former members think they might be able to identify faces, we would like them to contact us so

that we can arrange access to a copy of the relevant photo.

Our set of group photographs from this time period is incomplete; if anyone has photos from other years (particularly named ones) or is able to access any we would like to make a copy for the IPENZ archives.

Our collection includes the following group photographs, mostly taken at conferences.

- 1912 – Wellington Local Government Engineers – named (initials/surname)
- 1912 – Institute of Local Government Engineers of New Zealand (ILGENZ)
- 1914 – ILGENZ
- 1915 – New Zealand Society of Civil Engineers (NZSCE)
- 1917 – NZSCE
- 1919 – NZSCE
- 1921 – NZSCE
- 1922 – NZSCE
- 1923 – NZSCE
- 1924 – NZSCE

- 1925 – NZSCE
- 1927 – NZSCE
- 1928 – NZSCE
- 1929 – NZSCE
- 1930 – NZSCE
- 1931 – NZSCE
- 1932 – NZSCE
- 1933 – NZSCE
- 1934 – NZSCE – named (initials/surname)
- 1935 – NZSCE
- 1936 – NZSCE
- 1938 – New Zealand Institute of Engineers (NZIE) – named (initials/surname)
- c1940 – NZIE
- 1941 – NZIE – named (surname)
- 1949 – NZIE
- 1964 – NZIE

Please contact Megan Rodden (mrodde@ipenz.org.nz) if you can supply any information about historic IPENZ photographs. ☺

President's Message

The "P" words – power, planning and policy

As yet another energy "crisis" looms for New Zealand, one could be forgiven for wondering what we have learned since the previous ones. At a recent IEE/IPENZ breakfast meeting I asked the Minister of Energy, Hon Pete Hodgson, what compelling reason he could give consumers to save power. His response was to suggest they could save money by giving up such luxuries as heated towel rails.



He could have suggested altruistic reasons, signalled that demand-side management would be moved up the agenda, or promised that in exchange for our helping deal with this crisis the government would ensure it didn't happen again. He could even have hinted at an energy planning policy – if those "P" words hadn't vanished from official energy thinking since the 80s.

Subsequently he would blame "malign circumstances" – the premature depletion of Maui gas combined with lack of rain – for yet another crisis. The Maui decline was at least predictable, and foreshadowed as early as 1985.

IPENZ has had various stabs at getting successive governments to re-consider energy planning. In 1992 I chaired a policy committee, which approached energy as a "business unit" of "New Zealand Limited". The principles we came up with were:

- energy demand was still expanding in a static economy, against the OECD trend
- with demand unchanged, Maui depletion would leave us short of some 30% of the primary energy available
- NZ would remain committed to international greenhouse gas reduction targets
- improving efficiency at all levels would be fundamental
- a conservation ethic would be needed
- our choice of development paths would affect energy demand
- there were limited undeveloped or undiscovered water or hydrocarbon resources
- New Zealand's debt burden might prevent our taking an optimum course

Ten years later, and after major ideological change, only the last point has perhaps altered significantly.

Your Chief Executive and I also met the Minister of Finance, Hon Dr Michael Cullen. We suggested an Infrastructure Advisory Panel, with government and private-sector representation, to offer planning advice not only on energy but on national infrastructure as a whole, from a long-term perspective. So far we haven't heard back.

The press seems to reflect growing cynicism; asking the consumer to save power to get the country out of a hole, without changes in the pipeline to ensure it won't recur, is no longer acceptable. IPENZ wants to help. How we can best do that is still open to suggestions. We would welcome yours.

Gerry Te Kapa Coates
President

Ethical obligations and structural engineering safety

In the wake of the Scarry "open letter" Members have sought IPENZ's advice on their ethical obligations. The letter alleged that some buildings may pose a significant risk of structural failure in seismic events. IPENZ has advised that if a Member has knowledge of a building that leads them to consider that the building may present a significant and immediate risk to life or of injury, they have an ethical duty to inform the building's owner that the design and construction should be reviewed as soon as possible; and, depending on the circumstances, they should consider whether they should also inform users who might be at risk. This advice reflects the IPENZ code of ethics, and the CPEng minimum code of ethical conduct.

The obligation arises whether or not the present owner owned the building at the time of construction. Informing an owner of a perceived risk is not accusing the engineer in question of poor work; the building may have met standards at the time of construction, which may have since been brought into question by new knowledge.

In response to this advice Members have pointed out another ethical obligation: to inform an engineer before commenting on his or her work. This recognises the collegial nature of a profession; professional judgement must inform difficult decisions on issues that are not black and white, and collegial debate ensures that judgement is applied robustly. However, the CPEng code specifically excludes cases where there is significant and immediate danger. Then, the need to inform the engineer takes a lower priority than the protection of people; but the engineer raising the issue must get their facts right to avoid unnecessary alarm.

If a Member has assessed that a building presents a significant and immediate risk to people (as distinct from property) they probably should warn users as well as the owner. Risk concerning performance in an event with a 10-year return time should probably be regarded as immediate; with a return time of (say) 100 years, probably not – a personal judgement must be made as to immediacy.

If the engineer concluded that there was an immediate risk and they should inform users, it would be advisable to notify the owner of this intention, giving them reasonable time to act to reduce the danger. If nothing was done quickly enough in the engineer's view, then disclosure would be ethically proper.

Engineers must also judge what steps to safeguard life might be reasonable. This will depend on the engineer's assessment of the seriousness as well as the immediacy of the risk. Obligations might also vary depending whether the engineer was, for example, in New Zealand or overseas, and on or off duty. It would be unreasonable to expect an

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engineer briefly visiting a non-English-speaking country to be able to find a building's owner, or to expect an engineer to undertake substantial work for the benefit of the building-owner without fee. Conversely, where older buildings are not required to be upgraded to 100% of the present code, raising of concerns should not be used to tout for business.

A useful test might be to consider what you should have done if you had visited Cave Creek as a tourist, and something about the platform had made you uneasy. IPENZ takes the approach that whereas on duty an engineer should seek out and eliminate

dangers, there is no obligation off duty unless they should stumble upon a recognisable risk. So an engineer visiting Cave Creek would not be obliged to look underneath the structure; but if they did so out of curiosity and their expertise in the structural area allowed them to judge what they saw, they would have an obligation to act.

Warnings should be phrased with appropriate caution: for example, "My experience in engineering suggests this structure may not be safe, and I recommend that you take urgent action to have it reviewed," would usually be more appropriate than "This structure is unsafe", although occasionally such unequivocal advice could be given confidently. ☺

The Hume Fellowship

Applications are invited for the Hume Fellowship. The Fellowship was established in 1988 by Mrs Henrietta Hume, whose late husband Harry Hume had a distinguished career until his retirement in 1966 as Chief Civil Engineer, Ministry of Works, Wellington.

The purpose of the Fellowship is to provide financial assistance to young civil engineers to further their professional skills by a period of specialist study, normally at an overseas institution. New Zealand and the engineering profession are expected to benefit from the knowledge and skills acquired by the Fellows.

The Award

The award will be a sum of up to NZ\$30,000. The applicant must undertake to return to New Zealand for a period of not less than two years after the award, and to produce for the Trustees a report on the achievements of the study.

Eligibility

The Fellow will be a citizen of New Zealand, preferably between the ages of 25 and 35, with a university degree in civil engineering. Selection will be based on the potential of the applicant and the proposed programme to advance the technical skills of the engineering profession within New Zealand.

Applications

The proposed subject, period and location of study shall be detailed by the applicant. The applicant must have demonstrated ability and application in the chosen area of study. An indication of how the study will advance the profession within New Zealand shall be included in the application. The applicant must supply the names and addresses of three referees. The applicant must also supply a curriculum vitae giving age, nationality, educational qualifications, publications, awards and employment history.

Applications must be forwarded to:

The Harry Hume Fellowship
C/- The Dean of Engineering
University of Canterbury
Private Bag 4800
CHRISTCHURCH

Applications close on Wednesday 1 October 2003. Interviews of selected applicants will be conducted to determine the Fellowship winner. ☺

Ingenieur of New Zealand

In the three months since Professional Members and Fellows of IPENZ became eligible to apply to use the pre-nominal "Ir", only 25 Members have availed themselves of the option.

The term "Ingenieur" is simply the French equivalent of "engineer", and designates a person as a Professional Engineer. It thus signifies a certain level of qualifications, experience and ethical behaviour. Internationally, the pre-nominal "Ir" is recognised and highly regarded.

The IPENZ Board has made provision for the pre-nominal "Ir" (Ingenieur) to be reserved for use by IPENZ Professional Members and Fellows by trademarking it. President Gerry Coates supported this initiative and explained the rationale for making "Ir" available, which is summarised here.

Research has shown that New Zealand Professional Engineers seek recognition as a clearly identifiable group, distinct from the engineering trades. IPENZ was created by renaming the NZ Institution of Engineers in a way that emphasised that we were "Professional Engineers". Now "professional" is increasingly used simply to designate people who are paid for their services, such as professional sports players, as distinct from amateurs.

In many people's minds there is still confusion about the various more and less strict ways the words "engineer" and "professional" are used. Accordingly it was suggested that we should adopt an internationally recognised designation. In Europe such a distinct identity has been created by the use of the pre-nominal Ingenieur to designate a person holding a degree in engineering.

The Board has made the new designation available but not obligatory; it wants Members to decide individually whether they want to use it. Applicants to use the pre-nominal therefore need to inform IPENZ of their intention to use the title, and receive verification that they meet the entry requirements. These are, being a current Professional Member or Fellow of IPENZ, and obeying its Code of Ethics.

In written communication the title is used by inserting the pre-nominal "Ir" in front of the recipient's name. In verbal communication users may describe themselves as an "Ingenieur", pronounced "urn-gen-year."

Those questioned on their views about "Ir" have said that it will take a long time, maybe a generation, for engineers and the public to accept and understand the usage. The Board will review the relevance of the pre-nominal in April 2004. In the meantime Members are encouraged to give it their consideration. If there is a strong demand by the membership the designation can be promoted actively and retained. If not, it may be discontinued. ☺

President's Message

The Changing World of Professional Practice

This will be my last article for *engineering dimension* as President, and I do not intend to use it to look backwards. Some kind of retrospective is expected from the President at the Annual Convention, and it would be idle to preview its content.



Rather, I would like to consider a question that has been central to my year: the defining characteristics of professional practice in a world of globalisation, privatisation, deregulation, increasing complexity, demanding clients, and intense competition. There are no simple answers, but it seems worth remembering that professional practice, as reflected in our code of ethics and constitution, is largely an artefact of the industrial revolution. The model has served us well for nearly two centuries, but is arguably showing signs of strain.

Professional engineers seek, through expertise and judgement, to minimise risks and maximise rewards. Many definitions of professional engineering have been proposed over the years, but few match the candour and wry humour of one propounded by Dr A R Dykes, then President of the Institution of Structural Engineers, in 1976:

Engineering is the art of modelling materials we do not wholly understand, into shapes we cannot precisely analyse, so as to withstand forces we cannot properly assess, in such a way that the public has no reason to suspect the extent of our ignorance.

This should give us all pause. Rarely can we understand all the possible consequences of a proposed action. Even more rarely are we wholly in control of system design, development, implementation, maintenance and repair. Usually, we are just part of a large team, sometimes (as in segments of our construction industry) with minimal interaction between members. We need to think hard about the extent to which other members of such loosely-knit teams will understand the thinking behind our contributions.

Most engineering failures stem from a chain of events, where those who might have been expected to recognise emerging risks are absent, have focused their attention too narrowly, or have simply become distracted. I remember sitting in a courtroom listening to a chilling account of how a major building failure had unfolded. It cost seven lives, and could easily have cost many more.

Continued overleaf >>>

Notification of Revised Regulations for Investigation and Determination of Complaints against Members

At its meeting held 11 February 2003 the governing Board of IPENZ resolved that new IPENZ Regulations be made for investigating and determining complaints against members. These regulations come into force on 1 April 2003, and will be used for processing complaints received from that date. The full set of Regulations is available in the public area of the website (www.ipenz.org.nz/ipenz/finding/complaints). Members are hereby notified of the revised procedures, which are summarised below. Where possible, they are matched to the equivalent CPENG procedures.

- Complaints against Members can relate to either an alleged breach of the IPENZ Code of Ethics or alleged incompetence in relation to the Membership class the Member holds.
- As well as acting on complaints made by Members or the general public, the Institution can initiate inquiries into the behaviour of a Member of its own volition
- Complaints are initially investigated by a Complaints Research Officer who reports to the Chair of Investigating Committees on whether the complaint relates to a competence or ethical matter; the Chairperson then decides whether to proceed.
- If a complaint proceeds, an Investigating Committee consisting of senior Members of the Institution is formed and they investigate the matter.
- The Investigating Committee will decide whether the matter should be dismissed or a Disciplinary Committee should be formed.
- If a Disciplinary Committee is formed it will include two lay members in addition to Members of the Institution. It will decide what, if any, disciplinary action will be taken.
- Possible disciplinary actions include expelling, suspending, censuring and fining the Member concerned.
- The Member concerned may appeal, and in this case an Appeals Committee is formed to hear the matter, with the authority to reverse the decision of the Disciplinary Committee.
- The governing Board may resolve to publish the name of any member and a summary of the proceedings.

The key differences from previous procedures are that the role of the Complaints Research Officer, which was previously informal, is now formalised, and that there is a separation of ethical (moral) matters from matters of competence. Members should be aware that the Board intends that matters of competence will be dealt with in a way that acknowledges that competent engineers can and do make occasional mistakes (this said without in any way prejudicing or influencing decisions on cases that may arise). ☺

<<< Presidents Message continued

Briefly, the structural engineer had prepared a competent and unremarkable design, with a steel frame designed to carry vertical loads. Reinforced concrete floors, cast in situ, were to act as diaphragms, transferring the lateral loads to slip-formed service cores at the ends of the building. To reduce the need for temporary bracing during construction, the engineer had specified certain joints as moment-resistant, and recommended an appropriate construction sequence.

The steelwork drawings were passed to a fabrication company, whose chief design draughtsman, following common practice, carried out the detailed design of the joints, but failed to note that some should be moment-resistant. A different engineer supervised the construction, and did not pick up the discrepancy.

The steelwork was erected easily, but technical problems delayed completion of the service cores. The contractor's proposal that precast floor units with reinforced structural topping be substituted for the cast in situ floor slabs of the original design was accepted. The floor manufacturer, under financial and other pressures, requested that units be accepted on to site as soon as possible. Fearing that the manufacturer might go under, and be unable to complete the work, the contractor agreed. There was nowhere on site to store the units, so the contractor lifted them into place on the steel frames as they were delivered. Miraculously, this process passed without incident, and pouring of the structural topping began. Then the wind blew...

Minor computation errors rarely cause disasters, unless they are systematically repeated. By contrast, failure to recognise the real parameters within which a system may operate, or the vulnerabilities of a proposed solution, can be dangerous. Henry Petroski, in *To Engineer Is Human*, spelt out the implications:

Engineers ... are not superhuman. They make mistakes in their assumptions, in their calculations, in their conclusions. That they make mistakes is forgivable; that they catch them is imperative. Thus it is the essence of modern engineering

not only to be able to check one's own work but also to have one's work checked and to be able to check the work of others.

In tendering and pricing we reflect in our estimates the competitive edge that experience gives us. That is fine when the work lies well within our experience, and we can be sure that our drawings and specifications can be understood by those implementing them, and by those supervising their work. It is widely believed that the worst-case result is a pedestrian, possibly sub-optimal, but *safe* design. But this is not always the case.

In the past, most professions set or recommended fee scales, to ensure reasonably efficient practitioners sufficient income to exercise their responsibilities properly and safely. The system was criticised as anti-competitive, and as dragging expert practitioners down to the level of the least competent. Fee scales have vanished, and consumers of engineering services have benefited, at least in the short term. However, financial margins have eroded seriously in some areas, and the risk of error increases when practitioners cannot afford time to review designs properly, or to supervise their implementation thoroughly.

I can offer no simple solutions. Efforts have been made to persuade consumers to purchase engineering services on the basis of experience, quality and capability, rather than price, and some do so. They are less likely to when they will not own and operate the resulting structures or systems. Engineering judgement is required in considering not only the technical aspects of a project, but also the framework in which engineering services are to be delivered.

I cannot resist concluding with two quotations from Douglas Adams.

The major difference between a thing that might go wrong and a thing that cannot possibly go wrong is that when a thing that cannot possibly go wrong goes wrong, it usually turns out to be impossible to get at and repair.

Choosing the right quality marks – 2003 and beyond

With the opening of Chartered Professional Engineers (CPEng) Register organisations are considering the implications of the IPENZ quality marks on their staff development policies and quality assurance systems; they are deciding what engineering credentials are important for their professional engineers and considering how the IPENZ quality marks link in with the branding of their own organisation. Financial and other compliance costs are being balanced against the potential benefits of embracing the IPENZ quality marks.

IPENZ is encouraging members, and their employers, to embrace an integrated quality mark (MIPENZ, CPEng), in the belief that the member services, ethical behaviour, collective voice and shared wisdom of the engineering profession underpin engineering standards. We believe, therefore, that registration of competent people (CPEng) must be linked to the wider activities of the engineering profession via IPENZ, the only New Zealand-based professional body for engineers.

Organisations and individuals must decide which combinations of IPENZ quality marks they should embrace. Organisations may restrict certain positions within their organisations to professional engineers who are CPEng. They may contribute financially to IPENZ membership as part of their professional development or staff retention strategies. They may encourage team leaders to gain entry to the International Professional Engineers Register (IPER) if the organisation is tendering for work overseas. Such measures will contribute to their human resource capability.

IPENZ quality marks may impact on organisations in the ways outlined opposite.

Structural Engineering Practice Review

In the last issue of *engineering dimension* (February 2003) members were made aware of the Practice Review in Structural Engineering. The task force would like to hear your views on the following questions about structural engineering practice:

A Professional practice issues

1. Is there evidence of a widespread low standard of technical competence, for example
 - commonly used practices that are at odds with well known documented "best practice"?
 - a lack of appreciation of the special requirements of seismic engineering?
 - deficiencies in reinforced concrete, precast concrete and steel design?
 - poor computer modelling of structures?
 - inconsistency in design approach for all but the simplest of structural elements?
2. Is there a lack of motivation and commitment to continuing professional development (CPD) beyond the initial graduate training period?
3. Is there evidence of poor documentation, leading to inadequate designs and difficulties in peer review prior to issue of consents?
4. Are members aware of any unreported incompetent or unprofessional behaviour by engineers?
5. Has competition in fees led to unsatisfactory lowering of standards?

B. Territorial Authorities

6. Is there evidence of systemic failings by territorial authorities? (For example there is a view that some TAs accept inadequate design documentation and do not require appropriate checks with sufficient peer review as the final "gate keeper".)

C. Construction Industry

7. Is the construction industry delivering the quality required to achieve the intended design? for example:
 - are QA procedures delivering the required quality or is only lip service being paid?
 - has self-certification gone too far?

Please send submissions in writing (preferably by e-mail) to Murray Isdale, Engineering Practice Manager (misdale@ipenz.org.nz), to be received by Friday 21 March 2003. ☺

There is a serious message there as for engineers: our work will affect generations of users of the products we design, most of whom will be totally unaware of the assumptions we made about the ways in which they are likely to use them. And, after all:

A common mistake that people make when trying to design something completely foolproof is to underestimate the ingenuity of complete fools.

I cannot end on such a pessimistic note. Being President of IPENZ is not just an honour, it is also a wonderful opportunity to encounter very special people, and to recognise their contributions to their communities. Engineers create real wealth – not just financial returns on investment, but improved standards of living for whole societies. We do no favours if we set the value of our services too low, and thereby fail to achieve the best possible long-term outcome for all parties. We should remember that a dollar spent at the design stage will almost always return tens, hundreds or even thousands of dollars over the service life of a project, and may save lives as well.

The first tenet of our Code of Ethics has been placed in that position for a purpose.

Happy engineering.

John Webster
President

Professional Development

Encouraging staff to be *Professional Members of IPENZ (MIPENZ)* provides them with an avenue to engage with their profession and access to career development and engineering practice support, and allows them to contribute to the development and maintenance of engineering standards. All of this contributes directly and indirectly to the quality of organisational outputs.

Chartered Professional Engineers (CPEng) are required to undergo competence assessment at regular intervals (normally five years). This ensures that professional engineers continually reflect critically on their practice, which research has shown to be an effective technique for professional development. Regular current competence assessment will encourage engineers to participate in further learning experiences.

Quality Assurance

Establishing CPEng as the benchmark standard for professional engineers is a valid quality assurance strategy. In this way organisations can benchmark the quality standards of their professional engineers externally, using the IPENZ competence assessment processes. The IPENZ quality marks then constitute an independent verification of organisational capability. They are also about attitude: by encouraging their engineers to be active members of IPENZ, organisations recognise that professions set and regulate standards for acceptable and ethical practice.

Recruitment and Retention

IPENZ quality marks facilitate occupational classification. Requiring potential professional engineering recruits to be eligible for professional membership of IPENZ and CPEng registration in New Zealand reduces the time it takes to select competent professional engineers. IPENZ is the New Zealand agency that administers the IPER. This register is particularly relevant for organisations recruiting from an international pool.

If an organisation contributes towards professional membership and registration fees this is a good indicator to prospective employees of a supportive professional and learning culture – which can enhance its ability to attract quality staff. There is plenty of evidence that a strong learning culture within an organisation aids staff retention.

Graduate Development

The IPENZ competency development programmes help graduate engineers acquire the competencies expected of engineering practitioners. The IPENZ quality marks, MIPENZ and CPEng, are a motivational tool, providing a goal for graduate engineers, and a focus for their development. The required mentoring of graduates helps develop a strong learning culture, where graduates and mentors both benefit from critical reflection on their practices, and a supportive work environment. When the graduate engineers pass an IPENZ competence assessment, this provides organisations with an independent verification of the quality of their graduate development programme.

Credentialling

The IPENZ quality marks are relevant, valid and transparent credentials for professional engineers, recognised in New Zealand and overseas. The Chartered Professional Engineers (CPEng) register helps users of engineering services identify those currently competent to undertake professional engineering services in New Zealand; and the IPER recognises engineers who meet an internationally recognised standard of competence. Credentialling of professional engineers will be increasingly important as regulators and other users of engineering services restrict certain engineering activities to those with the appropriate credentials to minimise risk. ☺

Registered Engineers – the value of MIPENZ

Some engineers who have maintained their Reg Eng status but are not members of IPENZ may not qualify for CPEng recognition, as they may find it difficult to demonstrate the currency of their professional engineering knowledge and skills. They may, for example, be retired; or their current work role may be remote from the practice of engineering. Or they may not be able to provide sufficient evidence that they have maintained the currency of their professional engineering knowledge and skills. They will probably, however, qualify for recognition as an IPENZ Professional Member.

Professional membership of IPENZ (MIPENZ) will signify that you have, at one time, been recognised by your peers as having acquired the competencies of a professional engineer. Many engineers have a strong sense of pride in their engineering heritage and wish to continue to highlight their engineering backgrounds by using a post-nominal. On retirement MIPENZ is retainable.

As well as designating peer acceptance, MIPENZ also signals engagement with your profession. Members enjoy access to a range of career development and engineering practice services to support them in developing and maintaining their competence as engineering practitioners. IPENZ promotes and represents engineers to the wider community and works to ensure the standards of the engineering profession are maintained in the long term and recognised in the international arena. IPENZ members are bound by a common Code of Ethics.

MIPENZ is a life-time brand and members, although subject to the requirement in the IPENZ Code of Ethics that a member work within the bounds of their competence, are not subject to any ongoing review of their competence to maintain their professional member status. Nevertheless IPENZ members are subject to disciplinary procedures and generic professional development requirements if practising as professional engineers.

Refer to the IPENZ website <http://www.ipenz.org.nz/ipenz/join/> for further information or email admin@ipenz.org.nz

How do CPEng fees compare?

The fees for CPEng are set out and explained elsewhere in this issue of *engineering dimension*. An obvious question is how these compare with the fees paid by other professionals, such as doctors, engineers, accountants, lawyers, and architects.

The table compares the relevant fees as closely as we can ascertain them, because it cannot always be established whether the bases are similar. All figures are slightly rounded and include GST. Our CPEng Act has the regular demonstration of current competence built in as a requirement, and this adds an extra cost relative to most other professions. The CPEng annual fee includes about \$20 for the CPEng Council and \$110 (including GST) towards five-yearly practice reviews.

The accountants' fees look much lower than others, but we understand that their requirement to undertake 30 hours of approved CPD per year results in their short-course operation running profitably, thereby allowing subscriptions and application fees to be kept low.

The overall message is, not surprisingly, that the costs of being an engineering professional are not vastly different from those of other comparable professions. Registration in NZ was offered so cheaply in the past only because IPENZ members paid through their IPENZ subscription for many of the things (such as degree accreditation and international agreements) that the registration system relied on but did not contribute to. Furthermore the old registration system included no checks on retention of competence.

	Application & assessment fee (inclusive of GST)	Annual fee (inclusive of GST)
Registration only		
*Doctors – overseas candidates	\$2710	\$485
*Dentists – overseas candidates	\$4283	\$475
Architects	\$960	\$150
Valuers	\$415	\$277
(*NZ candidates' registration costs are built into their degree tuition fees)		
Combined Registration and Professional Body		
Accountants	\$180	\$560
Lawyers	\$1110	\$523-876*
(*excludes district society fees)		
Professional engineering		
CPEng only	\$780-1430	\$280
CPEng + Professional body	\$560-1275	\$640
replacing		
Reg Eng only	\$845	\$30
Reg Eng + Professional body	\$845	\$475



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IPENZ News

1. Nominations for Board Elections close in a few hours

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The closing date for nominations for three members of the IPENZ Board and the roles of President, Deputy President and Vice-President is 5pm on Friday 13 December – today! Please act urgently if this has slipped your mind! Nomination forms are available at http://www.ipenz.org.nz/ipenz/forms/pdfs/Board_Nomination_Form.pdf

Dr Andrew Cleland - Chief Executive

acleland@ipenz.org.nz

2. Review of complaints procedure

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Following the approval of the CPEng Rules, which include rules for investigating alleged complaints for breaches of the code of ethical conduct or performing engineering services in a negligent or incompetent manner, the IPENZ Board has initiated a review of the complaints, investigative and disciplinary procedures for IPENZ itself. The philosophy being applied is to make the procedures for complaints within IPENZ (in relation to members) as equivalent as possible to those for complaints about Chartered Professional Engineers. The main differences are:

- * Ethical conduct of members is judged against the IPENZ code of ethics rather than the CPEng code of minimum ethical conduct
- * Competence of members is judged in relation to what can reasonably be expected of a person holding their membership class rather than the expectations of a chartered professional engineer
- * The IPENZ procedures have appeal procedures as well as investigating and disciplinary procedures (in CPEng appeals are handled via the CPEng Council)
- * The penalties that can be imposed on members are more restrictive than can be applied to CPEng.

If any member wishes to act as a peer reviewer of the proposed procedures please contact me.

Dr Andrew Cleland - Chief Executive

acleland@ipenz.org.nz

3. IPENZ Foundation

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The IPENZ Foundation Trustees had their third meeting last week, when they.

- * discussed with the IPENZ President John Webster the relative roles of IPENZ and the Foundation
- * thanked those who have donated money through the IPENZ subscription round
- * instructed me to prepare a draft plan outlining proposed Foundation activities over the next couple of years

For those that have yet to pay their annual subscription, you are urged to consider donating to the Foundation which is a Charitable Trust for which donations are tax exempt.

For more information on the Foundation please refer to the material in your subscription invoice pack.

John Gardiner - Executive Director, IPENZ Foundation

jgardiner@ipenz.org.nz

4. Neighbourhood Engineers Programme Review – report available

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The Neighbourhood Engineers brand is used by IPENZ to cover activities designed to bring engineering into schools and provide careers advice. A review of the Neighbourhood Engineers programme was completed earlier this year. The objective of the review was to determine the efficiency and effectiveness of the current Neighbourhood Engineers programme. Existing documentation and material was reviewed, interviews conducted with key stakeholders and best practice in similar programmes in NZ and overseas was explored. Findings and a set of recommendations for the future direction of the Programme have been produced and a report is available on the IPENZ website, members area, under reports.

Angela Christie - Schools and Community Programmes Manager

achristie@ipenz.org.nz

<<< President's Message continued

Much more needs to be done. IPENZ simply does not have the resources to put trained and enthusiastic people into every school in New Zealand to help students to see engineering as a valuable activity, and a rewarding career. We need to focus our efforts on the institutions that educate and train new teachers, and the engineering schools themselves.

Some form of extended support to primary and secondary teachers is likely to prove more cost-effective than the brief contacts with school students that have been the focus of much of our effort to date. I would welcome feedback on these remarks.

We must provide greater encouragement and opportunity for people with diverse backgrounds to succeed in engineering. Entry criteria form part of the problem. There is a tendency to see secondary school studies in mathematics and the physical sciences as the only route to learning to acquire and weigh evidence, create predictive models, and reach informed judgments. Nobody disputes the importance of mathematics for engineering practice, but shortfalls can be addressed through bridging programmes and otherwise.

A more difficult aspect of the problem is the social framework of engineering education, and the tacit assumptions behind programme content and delivery modes. In my experience, an increasing emphasis on team-work and problem-based learning can make technical programmes more accessible and rewarding for diverse participants with no sacrifice of rigour.

Staff profiles should balance strengths in teaching and learning, research, professional practice and community service. Selection or promotion should reward excellence in all these areas, not just those that are traditional or lend themselves to measurement. The engineering schools and the profession should promote secondments, joint appointments, and mobility between schools and industry.

Programmes must equip graduates with a sound technical and professional background, and the capacity to communicate effectively, and understand the social and economic framework in which they practise. Engineering schools and professional bodies may well have put too much emphasis on management studies in undergraduate courses. Studying history, politics or communication might provide a more valuable counterpoint to technical courses.

The short half-life of technical knowledge in many disciplines emphasises the need for educational services that meet the needs for

lifelong education and professional mobility. Engineering schools, and IPENZ, will have to give more attention to recognising prior learning, including on-the-job training and experience. Engineering programmes appear increasingly to be based on co-operative models, and benefits can flow from closer relationships between industry and educational institutions.

No single engineering school should attempt to offer a complete range of advanced studies or carry out research in every specialised field of engineering. Rather than seeking economies of scale or consolidating the present system into a smaller number of larger schools, a networked, differentiated system should be developed. Government, industry and the profession should facilitate national and international learning and research networks, extending beyond the public tertiary education sector.

Finally, while we would all hope that new entrants to the profession will be driven by the excitement of using technical skills to address the challenges that face our country and communities, we need to make sure that misconceptions about the reward structure for new professionals do not create disincentives for new entrants. I would therefore like all members, whatever their role and status in their organisations, to spend a few minutes filling out the enclosed remuneration survey.

I know that some of you, particularly those holding very senior positions, feel that your remuneration might distort the figures for those who are involved in technical engineering roles. This need not be a concern. The job points system plots remuneration as a function of the authority, responsibility, and influence associated with each position.

We know that engineering can be financially rewarding as well as providing job satisfaction. The average income stream for people who hold engineering qualifications is comparable to that of other professionals, while their job satisfaction is often higher; potential students need to know these facts.

I, for one, will fill out the survey, although my work as the CEO of UNITEC is somewhat removed from technical engineering practice. There is no reason to hide from potential students the fact, celebrated in most countries, that an engineering degree is one of the best and most marketable general tertiary education qualifications available.

John Webster
President

Three registers, th

In the June 2002 issue of *engineering dimension* we outlined the proposal that IPENZ should introduce three competence-based registers aligned with the Professional (MIPENZ), Technical (TIPENZ) and Associate (AIPENZ) membership classes. Members have indicated their broad support for continued development of the proposed registers, but many have asked for clarification of the essential differences represented by the three. In this article, Basil Wakelin, Chair of the Professional Standards Board, explains work in progress towards developing three competence profiles.

First, members should be aware that the Professional Standards Board, which has the delegated authority to develop and approve competence standards, has yet to start considering the standards for the Technologist and Associate registers. However, National Office staff have done significant preparatory work on a first cut of competence profiles, which should answer members' immediate questions.

Members of IPENZ are united by professionalism; they all obey the same code of ethics and are expected to represent the engineering professions honourably and well. Accordingly the current thinking is that all three groups of registrants would be required to meet the same standards of professional behaviour, as illustrated in Table 1.

The differences between the three registers then reside in the technical aspects of their competence. All engineers solve problems and develop and design solutions but the complexity, depth and breadth of the problems and the techniques used to solve them will vary between the groups as indicated in Table 2. A key difference is thus the nature of the problem. For CPEng, the descriptor used was "complex" engineering problems. It is clear we need descriptors for engineering problems solved by technologists and associates, which will often be problems related to system components, or subsets of a complex engineering problem. For now the working descriptors adopted are "broadly-defined" (technologists) and "well-defined" (associates). A well-defined problem might be a component of a complex problem, or it might be a problem that can be solved routinely by standard codes. A broadly-defined problem might be a substantive part of a complex problem, or might belong to a family of problems that are frequently encountered.

The second major area of difference is the nature of the knowledge applied. Related to knowledge is the competence to assess and manage risk – generally speaking more knowledge is required to assess and manage higher levels of risk. Table 3 seeks to illustrate the differences but further work is needed to refine the profiles.

ree competency profiles

Lastly, there may be differing levels of accountability required – acceptance of responsibility is a key requirement for a competent engineer and there will be some difference in capacity in this area as well, related to the kinds of work each type of registrant will perform.

At time of writing the Professional Standards Board has approved what is effectively the left-most column of the various tables as the CPEng standard for consultation. Development of the competence profiles for the other registers is only beginning, because they are likely to be launched about a year behind CPEng. Comments from members that will help express clearly the nature of the appropriate competence for each register would be appreciated. They can be sent to the Registrar (jwastney@ipenz.org.nz).

Table 1: Standards of behaviour for all registrants

To meet the standard for registration the applicant must produce sufficient and valid evidence that within his/her area of engineering practice he/she is competent and exercises sound engineering judgement through being able to:

- conduct his or her engineering activities to an ethical standard at least equivalent to the code of ethical conduct (specified for CPEng) and
- appreciate the reasonably foreseeable social, cultural and environmental effects of his or her engineering activities and respond responsibly and
- communicate effectively and respectfully to other engineers and those affected by his or her engineering activities and
- maintain the currency of his or her professional engineering knowledge and skills.

Table 2: Possible differentiation between three groups of registrant in respect of the types of engineering problem analysed and solved

Professional Engineer	Engineering technologist	Engineering associate
Define, research and analyse complex engineering problems	Identify, further define and analyse broadly-defined engineering problems	Identify and analyse well-defined engineering problems
Design or develop solutions to complex engineering problems that are in accordance with good engineering practice	Design or develop solutions to broadly-defined engineering problems by applying widely-accepted procedures or methodologies	Design or develop solutions to well-defined engineering problems by using relevant standards and defined codes of practice
<p>Complex engineering problems means engineering problems having some or all of the following characteristics:</p> <ul style="list-style-type: none"> • Involve a variety of factors which may impose conflicting constraints • Have no obvious solution and require originality in analysis • Are unfamiliar situations • Are outside those encompassed by standards, codes of practice for professional engineering • Involve diverse groups of stakeholders with widely varying needs • Have significant consequences • Cannot be resolved without in-depth engineering knowledge 	<p>Broadly-defined engineering problems means engineering problems having some or all of the following characteristics:</p> <ul style="list-style-type: none"> • Are parts of, or systems within, complex engineering problems • Involve a variety of factors which may impose conflicting constraints • Can be solved by application of well-proven analysis techniques • Belong to families of familiar problems which are solved in well-accepted ways • May be partially outside those encompassed by standards or codes of practice • Involve several groups of stakeholders with differing and occasionally conflicting needs • Consequences are important locally, but may extend more widely • Can be resolved without in-depth engineering knowledge 	<p>Well-defined engineering problems means engineering problems having some or all of the following characteristics:</p> <ul style="list-style-type: none"> • Are discrete components of engineering systems • Involve several issues, but with few of these exerting conflicting constraints • Can be solved in standardised ways without requiring originality of analysis • Are frequently encountered and thus familiar to most engineers in the practice area • Are encompassed by standards and/or documented codes of practice • Involve a limited range of stakeholders with differing needs • Consequences are locally important and not far-reaching • Can be resolved using empirical approaches

Table 3: Illustration of differences between the three profiles for knowledge and handling of risk

Professional Engineer	Engineering technologist	Engineering associate
Comprehend and apply knowledge of the accepted principles underpinning international good practice and any good practice in professional engineering specific to the jurisdiction of the candidate's practice	Comprehend and apply knowledge embodied in widely applied engineering procedures and methodologies relevant to the jurisdiction of the candidate's practice	Comprehend and apply detailed knowledge of specific elements embodied in defined codes of practice or standard in the jurisdiction of the candidate's practice
Identify, assess and manage risk	Identify risks and implement defined and widely-accepted risk management strategies	Recognise limits of applicability, detect unlikely results and take corrective actions

Regulations for hearing complaints and disciplining members

IPENZ – Engineers New Zealand receive about 50 complaints about members per year. Of those, four or five may warrant the setting up of an Investigation Committee and of those only one is likely to progress to disciplinary action.

With the enactment of the Chartered Professional Engineers Bill it is timely that we review our Disciplinary Regulations. The process thus far has seen a review meeting held with IPENZ staff, the Chair of the Disciplinary Committee and the IPENZ Deputy President, from which a proposal was prepared for discussion at the 24th May meeting of the Board. The next step in the process is input from the membership. The current draft is in the "Discussion Documents" section of the member-only area of the IPENZ website.

This is an important issue for members of the profession; our own actions may be called into question, or we may be asked to be involved in the disciplinary process (for example as a member of an Investigating Committee). It is the mark of a profession that it has a code of ethics and is prepared to take disciplinary action if that code is breached. Taking such action helps us to retain the high regard of the general public.

Complaints may come from the public (IPENZ is listed on the Consumers Institute website [www.consumer.org.nz] as the body to whom complaints may be made about the practice of engineering), IPENZ members and staff.

IPENZ acts only on complaints expressed in writing. Ideally the complaint should make it clear which element of the code is alleged to have been breached, and provide supporting evidence. In IPENZ's experience many of the complaints are not ethical breaches *per se*, but are the result of poor client relationships (poorly-managed expectations, or poor communication). The public have high expectations of professions and many seek redress for any failure to meet these expectations, not only strictly ethical failures. Our processes need to meet these needs as well as ensuring that members are disciplined for proven failures to meet ethical standards.

A process with four separate stages is proposed. The IPENZ CEO manages the process to the Disciplinary Committee stage.

The first stage is research into the background to the complaint by a Complaints Research Officer, who will generally be either a staff member who is an engineer, or a member of the Institution. At this stage the member complained about will be consulted and information gathered to ascertain the seriousness of the complaint. The CRO may attempt mediation at this stage, but only if they are certain there is not an ethical breach but a failure to meet commercial expectations. The CRO may recommend proceeding, or that IPENZ has no jurisdiction.

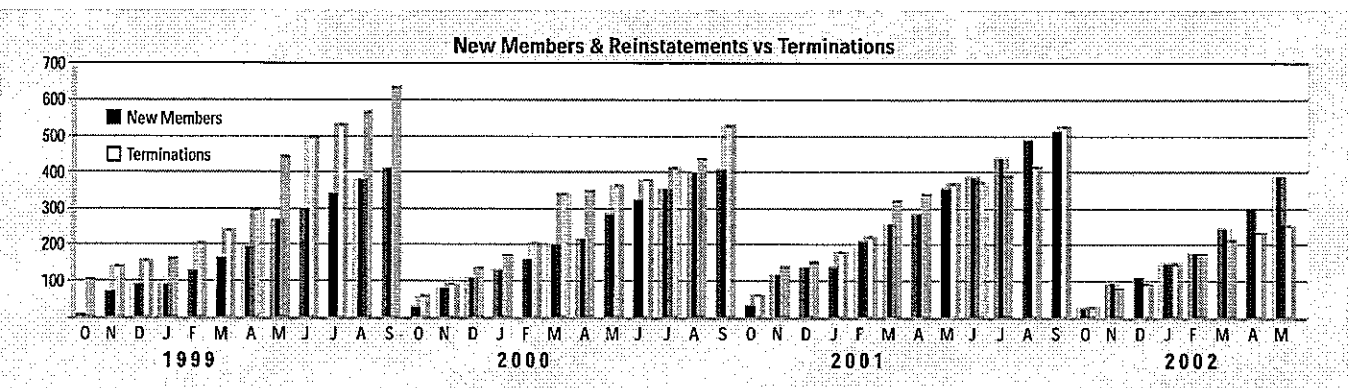
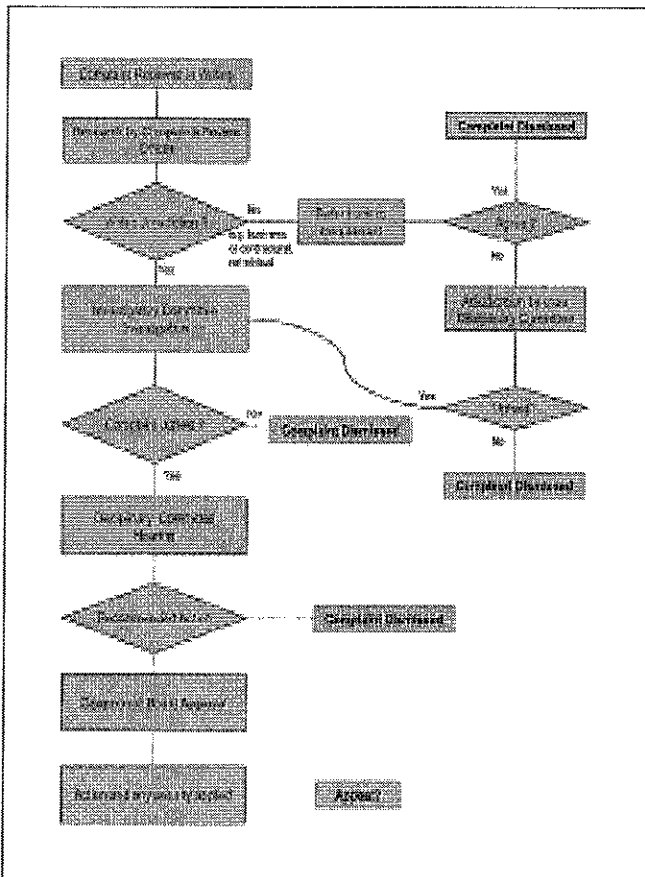
The second stage will be a formal Investigating Committee of three Members, normally Fellows, and usually from the same discipline as the engineer complained about. This committee must make one of three recommendations: that the complaint be referred to the Disciplinary Committee on the basis that there is a prima facie case; that the complaint be dismissed; or that the complaint lies outside its jurisdiction.

If the third stage is reached and a Disciplinary Committee is required the Governance Board appoints the chair (a standing appointment). The committee will be made up of two Fellows of the Institution plus two laypersons, one appointed by the Consumers Institute, and the other by the chair of the Disciplinary Committee. This will be a formal hearing with the right of representation by legal counsel. The report of the Investigating Committee will be available as evidence.

This committee may recommend to the Governance Board one of the following actions: dismissing the complaint; fining the member; expelling or suspending the member from the Institution; reprimanding the member.

The Governance Board must formally approve the recommendations of the Disciplinary Committee. If the Governance Board is unhappy with the outcome they may send the recommendations back to the Disciplinary Committee for further deliberation, but may not overturn their conclusions.

The Rules of the Institution allow a member to appeal a Disciplinary Committee decision. The Appeals Committee will consist of two members – either the President and a past president, or two past presidents – together with a barrister of the High Court of New Zealand. No change in this process is recommended.



Achievers Young and Old



Pauline Edwards

Left to Right: Lisa Phillips, Angharad Bolland, Aimee McNaughton, Dr William Pickering, Sam Leslie, Alex Nairn, David McKeivitt

Six secondary school students were rewarded for their technological insight at the Dr William Pickering lecture last month. They were the winners of an essay competition, which was open to students at secondary schools in the Wellington, Wairarapa and Marlborough regions. Following the IPENZ Convention theme "Harnessing Technological Innovation in New Zealand" students were asked to discuss the ways engineering and scientific innovation is contributing to New Zealand's economic development and/or improving the well-being of its people. Students were encouraged to seek out local case studies to exemplify their points.

After his Newnham Lecture, Dr William Pickering personally presented writers of the six best entries with copies of Matthew Wright's *New Zealand's Engineering Heritage*. Lisa Phillips from Freyburg College was announced the overall winner, and her prize will be a visit to JPL in California. Sam Leslie from Marlborough Boys' College was the runner-up for the junior category, and Angharad Bolland from Wellington Girls' College the runner-up for the senior category. As their prize, they will each be touring the premises of some of New Zealand's innovative companies in Auckland and Christchurch.

The essay competition was a joint IPENZ and IEE project, supported by the Gifford Trust. ☺

Full Steam Ahead for ALSTOM

ALSTOM New Zealand Limited recently won a \$200 million contract to provide a full range of locomotive servicing, maintenance and overhaul facilities for Tranz Rail over a seven-year period.

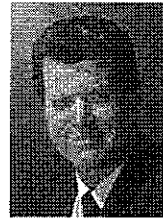
According to Geoff Hunt, Managing Director ALSTOM New Zealand Limited, the long-term viability and growth potential of New Zealand's railway maintenance servicing and engineering industry will be enhanced by this decision:

"ALSTOM is the world's largest rolling stock service business and it already has a big presence in New Zealand, servicing infrastructure in the electricity transmission, telecommunications and power generation industries; the addition of rolling stock servicing significantly broadens our base here," Mr Hunt said.

International interest in the contract was intense, he said, but ALSTOM's track record in New Zealand to date had provided a competitive advantage. ☺

President's Message

Aspiration vs Legislation



The new CPEng system has come a step or two closer with the unexpectedly early resolution of the debate on the Shop Trading Hours Bill, and informed observers believe that it may now be possible to have the Chartered Professional Engineers Act, for which there is strong

bipartisan support, in effect from the beginning of 2003.

This is splendid news, but it focuses attention on the steps that need to be taken to ensure that the rules for the operation of the register, which must be framed as regulations under the Act, are effective and widely acceptable. IPENZ is required to develop such rules, having regard to international best practice, and the CPEng Council must approve them provided it is satisfied that the proper procedures have been followed.

Much of the background work has already been done. The rules for entry to and continuation on the register will reflect the established procedures and criteria for IPENZ membership. These are already rigorous, and in line with the best practice principles that have emerged internationally through the work of the Washington Accord, the Engineers Mobility Forum and the APEC Engineer Co-ordinating Committee.

However, rather more debate will be required in respect of the code of conduct that must be defined and enforced in conjunction the CPEng register. At first sight, it might seem that we could simply specify that the IPENZ Code of Ethics be used for this purpose. However, there is an inherent tension between a code of ethics, setting out the ideals to which members of the engineering professions should aspire, and a legally enforceable code of conduct defining minimum acceptable standards for professional engineering practice. The tension remains even where individual practitioners decide not to seek CPEng status, since the courts may very well adopt a legally enforceable code as a guide to acceptable practice standards irrespective of the status of the practitioners concerned.

Within the environment of professional association membership, that tension is resolved by the exercise of engineering judgment, backed up by relatively detailed guidelines that explore how the code of ethics would normally be applied in some instances of the circumstances that may arise in everyday engineering practice. However, the issue becomes less simple when a code of conduct is embedded in legislation, and each clause may be interpreted by reference to

Continued overleaf >>>

<<<President's Message continued

the exact legal meaning of the words and phrases it contains. Some members have already expressed concern that the aspirational nature of our code of ethics could be used by a complainant to cast doubt on work carried out in good faith and in accordance with established professional practice.

Senior IPENZ staff members are preparing a draft CPEng code of conduct as a basis for discussion. This draft has been based on existing tenets and guidelines, with the wording of the guidelines adjusted to avoid suggesting that they demand more than can reasonably be expected from a competent and conscientious practitioner subject to the normal pressures of the workplace. This approach has the merit of maintaining intact the central tenets of our present code of ethics in the form of principles to which reference can be made in cases where the guidelines are silent. The disadvantage is that the aspirations set out in such principles might conceivably be used against a practitioner who had, on perfectly rational grounds, come to a different view from their clients or the wider community as to the proper course of action in a particular situation.

To illustrate the dilemma, consider, for example, the comparison between what is probably the least

A) IPENZ – Engineers New Zealand

Members have a duty of care to protect life and to safeguard people.

Guidelines

To satisfy this clause you need to:

- 1.1 Give priority to the safety and well-being of the community and have regard to this principle in assessing duty to clients and colleagues.
- 1.2 Be responsible for ensuring that reasonable steps are taken to minimise the risk of loss of life, injury or suffering which may result from the work or the effects of your work.
- 1.3 Draw the attention of those affected to the level and significance of risk associated with the work.
- 1.4 Assess and minimise potential dangers involved in the construction, manufacture and use of your products or projects.

controversial element of our code of ethics (box A) with the approximately equivalent clause from a much more prescriptive code of conduct, designed to apply within a legislative framework, and prepared by the National Society of Professional Engineers in the United States (box B).

The core difference is that our code of ethics is expressed in positive terms, suggesting what one should do to give effect to the basic tenet. The legally enforceable code of conduct tends to define what actions, if taken, would represent a breach of each tenet.

There is little doubt which version most professional engineers in New Zealand would prefer to take as their guiding light; and the NSPE code is silent on issues that we have taken very seriously in framing our code of ethics. A significant omission is any statement on sustainability. This

B) National Society of Professional Engineers (US)

1. Engineers shall hold paramount the safety, health, and welfare of the public.

- a) If engineers' judgment is overruled under circumstances that endanger life or property, they shall notify their employer or client and such other authority as may be appropriate.
- b) Engineers shall approve only those engineering documents that are in conformity with applicable standards.
- c) Engineers shall not reveal facts, data or information without the prior consent of the client or employer except as authorized or required by law or this Code.
- d) Engineers shall not permit the use of their name or associate in business ventures with any person or firm that they believe are engaged in fraudulent or dishonest enterprise.
- e) Engineers having knowledge of any alleged violation of this Code shall report thereon to appropriate professional bodies and, when relevant, also to public authorities, and shall cooperate with the proper authorities in furnishing such information or assistance as may be required.

tenet is readily expressed in positive terms, but is probably the hardest to define in terms of proscribed actions without unnecessarily limiting its scope:

Members shall be committed to the need for sustainable management of the planet's resources and seek to minimise adverse environmental impacts of their engineering works or applications of technology for both present and future generations.

At the same time, the NSPE code includes extensive provisions on finer points of professional etiquette that we might well see as archaic, or as being governed by other legislation, such as the Commerce Act.

It is important to remember that disciplinary action taken under the Chartered Professional Engineers Act might have more effect on the practitioners involved than complaints lodged under the current system, consideration of which would normally be suspended until any legal action had been concluded. In some cases, at least, action under the Chartered Professional Engineers Act would have equal standing to civil action for damages, and might proceed concurrently, the outcomes potentially being cited as evidence in subsequent court proceedings.

The NSPE code spells out what practitioners must not do, rather than what they should do. Experienced practitioners might argue that it is likely to be much easier for them to prove that they did not commit proscribed acts than to demonstrate that they had taken all the positive actions suggested in our guidelines and/or implied by the relevant tenet. To restate our guidelines in negative terms would, however, be a major undertaking, and would clearly result in a code of conduct very different in flavour from our code of ethics. The key question, therefore, is whether members are satisfied that our existing code of ethics can provide a satisfactory basis for a legally enforceable code of conduct.

A firm decision has yet to be taken, and my purpose is therefore to invite you to comment on the way ahead. Certainly the matter will be very much in the minds of the members of the IPENZ Governing Board over the next few weeks, and we will want to be reasonably sure that we understand the collective view of the profession before committing members and others to a legally enforceable code of conduct. Your input really can make a difference.

John Webster
President

HAVE YOU
registered

By registering on the IPENZ website, you can gain access to our 'members only' area, which provides specialised resources and an easy way to keep your membership up to date! www.ipenz.org.nz/ipenz/newuser.cfm

Developing a values-based code of engineering ethics

Gerry Coates¹ BE(Hons), ME, FIPENZ

When IPENZ decided to revise its code of ethics in 1992, a proposal that it be a values-based rather than rule-based code was put forward by the author. As a new member of the Ethics Committee, appointed because of his public views, his proposal was eventually accepted but only after much debate. This paper discusses the processes and background that was involved in arriving at such a different format, and some of the conflicting views. It also looks particularly at one of the community-focused values: Sustainable management and care of the environment. It discusses the effect of the guidelines associated with these values, and whether they remain adequate, or will need changing as society's attitudes change. Finally the paper looks at whether engineering codes of ethics, even in such a different format, serve a purpose, and if so whether that is now changing.

Keywords: code of ethics — IPENZ — sustainable management

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This paper, which was presented at the 1999 Australasian Environmental Engineering Conference, Auckland, New Zealand, was received on 12 January 2000 and accepted after peer review.

1. Introduction

Codes of Ethics, or Articles of Professional Conduct have evolved since the Hippocratic Oath for Physicians around the 5th century BC. Over the last 60 years or so, the major professions have regulated their own affairs with varying degrees of outside interference or public scrutiny. This internal focus meant that ethics was often a matter of etiquette as well as a code of professional conduct. Unkind people could even allege it was organised more to shield the professions from outsiders' view rather than as a way to advocate professional responsibility to clients or society.

However, beginning in the 60s and 70s, there was a move to codify professional behaviour and expand its scope, and to eliminate paternalistic views of the public. Coupled with this has been a trend in the 80s and 90s for far greater transparency of actions. This process of social transformation has probably been more pronounced in the engineering profession than any other.

In 1995 the Institution of Professional Engineers New Zealand (IPENZ) introduced a new Code of Ethics, replacing the one previously published in 1964. This Code broke new ground by being based on five key values, related to the perceived public duties of the engineering profession. It was seen as controversial at the time, stimulating both positive and negative reactions. Now there appears to be a general acceptance of its intentions, and apart from an initial modification in 1996 it has remained in place. In February 1999 IPENZ's chief executive told its annual general meeting that there were no plans to modify it in the near future.

2. Background

The IPENZ articles of professional conduct published in 1964 comprised 9 articles, largely based on the exhortation "a member shall not..." In 1986 the author - then founding secretary of the newly formed activist group

Engineers for Social Responsibility (ESR) - was asked to present a paper on ethics to the local IPENZ Branch. This talk was entitled "Engineers as moral heroes: Are our ethics good enough?" Initially it was intended merely to summarise and interpret the existing code, which seemed to be a random hotchpotch of clauses. A searching look however concluded that modifications were long overdue. The paper suggested these should include a rearrangement of clauses into logical headings, the removal of gender specific language, and the addition of a new clause - "In all their work (professional engineers) shall recognise their responsibility to the public interest as paramount."

The paper noted that IPENZ's then present code gave the appearance of being self protective, and inward rather than outward looking even as the expectations of society were beginning to demand a different approach. IPENZ was preoccupied with "the standing and reputation of the Institution and the profession" with only "due regard" to the public interest. The paper suggested that IPENZ do three things:

- consider revising its Code of Ethics to emphasise the public interest as a criterion for professional responsibility
- provide a more logical grouping of code clauses.
- consider revising its regulations for the observance of professional standards to cover not only complaints procedures, but also support for members who observed the Code of Ethics, yet risk being penalised.

The talk was subsequently published (Coates 1986) and referred to the Ethics Committee of IPENZ for consideration. As a consequence, the author was eventually appointed - in 1991 - to the IPENZ Ethics Committee, the first new member for several years. The terms of reference for the committee included the responsibility to "keep the Code under review in the light of changing professional and society expectations". By early 1992 little movement or change had been achieved - particularly

around issues relating to obligations to society - despite the support of the then president of IPENZ.

In 1992 the author wrote to the other committee members saying that, "while in 1991 I would have been prepared to accept a compromise position by tinkering with the old code I think that now we would be backward looking to do that", and added, "I feel we need to go back to first principles and look at the whole code from a values standpoint - what values current in the 1990s do we think need to be addressed and promoted in a new code?"

This stand was supported by a former IPENZ President Murray Sweetman who was then chairing the Engineering and Environment Committee. He urged that any new code should fit members "for the needs of the next century and demonstrate engineers' commitment to sustainability and survival of the planet".

The committee was eventually reformed in late 1992 with the continuance of the former chair, and tasked with ensuring that the code would be totally reviewed. An expanded and broader committee was convened with a wider range of ages, gender, disciplines and employment types. IPENZ's new President, Rob Wilkinson, particularly requested the committee to review the code's adequacy in addressing "private duties, public interest and the common good".

3. Approaches to codes of ethics

The legal, medical and accounting professions Codes of ethics have changed over time largely due to changing events in society according to Backof and Martin (1991). The question for the new IPENZ Ethics Committee was whether there had been any corresponding "sea change" in society's expectations of technology. If so, was it sufficient to warrant such a major change of emphasis of the code of ethics as was being proposed.

A key factor in moulding the author's thinking at that time was an article by Robin et al (1989) that proposed a radically different view of ethical codes. It looked at existing corporate codes of ethics and placed them in a four quadrant matrix according to whether they gave low or high specific guidance, and whether they were rule-based or value-based. Most codes fell into the first three of the cells, and none into cell four - i.e. a values based code that gave high specific guidance. These authors, in pondering what a cell four code might look like, said such a code "would be a statement of the company's ethical and social responsible values". It went on to say, "These values could be derived from an evaluation of potential threats and opportunities using both deontological and utilitarian reasoning". However, they warned that "only if the code is used with strong enculturation efforts would it reach the high level of guidance that is part of cell four" requirements.

With the committee having decided to proceed with a values-based code the next question was to determine which values to use. In exploring these, other seminal documents were revisited. For example the Decalogue (or Ten Commandments) from the Hebrew bible, provides short, mainly negative precepts for human conduct, generally covering the sanctity of human life, false testimony, and community-mindedness.

In Plato's virtues, the cardinal virtues were prudence or practical wisdom, justice, temperance or self control, and fortitude or courage. He considered these to be the necessary qualities for good actions, and to be subordinate to the theological virtues of faith, hope and charity which are "God directed". Modern virtues that derive from these are moderation, order, resolution, industriousness, sincerity, and humility.

A general consensus among ethicists summarised in Gay (1985) has developed ten essential values that are central to relations between people.

Caring	Loyalty
Honesty	Fairness
Accountability	Integrity
Promise keeping	Respect for others
Pursuit of excellence	Responsible citizenship

Social values in a profession include knowing (systematic knowledge and the intellect), doing (technical skill and capacity), helping (putting knowledge and work to the service of others) - (Merton 1960).

The idea of having obligations to future generations is a relatively recently expressed value, heralded by a rising awareness of environmental fragility. This was first epitomised by the publication of *Silent Spring* by Rachel Carson (1962). The idea raises questions about how far such obligations should extend, and how optimistic it is to expect future generations to be able to solve problems that present generations have created. Can any so-called "technical fix" be relied on, even partly, to solve the apparently exponentially increasing problems now being created?

Another value thread that runs through all ethical frameworks is that of the sacredness of life. Although originally derived from the idea of a God as creator, the right to life is really the basis for all other human rights, natural and legal, and the foundation for civilised society. There is an implied duty to cherish, preserve and protect human life and to take every means for the relief of suffering. For engineers the notion of "innocent" people has especial relevance, since their work touches many who do not necessarily have the knowledge or awareness to avoid the risks imposed upon them by technology.

Out of these values comes the general value of respect for persons. One of Kant's moral principles was: "Act in such a way that you always treat humanity, whether in your own person or in the person of any other, never simply as a means, but always at the same time as an end". This is a more philosophical statement of the scriptural command to "love your neighbour as yourself". Human dignity and irreplaceability (or uniqueness) means that a human being should not be treated as an object of finite value, to be measured or traded.

It is obvious that societies expect their citizens to accept wide duties aimed at improving their people's wellbeing. Actions towards people fall into the categories of permissible, obligatory and forbidden. It is the former two that a Code needs to address. A code need not repeat general legal duties - but should clarify expectations about issues where there is a choice. The use of the word "inalienable" in various acts and constitutions implies that there are certain rights which are supreme and cannot be forfeited. Here a code can remain silent.

In the early 90s the ideas expressed in the Brundtland report by the World Commission on Environment and Development (1987) were gradually becoming more accepted. The notions of protecting the environment and of sustainability were becoming respectable. A still developing argument is how far to extend this respect for humans, to include non-human life forms such as animals and plants - or the total environment. This was however considered to be too radical to apply to this recent Code revision.

4. Choices for IPENZ code

The previous IPENZ code, had it been categorised, would have fallen into four sections, although not given any particular order of importance. By 1991 there were indications that obligations to society were important - but still not enough to take first place:

- Professional life
- Obligations to society
- Relations with clients and employers
- Relations with other members

For a new approach the author initially suggested four values as an overarching framework for a new code:

- The preservation of life
- The preservation of the planet's environment (sustainability)
- Improving the quality of life for humanity
- Enhancing professionalism

These formed the basis for initial discussions by the new committee. Early Committee discussion then added a fifth value relating to the profession's responsibility to safeguard and enhance the body of technical learning. It was called "scientific heritage" for want of a better term at that stage. There was still a reluctance to put them in any order of precedence as above, and the current code (Appendix 1) preserves that determination to avoid a hierarchy of values. The author does not agree with this approach, and sees it as abdicate responsibility on the relative importance or hierarchy of values.

The code was to be a multi-level code. Each value was to be explored and draft code clauses prepared to highlight the detailed areas for compliance - Canons and Tenets, or Principles and Guidelines as other codes have called them. However the aim was for the detailed clauses to provide objectives rather than prescriptions - analogous to the New Zealand Building Code which allows with standard means of compliance with its clauses, but still has room for justifiable innovations. The new Code was also to be given a new and prominent place in the rules of IPENZ, with a new section dealing specifically with Ethics.

5. Process

The process for arriving at a final Code was to allocate each value or principle to teams of two or more committee members who developed lists of explanatory guidelines. These draft lists were then open for comment by other members of the committee.

An early difficulty was to decide whether the code clauses were to be enforceable rules, or less specific exhortations, but interpreted as "case law" over time, if necessary by

ethics compliance (rather than disciplinary) hearings. The author's view is that it was important that the clauses be quite specific, rather than vague statements. Where society's values were still changing these would inevitably be redefined by peer review through ethical hearings. During the course of the committee's deliberations other ethics code drafts appeared, such as the November 1992 FIDIC Code of Ethics. These generally still seemed to be inward looking codes, and made the committee even more aware of its own innovative ideas.

The final five values chosen to create the code were:

- Protection of life and safeguarding people
- Sustainable management and care for the environment
- Community wellbeing
- Professionalism, integrity, and competence
- Sustaining engineering knowledge

An overall set of basic statements was developed around these five values, with these in turn expanded in guidelines beginning "Members should..."

The discussion over clauses brought back to the committee by those tasked with dealing with each value was wide ranging and vigorous. The chair, Neville Beach, in his letter of submittal to the IPENZ President said, "the final code... is a consensus view arrived at over a long period and many meetings... and probably does not represent any Committee member's view of the perfect Code but it is one they can all live with". It was however, immense progress over 12 months and even allowing for the compromises made, a very forward looking document was produced.

Comment was sought from IPENZ Members by publishing a final draft in NZ Engineering in 1993. Although only a few comments were received relative to the total membership, these ranged from the those calling it an excellent document, to those suggesting that IPENZ was "constructing some very high ground against which lawyers can see us silhouetted against the sky". Most comments were on matters of detail in the wording, or provided useful additions. Consulting engineers were particularly vociferous about perceived additional responsibilities, and issues of protecting the confidentiality of client's information. In general most applauded the idea of the five values chosen, but differed over the material covered in the supporting guidelines - its content and descriptiveness.

In late 1993 the draft Code was submitted to a Code of Ethics review group, that included eminent IPENZ members, as well as significant people from the wider community. These included Dr Helen Hughes, Parliamentary Commissioner for the Environment, Professor Lloyd Geering, an emeritus theologian, Lady Jocelyn Keith, Wellington School of Medicine, and David Russell, chief executive of the Consumers Institute. By 1994 the draft Code was still being tinkered with by the IPENZ Council and its chief executive, and had by then been subject to minor redrafting at least twice. A legal opinion had also been obtained that focussed on the enforceability of the proposed Code, making the point that it would be the rules or guidelines that would be enforceable, rather than the more general preambles of intent.

A new draft of The Institution of Engineers Australia Code of Ethics was also received, for parallel consideration. But by this time the Committee felt it had done its job and should disband, leaving future progress to the new IPENZ president and chief executive. The Code was eventually formally adopted in 1995. Yet in 1996 still another redraft was under way to cater for dissent, particularly relating to the concerns of consulting engineers. The final present Code is in Appendix 1.

6. Society-focused values – sustainable management

Of the three values dealing with obligations to society – Protection of Life and Safeguarding People, Sustainable Management and Care for the Environment, and Community Wellbeing – the question of sustainability deserves further comment.

The Code's final version aims to encourage engineers to do three things – to use resources sustainably, to minimise environmental impacts, and also to give due consideration to the social and economic benefits. The final guidelines however are in the author's view minimalist at best.

At issue in this area is really the power of engineers to influence decisionmaking on matters where sustainability is pitted against economic growth. According to Beder (1999) the tendency of economic thinking is to incorporate the environment into the system, rather than the system into the environment. In her view sustainable development really means a continuation of "business as usual". By making engineers take into account the social and economic costs and benefits of avoiding adverse environmental effects arising from their work, the Code has tried to deal with these issues. But the Code itself became watered down during the comment and redrafting phases.

The Code as originally conceived did have a clause linked to currently accepted definitions of sustainability – "to ensure the ability of future generations to exist at a similar or higher level of quality of life". In the final version this was diluted to "minimise any adverse environmental impact ... of technology for both present and future generations".

The problem lies in balancing sustainability with expediency, both of which are processes and philosophies rather than ends in themselves. There will always be trade-offs specific to each case. The difficulty that any code has is in trying to be specific about issues that require principles broad enough to allow lateral thinking, and alternative approaches.

The problem with introducing concepts such as sustainable management into codes is less about exactly what that entails, than about how much engineers are (or should be) involved in decisionmaking. Should they be merely objective providers of advice, or should they take a more directional or advocacy approach?

7. The future for codes

Why do certain groups have codes? The usual answer is that they are professionals, and wish to be self regulating associations or centres of excellence. With the growth of corporate codes of ethics, this exclusivity no longer exists. Codes are increasingly seen as part of the transpar-

ency and honesty that is expected of any organisation dealing with its stakeholders – both public and internal.

Ethical codes do not develop in a vacuum – they are sensitive to events within society, and to changing value systems, including statutory frameworks. For example the Commerce Act forced the removal of anti-competitive clauses from earlier codes.

It has been said before that those who really need a Code of Ethics, will not benefit from one. The vast majority of members of professional associations behave ethically automatically without any coercion. Present day Codes seem to be moving away from regulatory documents into the inspirational and motivational areas.

Whilst the need for discipline within a profession still exists, a growing question with modern codes that are responsive to societal obligations is "What happens to those who obey the code, but are penalised?" There is now a need for processes to support members who choose to uphold some of the more public benefit oriented clauses. This is being matched by so-called "whistleblower" legislation under consideration.

In time the professions may well find their own codes being used by public interest groups to challenge further those professionals who are perceived not to have gone far enough – for example in mitigating adverse environmental effects.

8. Conclusions

There are several points that arise in the exercise of radically changing a professional code.

- It takes time – in this case over 10 years from first mooted the case for change.
- Too great a change encourages reactionary responses, retrenchment and results in delays.
- One must distinguish between the principle of compromise, and the compromise of principle – a matter requiring wise judgement.

Despite these factors, the changes have now been in place for several years, and seem to be operating satisfactorily. Whether they actually achieve one of the principle objectives of improving the performance and image of professional engineers, only time will tell.

9. References

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Appendix 1. Institution of Professional Engineers New Zealand Code of Professional Ethics

This version of the IPENZ Code of Ethics - approved by the Board to take effect from 1 November 1996

The respect which society accords the engineering and technology professions is earned and maintained by its members demonstrating a strong and consistent commitment to ethical values. These commitments are additional to the obligations, which every member of society is required to observe, such as obeying the law, and reflect the additional responsibility expected of all professionals.

It therefore follows that the Institution must maintain an appropriate Code of Ethics, to publish it for the information of the public and to enforce it impartially. This Code must be responsive to the changing expectations of both society and the profession and the global standards to which the Institution subscribes.

The Code of Ethics is based on the five fundamental ethical values set out in the Rules of the Institution. The Code is a set of principles to guide members in achieving the high ideals of professional life. To assist in the interpretation of the Code, guidelines are set out below for each Code clause.

These guidelines, which do not form part of the Code, are not exhaustive - they are offered as a guide to the understanding and intentions of the Code. They should be read with the Code as a whole and given a free and liberal meaning. They range from exhortations to excellence to prescriptive directions as to what constitutes ethical professional behaviour. Members will find in the Code and the Guidelines assistance in deciding the proper response to most of the situations they will meet in their professional life. In the final analysis the judgement of the member's peers as to what the 'reasonable professional' would have done faced with the same situation and applying the same Code will prevail. This is another reason why members should discuss any ethical problem that troubles them with senior members of the Institution. The Chief Executive would be pleased to assist in arranging this.

1. PROTECTION OF LIFE AND SAFEGUARDING PEOPLE

Members have a duty of care to protect life and to safeguard people.

Guidelines

To satisfy this clause you need to:

- 1.1 Give priority to the safety and well-being of the community and have regard to this principle in assessing duty to clients and colleagues.
- 1.2 Be responsible for ensuring that reasonable steps are taken to minimise the risk of loss of life, injury or suffering which may result from the work or the effects of your work.
- 1.3 Draw the attention of those affected to the level and significance of risk associated with the work.
- 1.4 Assess and minimise potential dangers involved in the construction, manufacture and use of your products or projects.

2. PROFESSIONALISM AND INTEGRITY

Members shall undertake their duties with professionalism and integrity and shall work within their levels of competence.

Guidelines

To satisfy this clause you need to:

- 2.1 Exercise initiative, skill and judgement to the best of your ability for the benefit of your employer or client.
- 2.2 Give engineering decisions, recommendations or opinions that are honest, objective and factual. If these are ignored or rejected you should ensure that those affected are made aware of the possible consequences.

In particular, where vested with the power to make decisions binding on both parties under a contract between principal and contractor, act fairly and impartially as between the parties and (after any appropriate consultation with the parties) make such decisions independently of either party in accordance with your own professional judgement.

- 2.3 Accept personal responsibility for work done by you or under your supervision or direction and take reasonable steps to ensure that anyone working under your authority is both competent to carry out the assigned tasks and accepts a like personal responsibility.
- 2.4 Ensure you do not misrepresent your areas or levels of experience or competence.
- 2.5 Take care not to disclose confidential information relating to your work or knowledge of your employer or client without the agreement of those parties.
- 2.6 Disclose any financial or other interest that may, or may be seen to, impair your professional judgement.
- 2.7 Ensure that you do not promise to, give to, or accept from any third party anything of substantial value by way of inducement.
- 2.8 First inform another member before reviewing their work and refrain from criticising the work of other professionals without due cause.
- 2.9 Uphold the reputation of the Institution and its members, and support other members as they seek to comply with the Code of Ethics.
- 2.10 Follow a recognised professional practice (Model Conditions of Engagement are available) in communicating with your client on commercial matters.

3. SOCIETY AND COMMUNITY WELL-BEING

Members shall actively contribute to the well-being of society and, when involved in any engineering project or application of technology, shall, where appropriate, recognise the need to identify, inform and consult affected parties.

Guidelines

To satisfy this clause you need to:

- 3.1 Apply skill, judgement and initiative to contribute positively to the well-being of society.
- 3.2 Recognise in all your work your obligation to anticipate possible conflicts and endeavour to resolve them responsibly, and where necessary utilise the experience of the Institution and colleagues for guidance.
- 3.3 Treat people with dignity and have consideration for the values and cultural sensitivities of all groups within the community affected by your work.
- 3.4 Endeavour to be fully informed about relevant public policies, community needs, and perceptions, which affect your work.
- 3.5 As a citizen, use your knowledge and experience to contribute helpfully to public debate and to community affairs except where constrained by contractual or employment obligations.

4. SUSTAINABLE MANAGEMENT AND CARE OF THE ENVIRONMENT

Members shall be committed to the need for sustainable management of the planet's resources and seek to minimise adverse environmental impacts of their engineering works or applications of technology for both present and future generations.

Guidelines

To satisfy this clause you need to:

- 4.1 Be committed to the efficient use of resources.
- 4.2 Minimise the generation of waste and encourage environmentally sound reuse, recycling and disposal.
- 4.3 Recognise adverse impacts of your work on the environment and seek to avoid or mitigate them.
- 4.4 Recognise the long-term imperative of sustainable management throughout your work. (Sustainable Management is often defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs).

5. PROMOTION OF ENGINEERING KNOWLEDGE

Members shall continue the development of their own and the profession's knowledge, skill and expertise in the art and science of engineering and technology, and shall share and exchange advances for the benefit of society.

Guidelines

To satisfy this clause you need to:

- 5.1 Seek and encourage excellence in your own and others' practice of the art and science of engineering and technology.
- 5.2 Contribute to the collective wisdom of the profession and art of engineering and technology in which you practice.
- 5.3 Improve and update your understanding of the science and art of engineering and technology and encourage the exchange of knowledge with your professional colleagues.
- 5.4 Wherever possible share information about your experiences and in particular about successes and failures.