



Focus on Risk Management

The Challenge of Risk Communication

by John Lumsden

Risk communication in its most familiar form is associated with decision-making about community issues such as pollution, cell-phone towers, landfills and quality of drinking water. But in spite of this, risk communication as an essential ingredient of risk management strategy is not well understood and therefore not well-practised.

Whereas risk tends to be assessed by technical analysts, people in the community rely mostly on intuitive judgments formed from media reports or hearsay to develop their perception of risk. Ironically, while we now have a higher standard of living and live longer, people also feel they face more risk than in the past. People will push to insist that authorities take remedial action for smaller risks but be slow to absorb information offered on potentially disastrous events, e.g. parents will remove children from a school because of perceived risk due to the proximity of a cell phone site, but people will also happily perform activities or build houses in erosion zones, on flood plains and adjacent to fault-lines.

It has been said that fear has a much longer shelf life when its object is on the threshold, possibly invisible at the limits of detection. On our statistics, travelling by car is risky. People accept such risks because caution rather than fear is the issue.

Communicating risk is an important part of hazard reduction. The most effective way to assist the post-hazard recovery process is to have optimised preparedness planning and here lies the greatest role of risk communication.

Background to risk communication learning

As a topic on its own, risk communication is still relatively new. In spite of growing community empowerment through legislation such as the Resource Management Act, risk communication is still often seen as a decision, the point where the public are advised rather than informed. This worked in the past, but as the public grew to question more such decisions, traditional communication became less effective, particularly in areas like the environment and public health. Risk communication has developed from a growing need to bridge the gap between scientific assessment and an often uninformed public. A complicating factor is that members of the public tend to perceive risks differently from those conducting the risk assessments. Without this disparity, risk communication would be relatively straight-forward.

Getting people to understand risks presents significant problems. One is getting people to appreciate potential

continued on page 2

outcomes from high impact but low frequency events. People's memories are short, and there are, for example, few people living in New Zealand today who have experience in recovering from a major earthquake.

Strategies for communicating Risk

An interesting strategy that has become well-known in the US is that developed by Dr Peter Sandman at Rutgers University. He asserts that two facets comprise risk communication: "scaring people" and "calming people down". So with natural disasters where people are apathetic, it is first necessary to alert them to potential danger, and then reassure them plans are in place to deal with such eventualities.

Risk assessment defines risk as (magnitude x the probability). Dr Sandman claims that experts focus on this definition and underestimate actual risk, because they ignore outrage. The public tends to focus on outrage and think less about defined risk. Risk communication tries to create a level of 'outrage' appropriate to the hazard level.

When public outrage about a perceived risk, e.g. the use of certain pesticides, is very high and the assessed risk is low, the defensiveness of both parties may limit the effectiveness of education efforts. In this situation, educators must acknowledge the public outrage as a component of the risk equation.

Sandman's thesis is that Risk = Hazard + Outrage.

Sandman goes on to give 12 principal components of outrage which need to be dealt with when communicating risk. These include making the risk as voluntary as possible, encouraging familiarity with the risk, making it less memorable, becoming a trustworthy source and creating a responsive process acknowledging responsibility,

remaining courteous and at a certain point, working with the outrage rather than the hazard. Dreaded risks (e.g. HIV and cancer) are perceived as greater risks than high blood pressure, an actually greater risk. An individually controlled risk is perceived as lower, e.g. car driving. Knowability means people want to know "highest possible damage" and there must be fair distribution of risk and benefits. Outrage will be higher if people in jeopardy are not receiving a benefit.

To develop communication strategies in disaster planning, the following points need to be kept in mind:

- Open emergency planning files to the public: the community deserves to be consulted. Present a plausible worst case. It's better to be accused of understating the situation.
- In presenting the worst case scenario, it is better to stress the magnitude and let the community focus on its low probability, or the converse will happen.
- Acknowledge that risk assessment of catastrophic risks is extremely uncertain.
- Pay more attention to prevention than to estimating magnitude and probability. The "right" debate should be about what is being done to reduce disaster risk rather than correct quantification.

The Media

The media plays a role in informing and educating which needs to be recognised. To avoid unbalanced reporting and speculation about the disaster and recovery process, good media relations, which take time, need to be encouraged with clear lines of communication and accurate information.

John Lumsden is Projects Director at CAE. This article summarises a paper given to an Earthquake Commission workshop on Community Recovery Planning and Performance, 15-16 May.

Marching with the Times: CAE's Programme Advisory Group

CAE was built on a vision to enhance this country's technical knowledge to benefit all New Zealanders, and for 15 years it has done this consistently and successfully. But in order to meet the challenging demands of today's technological world, changes must be made as programmes evolve.

"CAE must have the capacity to take up new and innovative project opportunities on issues of major importance to New Zealand," says Dr George Hooper, CAE Executive Director. "And it must be able to complete projects on time to meet contractual obligations and financial objectives." Over the past year an increasing use of external contract personnel has contributed to reaching goals.

In a move aimed at supporting new perspectives and identifying fresh initiatives, CAE has decided to set up Programme Advisory groups, linked to its five project platforms: Oceans, Sustainable Technologies, Civil Infrastructure, Risk Management and Emerging

Technologies. Each group will be formed of industry, government and academic representatives, while the CAE management team will retain responsibility for execution, supervision and overall coordination of programme activities. These groups will replace the current CAE Projects Committee of three Directors.

"In identifying gaps in New Zealand's knowledge base, these Programme Advisory Groups will assist CAE to investigate critical evolving issues by providing oversight which will contribute to strategy and action in achieving change," says Dr Hooper.

It is perhaps not widely known that CAE employs a small permanent staff of four. With major projects such as Distributed Generation and Waste Minimisation under way, along with regular publications and conference and seminar organisation, staff workloads have been weighty. Involving a wider stakeholder group will bring broader perspectives to and facilitate management of CAE's activities.



David Elms, CAE Executive Board member and Professor Emeritus, University of Canterbury, is a leading practitioner combining systems analysis with risk management techniques. David leads CAE's Risk Management Programme Advisory Group.

David Elms is the kind you don't let get away if you're mired in a conundrum. He untangles unique and knotty situations. Tall, spare, and with a dry wit, Elms has spent over 25 years researching and advising in the field of systems analysis and risk management.

David Elms was born in Britain and raised in Wales, working as a structural engineer for the De Havilland Aircraft Company in Hatfield after a BA at Cambridge. An MSE at Princeton University followed and it was while teaching there and completing his Ph.D., he was enticed to New Zealand by an emigrant colleague. "I said why not, we'll just keep going around the world. But we got as far as here and stopped."

Settling with his wife in Christchurch in 1964 began for Elms 24 years in the civil engineering department at the University of Canterbury, including a period as Dean of Engineering. He speaks highly of the university working environment, and Christchurch fits.

It was in 1970 that David Elms moved away from structural engineering to study systems engineering, spending 1971 on leave at the Massachusetts Institute of Technology. Here while absorbing systems analysis, he was also drawn to analysing risk.

"It was cutting edge stuff at that point. I was working with some of the significant figures in risk analysis and I began to appreciate what could be done."

Since then Elms has been involved with systems analysis and risk with the NZ Government and regulatory and local authorities. His work has covered transportation, risks due to natural and technical hazards, organisational risk management and safety related issues.

He helped, in the 80s, to develop computer-based techniques for the analysis of fire spread in buildings for BRANZ, and safety implications of revisions to the fire code for the Insurance Council of NZ. More recently he worked on the tangled issues of the NZ Police INCIS computer system.

Prime Minister Jim Bolger in 1992 wanted an assessment on the safety of nuclear ships in port. Elms was invited on to the Special Committee on Nuclear Propulsion.

"It was a very complex issue involving technical questions and what can go wrong, organisational questions on the good management of the facility, political issues, and in

terms of possible responses, economics. All these issues were scrambled together in an unholy mess and the trick was to be able to unscramble them. That is where system analysis comes in, and I can apply risk techniques when the system is unraveled."

The ships were shown to be not particularly unsafe, and interestingly, US nuclear ships now carry a copy of his resulting book.

NZ Rail wanted to know how much less safe an engine driver would be if he was on his own in a cab rather than with a second person. Enter Elms.

"In order to make sense of this, you had to first of all unscramble quite a complex situation and realise you had to do a comparative examination of the risks with and without another person in the cab. When you think about it, trains are all over the country and there are different cultural attitudes. To unscramble that we decided on a full depth investigation of all the things that can go wrong in one small section of line, to try to specify very carefully what it is we are dealing with. The tools must be carefully matched to the problem. Missing that step could result in disaster or an unsatisfactory outcome."

Showing no significant safety impact from having a driver on his own removed the issue from NZR/union discussions. Because each setting was totally unique, nobody in the world had solved either of these problems before, Elms says.

David Elms is strong on the impact of cultural attitudes in assessing risk. "This is a very important factor in safety but it needs significant effort on the part of the employer. Changing people's cultural attitudes is difficult. It's much easier to put up a notice." He's pleased road safety TV ads are targeting attitudes. "You can put barriers everywhere, but that won't change the way people think."

Where does he find inspiration to unscramble these mazes? Networking helps. On the nuclear ships issue, he rang a British friend to obtain safety cases for all British nuclear submarines. Another call to the chief designer of the first nuclear-powered submarine pulled in information for ensuring safety and a meeting in Soho with a third filled more knowledge gaps about nuclear ships.

An impressively long list of publications bears witness to David Elms' research activities, and he considers one of

continued on page 7



Janet Gough



Australia and New Zealand are seen as being at the forefront of best practise risk management. Just how this came about is told by Janet Gough, who studied risk research first in 1987 at Cambridge University, while on leave from the Centre for Resource

Management at Canterbury University where the Director was John Hayward.

John was very concerned about the impacts of the institutional changes primarily affecting environmental management, and specifically the loss of NWASCA, the National Water and Soil Conservation Authority. He saw that risk management could measure these changes, provide a tool for evaluating options for managing impacts, and a framework for predictions.

While my initial focus was environmental risk, I quickly found that the principles and practice of risk management derived from different disciplines including economics, psychology, engineering and management. In the late 1980s, with very little interaction between different sectors, the developing area of environmental risk management probably acted as a bridge, taking in tools and concepts from several disciplines.

Back in New Zealand, I became strongly interested in social sciences aspects of risk: perceptions of, attitudes to, and communication of risk. At the time, the Resource Management Act was being developed by the Ministry for the Environment, with input from a number of research groups such as the Centre. Early proposals for the

decision framework focussed on the Environmental Protection and Enhancement Procedures promoted by the former Commission for the Environment, with 'environment' incorporating social, cultural and human health aspects. The task was to find a framework to include all these types of impact. I promoted 'risk' as the foundation for this framework, since I see risk assessment as providing a useful 'umbrella' for analysing different types of impact. The 'effects' framework that was selected, defines effects in very broad terms, including risks.

In late 1993, having worked very much in isolation in the environmental risk assessment/management context, I was invited with five other New Zealand members, to join a Standards Australia/Standards New Zealand technical committee on risk management. This committee's work resulted in AS/NZS 4360: Risk Management being published in 1995.

Internationally the standard was an important development. Some related documents came out of the US Environmental Protection Agency, and Canadian standards, where the Environmental Management System (ISO14000) series had triggered the need for supporting documentation in environmental risk management. Now adopted in a number of jurisdictions in different countries, AS/NZS 4360 is also the basis for an ISO/IEC standard on risk terminology about to be ratified.

The standard is notable for its generic nature, arising from the broad expertise of the technical committee, its wide definition of risk, incorporating both opportunity and threat and recognising the links between risk and

benefit, and the promotion of risk management as an organisational culture.

The standard has also been very successful in its promotion of 'best practice' risk management, a theme picked up in the goals of the newly formed New Zealand Society for Risk Management (NZSRM). The downside of the rapid take-up,

particularly in Australia, is that many organisations have adopted the

examples included in the appendices, specifically the risk register and the qualitative assessment tables without adapting them to their own specific requirements.

Hopefully the suite of sector specific guidance documents that have been developed will help to better educate organisations.

Through the early to mid 1990s I found it interesting (and a little depressing) that there was little central government support for risk research. Research applications produced lukewarm, delaying, or negative responses. Later in the decade, risk management developed a 'flavour of the month' aspect, made all the more puzzling by what appeared to be a very limited understanding of what risk management was, and how and where it could or should be applied.

This ambiguity is reflected to some extent in the Hazardous Substances and New Organisms Act (1996). While the Act sets up 'the Environmental Risk Management Authority', the word 'risk' is only mentioned briefly, and there is no mention of either assessment or management of risks.

However, the Methodology developed by ERMA uses an explicit risk management approach to considering applications under the Act. While the early expectation was that applicants would provide the Authority with quantitative risk assessments this has to date proved incorrect, and the Authority's decisions have been based on qualitative risk assessment processes.

The revision of AS/NZS 4360 in 1999 reinforced the intrinsic importance of risk management to good management, and its relevance within an organisation for communication with stakeholders. A key plank of the standard is that risk management isn't just the responsibility of the risk manager, it is everyone's responsibility, and that effective risk management needs buy-in at the corporate level. It is timely to note that the latest handbook series based on 4360, currently in preparation, links corporate governance and assurance. While in many large organisations risk management has gained 'respectability' there remains an element of concern. The NZSRM, referred to earlier, is well supported and gaining new members every week. However, the success of the Society has highlighted some of the issues that act as barriers to improving risk management practise

in New Zealand.

Too many risk managers feel isolated. They have difficulty communicating the importance of their role to senior management, they don't feel valued, and they are only taken notice of when something goes wrong. In my view in too many organisations (a) risk management

and its role are not well understood, leading to variances in the quality of application, and (b)

risk management is still viewed as the sole responsibility of the risk manager. It must be recognised that risk management is an exercise in dealing with uncertainty and, as with other uncertainty issues, often there are no apparent reassuring solutions.

To some extent risk management in New Zealand can be seen as being at a crossroads. Risk management can either remain as a 'tool' used by risk managers, or if it is to reach its full potential it must be seen as a basic concept of organisational management culture.

In 1997 the State Services Commission required chief executives had to report against five expectations that required them to

- Provide a departmental policy statement on risk management.
- Promote an organisational risk management culture.
- Develop a proactive approach to risk management.
- Ensure effective strategies on risk communication with stakeholders including the general public are in place.
- Routine review of senior management.

These principles provide a good foundation for the promotion of risk management in both public and private sector organisations.

In deciding to develop a risk management programme CAE faces two exciting challenges. The first is the challenge to encourage better understanding and take-up of risk management as a culture and a process at Board and senior management levels within organisations, and the second is the challenge to help all managers extend the scope of risk management activities by thinking more broadly about risk and uncertainty and how these contribute to the success of their organisation.

Another important aspect of 'adding value' to the process will be assisting organisations to explore their 'appetite' for risk, or better defining acceptable levels of risk for different sectors of the organisation.

I look forward to being part of this process.

Janet Gough is an independent risk consultant based in Christchurch and a part-time policy analyst for ERMA New Zealand. She is the Programme Manager of CAE's Risk Management technology platform.

To some extent risk management in New Zealand can be seen as being at a crossroads...

Shouldering the Burden of Waste

Some thought-provoking conclusions have stemmed from a in-depth evaluation of over 300 waste minimisation activities in the first phase of the CAE project on Waste Minimisation.

While most waste reduction programmes are considered successful, few have data available to back this up because the activities are not usually monitored in ways which relate specifically to their goals. A common example is for such community initiatives to monitor only the quantity of recyclables they generate, and information is therefore lacking which would provide direct insight into the extent to which these ventures are reducing wastes to landfill.

Constant economic pressure under which community groups are placed appears to cause this problem. One key finding of the research is that supporting agencies, such as local authorities, must accept responsibility for on-going funding for waste minimisation initiatives, particularly if they wish these to include reduction and re-use as well as recycling. One-off funding drives community groups to focus on income-generating activities such as the recovery and sale of recyclables, to the detriment of other, more preventive elements of waste management. Apart from providing an inaccurate picture of how effective the initiatives are, this tends to de-motivate and sometimes drive away people who have a passion for prevention, rather than cure.

A second key finding from Phase I of this project is that supporting agencies need to maintain and enhance the commitment, motivation and enthusiasm of the people who work in waste minimisation activities, often in a voluntary or poorly paid capacity. Passion, which drives

change, is not only the single most precious social component of waste minimisation activities, but also the least valued. The research identified many ways in which to improve the effectiveness of waste minimisation activities and these are contained in the full report, "Assessment of waste minimisation activities in New Zealand", which is available from CAE.

The recent Government release of the New Zealand Waste Strategy was a landmark in the field. Aiming to provide "a vision for a society that values its environment and resources", the strategy also offers a guide towards achieving it. In the ten years since CAE published its ground-breaking report entitled "Our Waste: Our Responsibility, introducing to the country the relatively new concept of waste minimisation, hundreds of examples of waste reduction have risen up through initiatives in business, local councils and communities.

It was these developments, along with the Government's renewed commitment to sustainability, which prompted CAE to begin the current waste minimisation project. Phase Two of this project, now under way, will detail how waste practices contribute to resource stewardship in six key NZ sectors – dairy, meat, forestry, construction, tourism and retail. Each sector group will produce a report identifying a range of interacting factors and a set of case studies to show innovative approaches that can be applied to improve resource stewardship, with conclusions and recommendations. Draft results will be workshopped at the Waste Management Institute conference in early November.

CAE tells the World

The unique concept of CAE's Distributed Generation project was spotlighted when DG project coordinator, Ian Bywater, was an invited speaker at an APEC Distributed Generation Workshop in Mexico City in April. Attended by up to 50 participants and including speakers from the US and Canada, Ian's presentation aroused great interest. "I knew our paper would be different," said Mr Bywater. "Others were about first hand experience in regulation or researching and developing new technologies. Many presenters came up afterwards to say what a refreshing and insightful way of studying the subject. No one else attempted to deal with the overall issues of establishing DG – social and environmental concerns as well as technical and regulatory."

A resulting workshop proposal, supported by EECA Technical Manager, Robert Tromop, was that CAE apply for APEC funding for the 2004 year for a project which would redefine DG methodology to suit APEC economies. This would follow the late 2002 conclusion of the current CAE Distributed Generation study, As well as offering a broad communication exercise for the ten electricity companies involved, the current study will identify areas requiring specific research which CAE would expect to take place in 2003, said Mr Bywater.

Mexico has a strong interest in energy efficiency and new renewables, Mr Bywater said. Delegates from the Pacific Islands and Peru added a broader dimension to the APEC workshop. In one remote area of Peru without electricity, Distributed Generation could transform a small village economy by pasteurising goats' milk to enable it to be sold further afield. The workshop was considered to be a significant event and Mr Bywater believes it was certainly worthwhile for CAE. "New Zealand was there in the international forum, punching above its weight," he says. A copy of the presented paper is available on the CAE website (www.caenz.com).

his notable achievements to be the development of a technique for balancing risk. In aiming to reduce risk, this relates to the apportioning of money budgeted to obtain maximum value.

Another internationally-cited result Elms has produced, is what he calls 'the principle of consistent crudeness'. "The quality of the result is dominated by the crudest bit of the information you start with, the bit you don't know. There is no point in working hard refining some aspects of what you are doing if there is a bit down here you know nothing about."

While recognising his ability, Elms downplays his role. "I get worked up about something like engineering in the environment and I start making noises about it. There are a lot of people out there whose whole career has been working on this. I am a johnny-come-lately and then I am seen to be a major figure ... and I know I'm not. I'm a bit of a fraud. I try and convince them my ideas make sense."

That's not what the pundits think.

David Elms is the only New Zealander awarded the Australasian Association for Engineering Education Medal, in 1993, for distinguished contributions to engineering education, and last year he had bestowed the rare honour of becoming a Distinguished Fellow of the NZ Institute of Professional Engineers.

It's been a personally rewarding career for Elms. "If I have to deal with a complex problem I will usually be working alongside one or more people who know more about the problem than I do.... because I work closely with these people and often in a difficult situation, we end up being very good friends."

It's part of the challenge that David Elms can't anticipate the kind of work that flows in to him. If he's curious he's into it, but his next question is "How in the world do I deal with this? And this questioning can often lead to a new CAE project, says CAE Executive Director, George Hooper. "It was David's recognition that new forms of contracting are essentially a risk management tool to better align client and contractor interactions, that led to the recent successful CAE conference on innovative contracts."

Nearing his retiring age of 70, Elms will have more time to spend up hills, listening to music and visiting grandchildren in London. But for now he's enjoying work:

"I hope there are out there, some really awkward and interesting problems people will continue to ask me about. It's satisfying and good fun and produces great friends."

CAE's Risk Management Programme Advisory Group comprises invited people from a wide cross-section of the risk management sector, and acts as a CAE reference group on opportunities, programme objectives and industry needs.

Calendar of Events...

	Location	Dates
DG Study Workshop (EEA Conference)	Christchurch	20 June
Contracts book publication		July
CAE Commentary 2		July
Waste Project Sector Workshops	TBA	August
Information Bulletin Number 21		September
APCCHE Cleaner Production Workshop	Christchurch	29 Sept - 3 Oct
NZ Energy Futures Conference		2 - 3 October (prov.)
NZSRM Conference		3 - 4 October
DG Seminar	Wellington (tbc)	October
DG book publication		October
Waste Minimisation Workshops	Rotorua	6 - 8 November
Information Bulletin Number 22		November

Please note that events advertised are subject to change. Events marked 'tbc' are to be confirmed. An up-to-date listing is available on the CAE website (www.caez.com). Alternatively, please call or fax the CAE office for further details.

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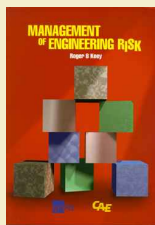
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