



ASSOCIATION OF CONSULTING
ENGINEERS AUSTRALIA

REVIEW OF THE NATIONAL INNOVATION SYSTEM

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Response to the call for submissions

ACEA SUBMISSION

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INTRODUCTION

DECLARATION OF INTEREST

The Association of Consulting Engineers Australia (ACEA) is an industry body representing the business interests of firms providing engineering, technology and management consultancy services.

There are over 260 firms, from large multidisciplinary corporations to small niche practices, across a range of engineering fields represented by ACEA with a total of some 41,000 employees.

ACEA presents a unified voice for the industry and supports the profession by upholding a professional code of ethics and enhancing the commercial environment in which firms operate through strong representation and influential lobbying activities. ACEA also supports members in all aspects of their business including risk management, contractual issues, professional indemnity insurance, occupational health and safety, procurement practices, workplace/industrial relations, client relations, marketing, education and business development.

ACEA welcomes the opportunity to comment on the Review of the National Innovation System. ACEA attended the Stakeholder meeting, chaired by Dr Cutler, in Sydney on Friday 14th March 2008. ACEA raised a number of points in brief that are set out in detail in this paper. ACEA has explored the regulatory, policy and cultural barriers to innovation and puts forward a number of solutions, which should be considered for implementation.

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EXECUTIVE SUMMARY

The engineering community provides substantial contribution to innovation. The Australian Bureau of Statistics reported that that engineering and technology research accounted for 55.2% of the total expenditure on R&D research in Australia in 2003/04 and 57.3% in 2005/06¹.

It could be said that innovation is business as usual for the consulting engineering industry.

The contribution of the consulting engineering industry and the service sector as a whole is largely unrecognised because the innovation within the service industries as a whole is rarely science based, i.e. it is 'hidden innovation'. Hidden innovation includes the diffusion of knowledge. Knowledge growth and sharing is hard to measure and so it is undervalued.

ACEA showcases engineering excellence each year at its annual awards ceremony. Each year the awards are a demonstration of the increasing diversity of innovative solutions delivered by Australian consulting engineering firms. There is no current mechanism to mobilise this talented industry instead it is left to businesses who must invest a sizable amount for little recognition and reward.

Since the Australian Bureau of Statistics (ABS) conducted its definitive study of the industry in 2001/02, consulting engineering in Australia has grown strongly. ACEA estimates that fees earned have increased from \$8.9billion in 2001/02 to \$16.5billion in 2005/06, an average growth rate of 17 per cent a year.

ABS data also shows that exports of engineering services have averaged more than \$620million a year over the past 6 years. Over six years to 2005/06, engineering services accounted for nearly two-thirds of all construction and related services exports, consulting engineering accounted for 1.7 per cent of Australia's total service exports.

ACEA and its members acknowledge that Australia faces some big challenges, which have been captured in the four national research priorities and their associated priority goals. Each of the four priorities will have to include the involvement of a broad range of engineering (and related professional) skills and experience before the goals can be realised. Some examples include,

- Sustainable water management practice;
- Reducing and capturing carbon emissions through clean technology and new power generation systems;
- Responding to climate change and variability;
- Frontier technology;
- Transforming defence technology.

The effectiveness of the national research priorities is influenced by the legislation and policies of governments as well as cultural issues. There are some clear areas where these influences have hampered the ability of the private sector to be innovative or at worst have stifled innovation. It is ACEA's contention that these barriers include:

- The current shortage of engineering skills (and related technologists);

¹ ABS 8104.0 2005-06 Research and experimental development, businesses

- A lack of emphasis on innovation, and processes to foster innovation, in the education system and support for the enabling skills, science and mathematics;
- Governments' attitude to accepting innovation risk, as demonstrated in many of the Government's procurement practices and contracts;
- Lack of harmonisation of regulation across Australia and;
- Lack of appropriate promotion and incentives for innovation.

Innovation must be encouraged, rewarded and acknowledged. These three ideals are a good foundation when considering policies to underpin the role and participation of the public sector and private sector in innovation. Governments must engage more effectively with business and reward innovation to create a system that includes both industry and government as co-contributors of new ideas and beneficiaries of a national Innovation system.

Acknowledging and celebrating innovation will provide an avenue for promoting new ideas and creativity. Executed correctly, celebrating and acknowledging innovation has the potential to create a cultural shift that will see innovation flourish in everyday life, business and education.

In brief, ACEA's recommendations for an innovative future are:

- Increase the number of engineering (and related) skills in Australia, this includes reform of the primary, secondary and tertiary education system. In the short term, to alleviate the significant skills shortage of engineering and related disciplines, reform the business visa program to fast track engineering (and related) skills into Australia.
- Reform the way in which governments procure the services of the private sector, with particular regard to risk management. ACEA acknowledges recent moves by some government departments to foster innovation through alliance projects, where there is risk sharing.
- Increase the R&D tax concession to a rate of 150% to promote Australia as an international hub for R&D and promote a higher level of investment in R&D by Australian firms. In addition review and reform the associated compliance requirements.
- Increased government funding through the CRC's for innovation projects linked to: water infrastructure; carbon reductions; climate change adaption; health (for the aging population); urban transport; exports into Asia and the Pacific.
- Introduce a Education and Training (E&T) tax concession at a rate of 125% to transform the knowledge and resources of business so that they are better placed to contribute to the innovation and the performance of the economy as a whole.
- Increase funding for initiatives that foster link between business, governments (at all levels) and research for agencies such as the CRC for Construction Innovation and government initiatives such as Commercial Ready and Commercialising Emerging Technologies.
- Harmonise and reduce regulation of business in Australia and engender collaboration between all levels of government and industry.

SKILLS AND INNOVATION

The professional skills shortage in Australia is impeding economic growth and the potential for increasing innovation. In order to harness creativity and build a culture of innovation, a cohort of creative and clever human capital is of primary importance.

ACEA believes that there hasn't been enough focus on professional skills shortages. There is no denying that there is a shortage of trade skills and ACEA's welcomes initiatives that promote vocational education and training. However the focus of the Howard government on trade skills appears to have been at the expense of growing Australia's much needed professional skills base.

Monash University Centre for Population and Urban Research have published a paper entitled, "Labor's education and training strategy: building on false assumptions?"²

The paper highlights that through the Rudd Government's Skilling Australia for the Future initiative, funds have been allocated for 450,000 new training places over four years.

Despite the title, "Skilling Australia" its function does not appear to include any form of initiatives to grow Australia's professional skills.

The paper also confirms that there has been a restructuring of the Australian economy towards services, which is favouring workers with post-school credentials, particularly those with university qualifications.

"Some 61.4 per cent of the 1.47 million growth in employment over the decade 1996 to 2006 occurred within the ranks of people who would normally possess post-school qualifications."

Employers instead are relying on skilled migration to compensate.

"There were 55,980 finalised nominations of principal applicants in 2006 to 2007. The great majority were for professional, including 6,210 computing, programming and software designers, 4,060 nurses, 3,610 general practitioners and doctors in training and over 3,000 engineers".

The paper concludes that the situation is serious with a far greater need for additional training at the university level.

The only policy announcement regarding tertiary education has been a Review of Higher Education, which is to report in October 2008.

ACEA believes Australia's services based economy will continue to be a significant driver of Australian growth and innovation.

Innovation and problem solving are the everyday business of consulting engineering firms. The *Water Cube*, built for the 2008 Beijing Olympics is a revolution in design thinking, the project incorporates innovation in every facet of its design, from the iconic structure based on organic cells, to its conservation of resources. This project emerged from within the consulting engineering industry.

Small firms are also driven to design creatively and in new ways by applying innovative engineering to achieve energy cost savings in difficult environments, like the design of the IKEA Logan QLD store's low energy air conditioning. ACEA also recognises small firm engineering excellence at its annual awards each year.

² People and Place, Vol 16, no 1, 2008

These project examples are occurring in a highly stressed environment. A skills shortage within the consulting engineering industry means that there are fewer engineers (and related technical professionals) to perform the various critical roles, which places stress on project teams, extends average work hours and delays project outcomes. This is not an environment conducive to innovation. This is why improving the skills shortage situation is critical for the origination and deployment of innovation.

Skills shortages in Australia can be improved in the short-term by reforming the skilled migration program and offering business incentives to invest in the ongoing training and skills upgrading for staff. In the long term an education system that supports and nurtures an equal balance of creative thinking and technical knowledge will help to position Australia as an innovative and globally competitive nation.

ACEA proposes the following solutions (set out in more detail below):

- Long term solution: improving the education system to ensure long term prosperity from innovation.
- Short term solution: increasing skilled migration to relieve the pressure of skills shortages, import new ideas and encourage innovation in the workplace.

In addition a greater level of cooperation and cohesion needs to be developed between federal government departments and state/territory departments and industry. The Department of Education, Employment and Workplace Relations (DEEWR) for example has a large stake in education outcomes, in working together with their state and territory colleagues it would be possible to adopt innovation as a key learning objective. The Department of Immigration and Citizenship (DIAC) control the migration of innovative human capital into Australia and need to work closely with their industry and workplace colleagues to accurately monitor the skills gaps that can be filled by overseas workers.

These relationships will bring new possibilities for the creation of truly innovative and modern policies. Collaboration is widely acknowledged as driving the most innovative outcomes.

1. EDUCATION: PRIMARY SCHOOL EDUCATION SYSTEM

Reforms to the way primary school students learn maths and science are needed in order to develop innovation skills, which in turn are fundamental to attracting young Australians into engineering careers and other innovation intensive occupations.

Experimental and experiential science teaching for primary school students is critical in giving students an interesting and inspiring introduction to science and maths. Teacher confidence and occupational health and safety (OH&S) concerns have been identified as barriers to this process.

Learning about science is a matter of experiencing its effects, doing rather than reading and listening. Encouraging science, engineering and technology (SET) skills at a young age in primary school provides the impetus for interest in furthering their studies in SET skills.

Experimental learning fosters engagement and interaction. ACEA believes the reduction in experimental learning is driven by a number of factors, including, for example, occupational health and safety concerns due to large class sizes. With class sizes affecting the potential for incidents to occur during experimental learning, ACEA believes that it is likely for primary school teachers to continue to move away from hands-on experimental teaching, removing the excitement of science from the learning experience.

The overall quality of teaching resources for primary school students has a substantial impact on the learning experience. Out of date mathematic text books and insufficient equipment to conduct science experiments has a resounding impact on the way primary school students assimilate and associate with these two subjects. If a student is not stimulated throughout primary school within mathematics and science classes, they are unlikely to have the desire to pursue these upon entering secondary school. Science is compulsory

for early secondary school students (up to year 10) but they are likely to go into these subjects with an already negative view (fostered in primary school) hindering participation and their opinion of mathematics and science.

The Status and Quality of Teaching and Learning of Science in Australian Schools (2000) report found that “there is a considerable gap between the ideal or intended curriculum and the actual or implemented curriculum”³ for school science teaching in Australian schools.

Improving the scientific literacy of students is the main purpose of school science education. Scientifically literate persons will be able to contribute in an innovative way to both the social and economic well-being of Australia.

The report went on to further conclude that in the compulsory years of secondary schooling, most students find science unrelated to their interests or concerns, and in many schools science does not develop the learning outcomes that contribute to scientific literacy.

The National Curriculum Board has the potential to take a leading role in ensuring that the education of primary school students is more experimental. Bringing all the best, identified education practices from around Australia and comparing them to international standards should be the core role of the National Curriculum Board.

ACEA will be presenting the Board with a series of recommendations and identified best practices as collaboratively agreed by state curriculum developers, DEEWR personnel, industry and educators.

The aim is to allow primary school students to experience a science education that will make a difference in their lives, and attract our best young minds into engineering as well as science & research.

RECOMMENDATIONS: PRIMARY SCHOOL EDUCATION SYSTEM

ACEA believes it is important to prepare young minds for innovation through experiential and experimental learning in the early years. This can be achieved through the following:

- A reduction in class sizes and a mandatory cap (not an average) measure of students per class.
- Parent involvement in science experiments from a supervisory perspective would allow teachers to feel less burdened by OH&S constraints.
- Ongoing professional development for teachers to increase confidence.
- Science, mathematics and English teaching should comprise 50% of daily classes and the other 50% be divided up of arts, sport, languages and other creative teaching units.

³ Goodrum, D, Hacking, M, Rennie. 2000. *The Status and Quality of Teaching and Learning of Science in Australian Schools*. Prepared for the Department of Education, Training and Youth Affairs.

2. SECONDARY SCHOOL INNOVATION

Attracting students into heavily innovative careers like engineering will increase Australia's potential for an innovative future.

ACEA recognise that there are many quality teachers who are passionate and knowledgeable within their designated fields or disciplines. The prevalent issue is that there are not enough of them and the fact that the average age of teachers worldwide is mid to late forties⁴ indicates that currently there are not enough teachers graduating from University and remaining in this field.

For most secondary school students science involves learning facts for an exam, remembering formulae, plugging the right number in to get the correct answer, and the need to perform some short experiments that hopefully produce the result required by the teacher. Many, if not most, students who spend four or six years going through this system become both somewhat naive and disenchanted about the role and process of science. The traditional teacher-led classroom with its emphasis on passive learning and experiments with predictable outcomes does little to foster and develop the innate curiosity and interest with which many of them commence their formal study of Science.⁵

In addition, according to statistics from the Science Teachers Association;

- Nearly 43% of senior school physics teachers do not have a physics major;
- 1 in 4 have not studied physics beyond the first year;
- 1 in 4 teachers of senior school chemistry do not have a chemistry major;
- There is a high percentage of year 7 & 8 teachers who have no university exposure to any of the major science disciplines;
- More than 1/3 of male science teachers are over 50 years old.

Recent Commonwealth policies which encourage students to study and teach maths and science are a welcome and contemporary solution to this problem. Offering students incentives through HECS to study science and maths and then teach will do much to solve the shortage of secondary school science and maths teachers. The Government also needs to recognise that once engaged in teaching there must be adequate salaries, support resources and development opportunities in order to retain them.

Resource constraints within science, technology and mathematics departments in secondary schools have the ability to drastically affect whether or not students choose these subjects in years eleven (11) and twelve (12). This may ultimately decide which avenues will be open to them when considering higher education or employment.

Resources must meet the contemporary needs of dynamic mathematics and science disciplines. Teaching without engaging materials and tools does not encourage a learning environment that is satisfactory by today's standards.

⁴ Kelchtermans, G. 2005. Professional commitment beyond contract: Teachers' self-understanding, vulnerability and reflection. Paper presented at the *Challenges for the Profession: Perspectives and Directions for Teachers, Teaching and Teacher Education* - 12th International Conference of the International Study Association on Teachers and Teaching, Sydney.

⁵ Hollow, R.P. *The Student as Scientist: Secondary Student Research Projects in Astronomy*. Publications of the Astronomical Society of Australia, (ASPA)17 (2), 162

With no maximum cap for class sizes, students are paying the price for this constraint on resources. Class sizes of twenty-five (25), not as an average but a maximum would ensure students receive the right level of attention in years 7-10. For years eleven (11) and twelve (12) a maximum cap of 20 students per class would greatly increase the potential for a comprehensive learning experience and an appropriate level of individual student-teacher time.

The current support from a careers advice perspective is well below what Australian secondary school students require. Advice is not being delivered from educators with a wide background knowledge on a range of occupational avenues. The largest constraint on careers advice being delivered comprehensively is the lack of careers advisors at secondary schools whereby a typical high school has one (1) careers advisor for one thousand plus (1000+) students. Typically careers advisors spend much of their time with high-risk students and organising work experience for year ten (10) students, and little time is left for counseling more academically capable students on potential career choices.

Furthermore, Careers Advisors cannot be expected to fully comprehend and appreciate every career path available. Few careers advisors have an understanding of engineering as a career. To this end ACEA has developed a DVD, "Engineering, Design Your World", which explains and sells engineering as a career choice for young Australians. The DVD was delivered to school students around the country in November 2007.

ACEA believes, however, that the long-term solution requires the engagement of classroom teachers in delivering careers advice to students. Classroom teachers have significantly more impact on students due to their increased interaction time and individual understanding of students. They also will have a far better understanding of students' strengths and weaknesses and can thus provide better guidance than Careers Advisors who have extremely limited interaction.

ACEA sees this model working by allowing industry groups to communicate with classroom teachers to provide insight into industry's ever changing and evolving workforce. When considering the engineering industry for example, historically there were five (5) different types of standard engineer occupations; now over one hundred (100) different types of engineering and related roles can be classified. Currently classroom teachers would not be expected to know this, but using very simple methods like industry group meetings or giving teachers access to industry newsletters would allow careers advice to be delivered through the classroom in a more beneficial and student-specific manner.

Schools should also take opportunities to bring engineers/practitioners into the classroom. Their involvement can provide the link between industry and its future workforce and instill in students (and teachers) the exciting array of opportunities that await them in the field of engineering.

RECOMMENDATIONS: SECONDARY SCHOOL INNOVATION

Secondary school curriculum requirements could better support the fostering of innovative individuals through the following:

- Teachers being required to teach within their disciplines to enhance the quality of teaching.
- A reduction in class sizes and a mandatory cap (not an average) measure of students per class.
- Tailored, relevant and accessible careers advice to aid students when making year 11 & 12 class selections and then university course selections.
- Establish an Australia wide program of engineering/practitioner involvement in the classroom. The involvement of engineers in schools could be incentivised as one of the criteria in an education and training tax concession (explored further under 'Government Incentives' section 3 of this paper).

3. INNOVATION IN THE HIGHER EDUCATION SYSTEM

The Australian Bureau of Statistics (ABS) Innovation in Australian Business (2005) survey result revealed that general business skills were the most common skills and capabilities sought by innovating businesses across all employment sizes.⁶ A robust higher education system is central to producing workforce participants who contribute to the innovation and productivity gains required for long term economic development and growth.

However, while the Government is increasing funding for vocational education and training there no like support for Universities. This is despite continued evidence of significant skills shortages of engineers experienced by private sector and public sector employers. The Government needs policies that grow both the tertiary and vocational training and education capacity of Australia.

The Department of Employment, Science and Training, Higher Education student statistics collection 2002 to 2006 shows that the number of students entering into an engineering degree has been all but static, showing a growth of only 0.1 per cent.

Tertiary graduates require employability skills to be able to put their ideas into practice. ACEA recently submitted a report to the Department of Education Employment and Workplace Relations (DEEWR) outlining support for a number of recommendations to implement graduate employability skills into all Australian university curricula.

One of the Graduate Employability Skills, labeled *Initiative and Enterprise* seeks to develop skills that contribute to innovative outcomes. Development of these skills would be primarily fostered by teaching students to think strategically and creatively. This 'Employability Skill' would further seek to instill the ability of graduates to identify opportunities not obvious to others, translate ideas into action, generate a range of options; and initiate innovative solutions. Graduates that exit the tertiary sector with a grasp of the initiative and enterprise skills will be very well placed to act as our nation's future innovators.

The recently announced Higher Education Review is an exciting possibility for a solution to the lack of engineers graduating university with high level technical and employability skills. ACEA views that examining the current state of the Australian higher education system against international best practice is important in assessing the current capabilities of the education system. In addition this is an opportunity for the Review to identify where the greatest possibilities are for preparing the next generation of innovators.

Continued financial support for Commonwealth supported places in disciplines such as engineering will encourage a larger cohort of future innovators. Currently 1070 Engineering places are supported by the Commonwealth and this has seen a rise in enrolments in engineering. Clearly this is an incentive provided by government that has generated the desired result.

RECOMMENDATIONS: INNOVATION IN THE HIGHER EDUCATION SYSTEM

ACEA views the following reforms could provide the greatest impact on creating innovative Australians:

- The implementation of graduate employability skills into all university courses.
- Ensure that the *Higher Education Review* seeks to identify where the opportunities for incorporating innovation into education outcomes for graduates lie.

⁶ 8158.0 - Innovation in Australian Business, 2005. Australian Bureau of Statistics
<http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/8158.0Main+Features12005?OpenDocument>

- Improved and continued funding for government supported engineering university places. This shows a flexible approach to adapting to where the professional skills shortage lies in an innovation intense industry.

4. SKILLED MIGRANTS CONTRIBUTING TO INNOVATION

In order to source the creativity of skilled people outside Australia, a contemporary skilled migration program is required to supply Australian business with not only new skills for creative enterprise but also importantly to alleviate the skills shortage prevalent in so many Australian industries.

To attract the most talented, creative and highly skilled people, a flexible and contemporary skilled migration system is necessary. There is a global shortage of engineers and Australia faces strong competition from Europe, Canada, Dubai, and parts of Asia for skilled professionals. Australia should be looking to increase permanent migration to Australia for engineering professionals and related services and making Australia an attractive proposition for migrants.

Without an accessible skilled migration scheme there is no alleviation in sight to meet consulting engineering skill shortages in the short/medium term, further slowing the Australian economy as construction, infrastructure and other engineering projects are stalled, and stifling the scope for innovation.

There is also a need for flexible temporary migration arrangements, particularly for engineering projects. Modern engineering projects require a range of different professional skills and disciplines. If a particular discipline of engineering or expert is not available in Australia, or simply more engineers are required, a fly-in fly-out approach is needed.

ACEA proposes the implementation of a two-tiered system for the 457 temporary business visa approval process. This would see the applications of highly skilled professionals fast-tracked when applying for vacancies in Australian companies with an exceptional reputation and within identified skills shortage industries.

The 457 visa scheme encourages transfer of knowledge between the visa holder and the sponsoring company and this is advantageous to the applicant, the firm and the Australian consulting engineering industry. It also facilitates future business opportunities between the sponsoring firm and the visa holder's country of origin.

A two-tiered approach will allow tier-one businesses, who have utilised the scheme without breach, to have their 457 visa applications fast-tracked and the second tier, where abuse has been prevalent, to be subject to a more rigorous review.

A two-tiered approach will enable highly-skilled migrants who are needed to perform roles in Australia to enter the country quickly and address the skills shortage crisis commonly agreed as being critical in many industries.

By identifying the businesses within these industries who have a good track record with their use of 457's and are recruiting for skills that are in critically short demand domestically, the Department of Immigration and Citizenship (DIAC) can prioritise these applications so that Australia's economic growth can be sustained.

Within the engineering industry, highly skilled and highly paid professionals undergo extensive interview processes and checks by the employer firm, prior to the 457 visa application being lodged. The level of rigor and the length of time a 457 application is now taking is simply not meeting the needs of Australian consulting engineering firms, 2/3 of our member firms are either delaying infrastructure projects or not bidding for projects because they simply do not have the staff available.

Without an accessible and timely approach to 457 visa applications, Australia's short-term skills requirements cannot be met. ACEA has submitted an expanded and detailed version of our two-tiered approach to the Department of Immigration and Citizenship.

RECOMMENDATION: SKILLED MIGRANTS CONTRIBUTING TO INNOVATION

ACEA recommends that:

- The Government's migration policy should create a flexible and accessible skilled migration program and visa system that facilitates the fast processing of applications and facilitates both permanent and temporary migration catering for a variety of situation and circumstances.
- The Government should introduce a two-tiered temporary skilled visa application/approval system.
- The Government to introduce a "3 week to 3 month" employer sponsored working visa to be granted within 10 days (subject to minimum checks only), with a facility to apply for a 457 temporary business visa on satisfying the standard visa application requirements. This visa should only be available to registered consulting engineering firms operating in Australia.

RISK

1. INNOVATION AND RISK

Clients of the consulting engineering industry have an important role to play in the promotion of innovation. The Queensland Government is, for example, a large client for the consulting engineering industry and has currently estimated \$50billion in infrastructure expenditure over the next four years. The extent to which the Queensland Government, and other public and private sector clients, are open to and encourage innovation will dictate the ability of the consulting engineering firm to introduce innovations. This is because the client determines the scope of the project and the services that they require of the consulting engineering firm.

*"Set an engineer an ordinary challenge and you will see an ordinary design emerge. Set an engineer a stimulating challenge and you will see an innovative design emerge."*⁷

Innovation as the origination of new knowledge and ideas means that there is risk involved. Questions arise such as: Will it work in practice? How long does it work for? What will happen if it fails? Will it be cost effective in comparison to traditional methods?

In manufacturing prototypes can be made to assess the answers to these questions, but in engineering design for buildings, construction and infrastructure it is much harder to test the theory before it is put into practice. It can be argued therefore that every engineering design contains some innovation as the variations in position, ground, climate and function can present unique challenges that must be overcome.

The risk of innovation in consulting engineering can be high, but the risk of failing to complete the project and overcome the challenges is typically higher. Clients of consulting engineering firms are, therefore, focused on the end result; they demand that projects come in on time and on budget. Clients can be often reluctant to accept the risk that goes with the innovation required to complete the project.

Information from the Australian Bureau of Statistics shows that engineering and technology research is accounting for half the total R&D expenditure, reporting 55.2% in 2003/04 and 57.3% in 2005/06⁸.

⁷ Quote by Dr Alan Finkel AM FTSE Chancellor Monash University. ATSE Focus Magazine February 2008

⁸ ABS 8104.0 2005-06 Research and experimental development, businesses

This shows that there is significant investment in innovation by the consulting engineering industry. ACEA believes however that this contribution goes unrecognised and unrewarded. It is ACEA's position that there could be far greater deployment of innovation within the consulting engineering industry if clients were prepared to support the industry by accepting some of the associated financial risk.

Unfortunately the manner in which many governments contract with the private sector means that all risk is passed (either directly or through the chain of suppliers) to the private sector. These risks can include, financial, project outcome, third party, innovation, political, terrorism etc, regardless of the level of the consulting engineering firm's involvement, fault and financial capacity.

This is done through the use of contractual terms, which include terms and conditions that require the consultant to accept all/substantial risk regardless of whether the risks are beyond the control and good management of the business. Ironically this exposes not only the consultant's business to potentially catastrophic liability(ies) but also exposes the government to uncertainties in the project outcome. This uncertainty can lead to increased litigation, poor value for money and cost to the community.

Small firm members of ACEA are deterred from tendering for government work because of the risk transfer through the contract and for many retaining a lawyer in attempt to negotiate better terms because the cost is greater than the fee that they would receive for the project. Only those small firms that offer very specialist services have some success in negotiation because they have greater market power in light of the niche position that they hold.

Some medium and larger member firms are independently taking a commercial decision not to tender for any government work or tender for a limited number of government departments only.

These contracting behaviours are evident across the building and construction industry and are also driving poor risk management behaviours in the private sector.

ACEA's Public Sector Contracting Paper explores the issue of contracting behaviours in more detail and can be made available on request.

Essentially this type of contracting behaviour is a significant disincentive for innovation. This is because there is no room for taking a shared and proportionate approach to the sharing of risk.

This belies most government's stated approach to risk. Governments across Australia follow the principle that 'risk must be shared by the party most able to bear it'. This is however too often defined as the private sector.

2. PROJECT DELIVERY

A significant factor that ACEA believes has contributed to this narrow view of risk is the loss of skills within government procurement offices. This has meant greater reliance on external legal advice regarding procurement and contracting methods.

ACEA suggests that this is evidenced by the Commonwealth Attorney General's announcement on 7 February 2008 that, under the previous Howard Government, the expenditure by Commonwealth agencies on legal advice blew out by 20% up to \$413million for 2006/07. The highest billers were Clayton Utz (used by Department of Defence and many others) and Blake Dawson.

This means that contracts are focusing on allocation of liability rather than focusing on the project and achieving the best outcome. The focus on allocation of liability creates an adversarial environment, which starts when the consultant attempts to negotiate more reasonable terms. Often time the consultant is unable to tender for the work unless it agrees to the contract terms unamended.

In addition decisions continue to be made based on lowest cost bid in response to the tender because this is the easiest way for government agencies to demonstrate value for money even though there may be a high number of variations as the project develops. Following a selection criteria that only considers cost,

especially for projects that are technically challenging, is a major barrier to innovation. The successful low-cost bidder has no scope left for innovation, whereas the losing bidder may have factored it in but has lost the job. This discourages tenders which include innovations.

Low cost bids coupled with acceptance of project risk leaves little incentive for a consulting engineering firm to offer or even be open to innovative ideas, for fear of the client and its contract.

It should be observed that some clients have recognised the impact that unbalanced and onerous contractual terms have on the quality of the tenders that they receive. They have realised that they either receive no tenders at all or the quality of the documentation is not of a suitable standard. An innovative solution was required to address the dissatisfaction felt by the client, contractor and consultant. This led to relationship or 'alliance' contracts being developed. Relationship contracting is a flexible approach to establish and manage relationships between clients, consultants and contractors, and to implement practices and techniques to optimise project outcomes.

These contracts have been used to great effect to deliver some large infrastructure projects in Australia.

The key features of a successful alliance project are:

- Focus on project results;
- Innovative contractual arrangements, including a 'No blame' clause meaning that the participants to the alliance will not apportion blame but focus on rectifying the problem rather than falling into a dispute;
- Access to and the contribution of the best resources of each participant in the Alliance;
- Clear understanding of individual and collective responsibilities;
- Success measured against Key Performance Indicators;
- Emphasis on openness and co-operation; and
- Equitable risk/reward balance.

ACEA's Awards for Excellence have highlighted that there is growth in the number of major infrastructure projects delivered by alliances. The 2006 Project of the Year winner Coffey Geotechnics and Maunsell (members of the LHD Link Alliance) for the Lawrence Hardgrave Drive in NSW is a significant example of a successful alliance.

Lawrence Hargrave Drive forms part of the NSW "Great Ocean Road" south of Sydney. Repeated rock falls and embankment collapse finally led to the closure of the section of road in August 2003, severing an important social and business link between the coastal village communities of Stanwell Park and Thirroul.

The Roads and Traffic Authority of NSW (RTA) formed the LHD Link Alliance, which included Coffey Geotechnics and Maunsell, to identify and develop alternative and more permanent road solutions.

The centrepiece of the preferred engineering solution is the Sea Cliff Bridge, an elevated two-lane roadway with attached pathway which, in following the natural curves of the coastline, bypasses seaward of the area of high instability and connects to the upgraded road approaches. The bridge was constructed in two halves, the southern section being a curved balanced cantilever design, meeting the northern incrementally launched section in the middle. The project also involved further construction to protect from the effects of further rock falls and area instability.

It opened in December 2005, the project was delivered in just 24 months after the formation of the LHD Link Alliance, thus providing a cost-effective and timely road link for the local community.

Information is available at: <http://seacliffbridge.com/>

The 'no blame' contractual arrangement between the alliance participants takes the focus away from disputes. Instead it builds trust and collaboration between the parties. This enables them work together on what's best for project and introduce new ideas and innovations. This is a very different approach to the 'master and servant' style of traditional project delivery and contracting methods.

It is the case that alliance projects can produce highly successful outcomes for large projects in Australia. It is also the case that Australia is leading the world in terms of this collaborative style of relationship contracting. Australia's experience with true alliances should continue to grow for large infrastructure projects.

For smaller projects ACEA believes that there are principles from alliances that can be carried across to traditional forms of contract, such as early consultant and contractor engagement and greater emphasis on collaboration between the project participants.

3. LOSS OF INTELLECTUAL PROPERTY

There are also contract terms in use which are a direct deterrent to innovation relating to intellectual property. In order to apply for the R&D tax concession the applicant must own the intellectual property. It is commonplace to find government contracts which contain a clause requiring the consultant to transfer their copyright to the government. Examples can be found in Commonwealth, State and Local Government contracts and the wording varies from contract to contract.

Even the Australian Standard AS4122 General Conditions of Contract for Engagement of Consultants contains an alternative clause that requires the consultant to transfer their Intellectual Property;

"On payment by the Client of all fees due under this Contract plus an addition fee set out in Item 12 to the Consultant, the Intellectual Property Right in or relating to the Contract Material shall vest in the Client by such vesting shall not affect any lien or other rights of the Consultant specified in the Contract.

The Client grants to the Consultant an irrevocable licence to use that Intellectual Property Right in any original ideas, equipment processes or systems created outside the terms of the Contract and used in carrying out the services. The Consultant shall grant or cause to be granted to the Client an irrevocable licence to use such Intellectual Property Right for any purpose the Services are provided including any subsequent repairs to, or servicing supply of replacement parts, additions or alterations.

To the extent the Intellectual Property Right in or relating to the Contract Material is not capable of being vested in the Client because the Consultant does not own that Intellectual Property Right, the Consultant shall ensure that Client is irrevocably licensed to use that Intellectual Property Right."

The transfer of their intellectual property means that a consulting engineering firm is unable to apply for the R&D tax concession. This contract condition does not, therefore, encourage firms to invest in innovation.

4. CONCLUSION

ACEA believes that governments should be concerned and taking steps to address these issues in consultation with consultants because:

- The allocation of unmanageable risk and liability to consulting engineering firms increases the risk of the project; the likelihood of cost blow-outs and; the likelihood of litigation, i.e. 'the blame game';

- The use of onerous terms by government procurers are economically and commercially inefficient and counterproductive in driving efficiency gains;
- The perception that “value for money” in a bid selection means “low cost” is a major barrier to innovative solutions and deterrent to future innovation contributions.
- The independent professional judgement of consultants is compromised by onerous terms and complex contracts, which again increases the risk of project failure and litigation;
- The risk averse nature of some government agencies, means that innovation and the ability of the consultant to introduce innovative solutions is near impossible;
- The use of onerous terms in design and construct contracts encourage contractors to recover losses that occur from others in the design & construct team including consultants and have a disproportionate impact on the risk profile of consultants; and
- The industry will continue to experience major skills shortages in an environment that exposes consulting engineering firms and their clients (public sector procurers) to unmanageable levels of risk rather than one which encourages fair and proportionate risk allocation.

The Australian Government has recognised and launched some important initiatives intended to boost Australia’s productivity and growth, which include:

- Infrastructure Australia in order to manage the significant workload of infrastructure projects in Australia;
- A review of innovation, recognising the importance of innovation and acknowledging that Australia is behind in this area in comparison to other key economies;
- Skilling Australia, which looks to boost the take up of construction and other trade skills and;
- An audit of Government procurement practices.

ACEA welcomes and supports these initiatives but suggests that the Governments of Australia must address the way in which projects are delivered in Australia and the contracting behaviours that have evolved. This is the foundation on which infrastructure is delivered, innovation is encouraged and skills are retained.

RECOMMENDATIONS: RISK

ACEA believes that some fundamental issues must be addressed in order to develop a productive and vital consulting, engineering and construction industry:

- An audit of government procurement practices, including the way in which agencies contract with the private sector, is required across all levels of government and should include consultation with ACEA and other key consultant and construction industry representative bodies.
- Adopt standard forms of consultant contract, to be developed with ACEA and other key industry bodies and reduce reliance on external legal advice. These should not be varied without a robust assessment and sign-off procedure to confirm that it is necessary.
- Develop the ‘Procurement Professional’ within government agencies, who should receive robust training and education on project delivery methods, risk and liability management and project management.

- Adopt a commercial approach to risk and liability which is consistent with the suite of Abrahamson's Principles described in the 1990 "No Dispute" Report. Guidelines should be developed in consultation with ACEA and form the basis of KPIs for public sector procurers;
- Adopt a commercial approach to risk sharing for innovative solutions;
- Remove "value for money" consideration in procurement guidelines and replace with "quality based selection".
- Refrain from incorporating terms in contracts which prejudice the ability of a consulting engineering firm, engaged by the contractor, to exercise independent professional judgement and prejudice their Intellectual Property Rights;
- Instigate Key Performance Indicators regarding dispute avoidance, meaning that contractual conditions that continually give rise to disputes should be recorded and corrective action taken to address the issues.
- Champion the Proportionate Liability and Professional Standards Legislation and ensure that all government agencies comply with the spirit and intent of legislation which is directed towards limiting consultant liability and encouraging a buoyant and competitive market for insurance in Australia;
- Amend the Trade Practices Act 1974 to ensure that all Federal, State and Territory (including Local) Government procurement activities are covered by the Act in accordance with the Productivity Commission's recommendation and;
- Maintain a varied portfolio of project delivery methods, so as to encourage a competitive market between contractor led and consulting engineering firm led methods.

GOVERNMENT INCENTIVES

1. R&D TAX CONCESSION RATE

The R&D tax concession is an integral part of the development of R&D in Australia and should be endorsed as a permanent feature of Australia's taxation system. ACEA views the R&D tax concession as a major instrument for encouraging innovation not just in the consulting engineering industry but the economy at large.

With an increasingly globalised economy and mobile workforce, firms consider the government assistance as a vital factor affecting their decision to invest in R&D projects in Australia. If Australia is to significantly increase the domestic level of R&D and improve our international attractiveness in a global environment then the current level of concession needs to be addressed.

The R&D concession plays a pivotal role in increasing the attractiveness of Australia as a destination to undertake high levels of R&D. To improve our international competitiveness in R&D and attract and retain high level academics and research staff associated, ACEA recommends restoring the R&D concession to its previous rate of 150%.

Increasing the concession to 150% will play a crucial role in attracting R&D into Australia especially in the Pacific region. Australia needs to compete with countries such as New Zealand who have embarked on an ambitious R&D tax scheme introducing a concession at the rate of 15 cents in the dollar. The New Zealand credit is currently twice the rate of Australia and will no doubt hinder our economy in becoming a highly innovative society.

Increasing the concession to 150% will also promote much greater investment in R&D by Australian firms as it maximizes the reward for becoming innovative. The reward will also help to reduce the present costs of compliance associated with apply and maintain the register. This is considered to be a great disincentive in claiming the concession particularly amongst the small and medium enterprise where formal approaches to R&D are limited.

RECOMMENDATION: R&D TAX CONCESSION RATE

ACEA recommends that the Government:

- Increases the R&D tax concession to a rate of 150% to promote Australia as an international hub for R&D and promote a higher level of investment in R&D by Australian firms.

2. R&D TAX CONCESSION COMPLIANCE

Innovation is considered every day practice or business as usual for the consulting engineering industry. Through incremental development a systematic change in project delivery occurs over time and is diffused throughout the industry in an ad hoc fashion.

Firms that become leaders in project design and project management outperform those who are less adaptive and not as willing to take on new ideas and hence become innovative.

Measuring the success of one firm to the next is difficult and becomes even more complex when comparing the Australian industry on an international scene. Much of the complication arises from how innovation is currently measured. At its broadest means the uptake of the R&D concession is used to measure how well an industry is doing. However the consulting engineering industry results are hidden across the “other industry section” of any formal ABS document.

Members are continuously expressing concern about the terminology used to measure innovation and its applicability to the service based industries such as consulting engineering. If innovation is to be fully measured and the uptake of the R&D concession promoted and used as a measure of innovation, then this contentious area of the scheme needs to be addressed.

Compliance costs associated with claiming the R&D concession are also considered by members to be very onerous and complex. This feature coupled with the time associated and loss in billable hour’s results in the marginal benefit for complying as minimal and is quite often seen as a disincentive.

Greater awareness and promotion of the R&D concession scheme is sought if the consulting engineering industry is to access the scheme and assist in the spread and diffusion of ideas and knowledge across the economy.

Fundamental to the applicability of the R&D tax concession scheme to the consulting engineering industry is the terminology used and how it is perceived, interpreted and introduced by the engineering community in the design phase.

To be undertaking R&D activities as defined by the Australian government involves “Systematic, investigative and experimental activities that involve innovation or high levels of technical risk”. The use of words such as “*experimental*” and “*high levels of technical risk*” are terms that engineers don’t often like to be associated with.

Generally in the design phase engineers follow a strict set of structural and mechanical guidelines to ensure a safe and successful project. As each project is considered unique and a once off in design in many ways, any deviation away from these practices could result in dangerous and unsuccessful outcome. To reflect the true nature of what innovation involves in the consulting engineering industry, how the terminology is perceived by engineers needs to be addressed.

Too often the terminology is overlooked, as it is viewed as only applying to the classical “guys in white coats” scenario and not relevant to the engineering community. The result is the knowledge and formal acceptance of new ideas is not adopted as standard business practices and therefore not diffused through the industry and economy at large.

Across the ACEA membership many of our firms access the R&D concession and it now forms an integral part of their ongoing business operations. The concession assists by enabling many projects to be undertaken that would not have fallen under normal business practice due to a number of factors including risk, skills and resources. It should also be noted that it has allowed firms to readily justify the recruitment of additional resources to undertake R&D projects that would otherwise never have been embarked on.

However firms often stress the applicability of the concession to their firm and the consulting engineering industry in general. Firms that do access the concession note that the process of applying for and maintaining contemporaneous records can be a large disincentive for firms and therefore hinder the spread of new ideas and knowledge throughout the economy.

This is particularly true amongst smaller and medium firms that often note compliance costs associated with managing the application and managing the register is very onerous and not a vital part of their core business activities and hence is not adopted as normal business practice.

RECOMMENDATIONS: R&D TAX COMPLIANCE

ACEA recommends that the Government:

- Reviews the terminology of the application for the R&D tax concession to achieve clearer, simpler, less bureaucratic terminology which recognises the importance of the engineering profession needs, so that service based organisational and institutional innovation within the firm is recognised and firms are rewarded for it. The review should take place in consultation with industry to assist in the development of appropriate terminology for the consulting engineering industry.
- Reduces compliance costs associated with registering and maintaining the records as the costs do not often justify the rewards for small and medium sized business.
- Improve the accessibility of the concession scheme to better reflect innovation that exists in the consulting engineering industry. Emphasis should be placed on innovation that shows an adoption of advanced practices which express a degree of technological innovation novelty.

3. EDUCATION AND TRAINING TAX CONCESSION

The process of innovation comes from a knowledgeable and well trained workforce. Fundamental to this is ensuring that when the formal education system ceases businesses are able to increase the skills and knowledge that encourage creativity and innovation.

The lack of incentives and opportunities for business to invest in ongoing training and development makes fostering innovation difficult. Due to the shortage of professional engineers, many are already working above-capacity and taking time out to further enhance their skills is a demanding exercise.

ACEA believes that Australians need to be educated and trained to drive innovation. This should not stop once they join the workforce, but should be relevant to their workplace and industry. An innovative workforce delivers success for the business and success for the economy.

To encourage consulting engineering firms to continue to invest in the further education and training of their workforce ACEA proposes that the Government introduce an education and training tax incentive. This would complement the R&D tax concession because a better trained and innovative workforce is more likely to invest in research and development. ACEA believes that the two go together.

ACEA is proposing an education and training concession at 125% to complement the R&D concession. The concession would help develop skills and knowledge which are fundamental to increasing the level innovation and R&D.

The concession would be similar in nature to the R&D concession and would be given as an incentive to increase the level of education and training activities as a proportion of turnover. This means that when a firm's spending on education and training activities goes beyond 2% of payroll per year, that firm should be eligible for the concession at a rate of 125%.

In order to claim the concession conditions relating to incumbent workers and the courses that are applicable should be included. ACEA suggests that employers should be able to claim the concession for workers who have been with the firm for 180 days. The courses applicable should include, but not be limited to, registered training organisations and other government approved courses.

The concession will drive innovation and productivity at the workplace by drawing more effectively on the talent and creativity of employees already in the firm. It would also increase the level of support available for existing workers to update and upgrade skills that support productivity innovation and knowledge within the Australian economy.

RECOMMENDATION: EDUCATION AND TRAINING TAX CONCESSION

ACEA recommends that the Government:

- Introduces an Education and Training (E&T) tax concession at a rate of 125% to transform the knowledge and resources of business so that they are better placed to contribute to the innovation and the performance of the economy as a whole.

4. RAISING AWARENESS

As a whole the consulting engineering industry is relatively unfamiliar with the government initiatives, other than the R&D concession. It is essential to strengthen the linkages between research centres, business and government. The process of bringing forward the commercialisation of new ideas and practices needs to be improved in universities and research centres for a highly innovative and competitive industry to evolve.

The BRITE report on construction innovation highlights collaboration with universities and research centres is low as is the crucial role that industry bodies, such as the ACEA, play in promoting innovation amongst businesses. Industry bodies are often the first place members will turn to for advice and assistance especially amongst small and medium firms.

Industry bodies assist by highlighting government initiatives available to the industry as well as the collaborative arrangement between research centres and financial assistance. However associations can only assist so far and governments need to take on a greater role in supporting innovative in industry.

To highlight the specific government initiatives and private research centres available to the consulting engineering industry the ACEA is proposing an industry innovation outreach officer program.

The officer would be armed with knowledge of the CRCs applicable to the consulting engineering industry for example, where to find additional funding, skills and resources that are not present in the firm and, how to apply the terminology and improve eligibility of small and medium firms to the R&D concession scheme.

An innovation outreach office program would add value because it would:

- Reduce compliance costs associated with accessing the R&D Scheme.
- Reduce misconceptions in the industry about who the scheme can benefit.
- Link CRC private research agencies and universities with the consulting engineering industry.

As a minimum requirement the industry is likely to benefit greatly from a government public awareness campaign to highlight the initiatives available to the consulting engineering industry and how to access them. The campaign should be launched by Ausindustry and highlights the areas including but not limited to:

- Greater awareness of the entire R&D concession scheme and the eligibility of the consulting engineering industry;
- Promoting Cooperative Research Centers that are relevant to the consulting engineering industry;
- Promoting greater collaboration between universities, private research centers and the consulting engineering industry;
- Highlight the importance of industry associations in promoting an innovation culture and the role they play in the diffusion of new ideas throughout the industry.

RECOMMENDATION: RAISING AWARENESS

ACEA recommends that Government should:

- Launch an advertising campaign through Ausindustry to promote the benefits and assistance that the government provides through the current schemes available to the consulting engineering industry.
- Introduce an Industry Outreach Officer program.

5. COOPERATIVE RESEARCH CENTRES

CRC for Construction Innovation is the only CRC of relevance to the membership of ACEA i.e. consulting engineering firms. ACEA believes that this CRC offers an acceptable level of continuing professional education based on industry-endorsed research outcomes. ACEA have worked with the CRC jointly on a number of projects. ACEA is in principle supportive of the CRC programme but has a number of functional issues to raise.

ACEA is concerned that the CRC is too narrowly focused on the construction industry, instead ACEA believes that it would be more appropriate for the CRC to cover the built environment, meaning it should encompass design professionals in addition to the construction industry. This would give it greater emphasis on innovations in the full range of Australia's man made environment, including water and energy.

The governance of the CRC's is also an issue because there should be a majority of industry representatives on the Board and this is not the case for the CRC for Construction Innovation. This means that industry innovation programmes are overlooked in favour of more academic based research, which while important, should not be prioritised over industry innovations which can provide faster relief and problem solving.

The funding that CRC's provide could be further enhanced by incentivising specific projects that address:

- Water infrastructure for efficiencies and elimination of wastage;
- Carbon reductions;
- Climate change adaptation;
- Health (for the aging population);
- Urban transport and;
- Export to Asia and the Pacific.

The premium funding of these projects would incentivise thought leadership relating to the National Research Priorities and exporting, which is where innovation is most needed for productivity and sustainability.

RECOMMENDATIONS: COOPERATIVE RESEARCH CENTRES

ACEA recommends that the following actions are taken in respect of the Cooperative Research Centres:

- The Government should provide greater support for public research organisations. This should include research into careers that are “innovation enabling” such as engineering.
- The Government should implement measures to promote greater movement of knowledge between public research centres and the consulting engineering industry;
- Increase funding for initiatives that foster links between business, governments (at all levels), and research agencies such as the CRC for Construction Innovation and government initiatives such as Commercial Ready and Commercialising Emerging Technologies .
- Increased funding for specific innovation projects linked to: water infrastructure; carbon reductions; climate change adaptation; health (for the aging population); urban transport; exports into Asia and the Pacific.
- Change the governance structure of the CRCs to ensure that industry leaders are fully and appropriately represented by a majority on the Boards.
- Introduce a CRC for the Built Environment to represent all disciplines of built environment professionals.

6. INNOVATION COUNCILS

ACEA notes that Senator Carr made mention of the creation of industry Innovation Councils to *'foster ongoing partnerships across the value chain in key sectors and develop a long-term approach to boosting productivity'*.⁹

ACEA is supportive of the initiative and proposes that an Innovation Council be established to represent the built environment design professionals and other stakeholders in the built environment.

An Innovation Council for the Built Environment would comprise appropriate representation from both private and public sector, including academic and training institutions; government representatives; industry peak bodies representing the built environment.

For example, ACEA (as the major employer industry group for the consulting engineering industry) the Property Council of Australia, the Council of Built Environment Design Professionals, the Australian Construction and Industry Forum (ACIF), Australian Contractors Association and the Building Products Innovation Council. Relevant Unions should also be represented.

It will be very important for the Council to have a targeted and focused mandate, with appropriate Key Performance Indicators, a clear governance structure and accountability. The Council should have clear and achievable goals for the short and long term fostering innovation through partnerships across the sector.

HARMONISATION OF BUSINESS REGULATION

Over time a multiplicity of regulation has been accruing at Federal and State and local level. This has resulted in a complex and unwieldy system that is hard to understand and costly in terms of both compliance and administration. The burden of business regulation is an inhibitor to innovation.

Much of the regulation that impacts the consulting engineering industry has been developed in isolation at state and local levels; this has led to a 'patchwork' of regulations, which lack consistency and overlap other jurisdictions. Due to a lack of effective cost benefit analysis and regulatory impact statements or assessments, the regulations often seek to impose unreasonable and unrealistic duties of care on business.

New regulation is often given little time to 'bed-in' before amendments are introduced, meaning that business has little time to absorb the impact of the regulation before new changes are introduced. A review of the regulation to determine whether it is working as intended is not undertaken nor as amendments are introduced is there a review of whether the amendment renders other provisions redundant that can then be removed.

It is this continued layering of regulation that leads to the multiplicity and patchwork regulatory environment that exists in so many areas today.

ACEA's submission to the Regulation Taskforce, Reducing the Regulatory Burden on Business November 2005, identified that, following a survey across the ACEA membership, there is a total revenue loss of \$18.5million per annum due to unnecessary regulation.

⁹ *'An innovation future for Australian industry'* Senator Kim Carr, Shadow Minister for Industry, Innovation, Science and Resources, Election 2007

ACEA also identified key priorities for reform, which include:

- 1 Occupational Health and Safety Regulation;
- 2 Taxation Compliance;
- 3 Australian Standards in Building and Construction;
- 4 Building Certification;
- 5 Public Sector Procurement Regulation;
- 6 Business Registration /Regulation;
- 7 Environmental/Sustainability Regulation;
- 8 Energy Use and Regulation;
- 9 Trade Practices Act and State Consumer Acts;
- 10 Inconsistencies in Professional Standards Legislation and Proportionate Liability Legislation and;
- 11 Industrial Relations.

The lack of consistency in and, in some cases, over burdensome regulation impacts on the ability of consulting engineering firms (particularly small businesses) to innovate. The business of compliance means that there is little time for innovation.

RECOMMENDATION: HARMONISATION OF BUSINESS REGULATION

ACEA recommends that all levels of government should introduce key performance indicators for their policy staff introducing compulsory regulatory impact assessments and cost benefit analysis. There should also be a compulsory open and transparent public consultation period of not less than 3 months (the UK model).

In addition the Council of Australian Governments' (COAG) process should continue to work towards national harmonisation of laws in Australia.

-Ends-