BARTLETT SCHOOL OF PLANNING

Incorporating Principles of Sustainable Development within the Design and Delivery of Major Projects: An international study with particular reference to Mega Urban Transport Projects for the Institution of Civil Engineers and the Actuarial Profession

Seminar – 1st April 2010: Report on proceedings

Omega centre
Centre for Mega Projects in Transport and Development

A global Centre of Excellence in Future Urban Transport sponsored
by Volvo Research and Educational Foundations (VREF)

1.0 Introduction and contents

This brief report sets out the aims, preparation and activities of the Seminar held to discuss the emerging findings of the RAMP Study. It includes the following sections:

- Aims, planning and preparation
- Invitees and attendance
- Programme on the day
- Focus and proceedings
- Conclusions

2.0 Aims, planning and preparation

The proposal by the Omega Centre for the RAMP Study included as an option a Seminar at which to present and discuss the emerging findings of the Study (Tasks 6.1 and 6.2 of the proposal). This was "… designed to present / discuss the proposed new appraisal framework and major findings." The proposal recommended "… that the Seminar could most usefully be held after the completion of Task 4 … when the Study Team will have reached mature conclusions regarding the proposed Appraisal Framework."

Discussions during 2009 indicated that the Steering Group saw the Seminar as a useful contribution to the Study and that it should take place at a late stage in the work. This would enable delegates to comment on the findings from the main stages. They could also respond to the Study team's emerging ideas on what approach and structure they might suggest for RAMP but before these ideas were developed into firm recommendations.

An initial report outlining the proposed arrangements was considered at the Steering Group on 16 December 2009. The date agreed was Thursday 1 April. Work to arrange the Seminar took place from early in 2010. A further report was considered at the Steering Group on 16 March 2010.

The main work involved contacting and inviting potential delegates, booking and organising the accommodation, and organising refreshments. This was undertaken primarily by the Steering Group Secretary, with good support from colleagues at ICE, and with some input by the Study Team Project Manager.

A briefing report was sent out to all delegates in advance, to provide the with an understanding of the Study aims and work programme and the main findings to date. This outlined the work undertaken and main findings on the principles and issues of sustainable development drawn out by the literature review and the questionnaire surveys, including the role of Multi Criteria Analysis and Cost benefit Anslysis. It set out the emerging thoughts of the Study team on how to incorporate sustainability factors into the RAMP processes, based primarily on papers discussed at the 16 March 2010 meeting of the Steering Group, modified to take into account the Group's views.

3.0. Invitees and attendance

The list of delegates was aimed at drawing together a range of people with the relevant experience and knowledge, in order to gain a well considered discussion. A draft list was considered at the 16 December 2009 Steering Group and the list was reviewed at the 16 March 2010 Steering Group.

The initial list of potential invitees was drawn up to include:

- respondents to the questionnaire surveys
- other key people suggested by the Steering Group
- other key people suggested by the Study team
- the Steering Group
- other members of the RAMP Committee
- the Study team

Formal invitations were sent out to about 40 people, mostly in February or March, although a good number of people were informally contacted before then. Acceptances or refusals were received fairly soon from many invitees. Regrettably several invitees did not respond, even to follow-up emails and telephone calls. A few who were unable to attend nominated colleagues in their place.

It was envisaged that the overall numbers should be around 30, of which about 20 would be invitees from outside. In practice the final number , including members of the Steering Group and Study team, was 23

Appendix 1 lists those who attended the event.

4.0 The programme on the day

The actual event was scheduled for three hours (10.00-13.00). The main objective was to obtain a balance between the three elements of presentations, discussions in groups, and feedback followed by plenary discussion. Brief breaks between sessions were also deemed important.

An additional problem was created on the day by ICE's unexpectedly scheduling a bomb emergency practice. This took up the first 25 minutes, and required everyone to go down to the basement.

Thus the actual timetable was:

- 09.45 registration and coffee
- 10.00 bomb emergency rehearsal
- 10.25 Chairman's introduction
- 10.30 presentations by Study team
- 11.20 introduction to group discussions

- 11.30 start of group discussions
- 12.10 end of group discussions
- 12.15 feedback by rapporteurs
- 12.25 start of plenary discussion
- 12.55 conclusions and thanks by Chairman
- 13.00 end of Seminar, lunch

Leadership and reporting were as follows:

- The Seminar was chaired by Steering Group member Mike Nichols (sadly the Steering Group Chairman, Chris Lewin, was prevented from attending by severe weather in his home area).
- The three discussion groups were chaired by members of the RAMP Steering Group / Committee.
- Two members of the Study team plus an invited researcher in a similar field acted as rapporteurs for the three discussion groups and gave the feedback on them.

The proceedings were, with agreement of the delegates, recorded. The recordings were subsequently transcribed.

5.0 Focus and proceedings

The Steering Group defined three key questions for discussion. These were addressed by the three groups and at the plenary session. They were:

1. How far do you recognise and accept the key findings and analysis?
2. What are your views on how the key findings can be applied when appraising projects?
3. What do you believe will be the final beneficial outcome from the research?

From the transcriptions a summary was prepared of the key points made in the discussion groups and the plenary sessions. These summaries of proceedings are set out in Appendix 2.

6.0 Conclusions

It is considered that the Seminar proved a fruitful as well as interesting event (despite some late hitches). The discussions over the material presented generated some insights which will prove valuable in completing the Study. The event also helped generate interest in the work being carried out for the RAMP Committee and highlighted some issues which have wider currency for project planning and management. It is thus considered to have reached a successful conclusion.

Appendix 1: RAMP seminar – delegates

Title	First Name	Surname	Position	Organisation	Location
Dr	Roger	Allport		RAMP Steering Group	
Professor	Elisabeth	Campagnac	Director of Research	Ecole Nationale des Ponts & Chaussees	PARIS, FRANCE
Mr	Stephen	Joseph	Director	Campaign for Better Transport	LONDON, UK
Mr	Peter	Hine	Associate Director	Capita Symonds	
Mr	Tom	Worsley	Deputy Director, Network Analysis & Modelling	Department for Transport	LONDON, UK
Mr	Gordon	Hutchinson		Forum for the Future	LONDON, UK
Mr	Trevor	Llanwarne	Government Actuary	Government Actuary's Department	LONDON
Mr	Colin	Wilson		Government Actuary's Department.	LONDON
Mr	John	Hawkins	Head of Management, Procurement and Law	Institution of Civil Engineers	LONDON
Mr	Doug	Oakervee	Chairman	Laing O'Rouke HK	HONG KONG
Mr	Alan	Stillwell	Director	Merseytravel	LIVERPOOL, UK
Professor	Harry	Dimitriou	Director, RAMP Study	Omega Centre, UCL	LONDON, UK
Mr	Reg	Harman	Project Manager, RAMP Study	Omega Centre, UCL	LONDON, UK
Dr	John	Ward	Assistant Project Manager, RAMP Study	Omega Centre, UCL	LONDON, UK
Ms	Yen-Ning	Tseng	Research Assistant	Omega Centre, UCL	LONDON, UK
Mr	Terry	Hill	Head of Transportation	Ove Arup Partnership	LONDON, UK
Dr	Tim	Marshall		Oxford Brookes University	OXFORD, UK
Mr	Michael	Clark		RAMP Steering Group	LONDON, UK
Mr	Mike	Nichols		RAMP Steering Group	LONDON, UK
Mr	Jerry	Greenhalgh		RAMP Working Party	LONDON, UK
Mr	Clive	Hopkins		RAMP Working Party	LONDON, UK
Ms	Alison	Brown	Secretary	RAMP Steering Group	
Mr	Jim	Steer	Director	Steer Davies Gleave / Greengauge21	LONDON, UK

Appendix 2: Summaries of main discussion points

Discussion Group 1

Our forecasting ability is poor, particularly for public sector projects, and particularly for social and environmental impacts. We must improve on this in order to be able to appraise success.

A definition of ‘stakeholders’ (as distinct from more generic environmental interest groups) was suggested as those outside the project but with an influence on it. One way of examining the importance of stakeholders is to plot them on a graph with interest and influence as the two axes (for example the Treasury have a lot of influence but no interest in the individual project). Stakeholder engagement affects success, both positively (by helping define the project and affect operational success) and negatively (as opposition can cause delay, can set the agenda for you). Stakeholders have a valid role in influencing the project – ultimately they judge the outcomes as they have to live with it – but they are partisan by definition and so can also compromise it.

Multi-criteria analysis can be combined with stakeholder engagement to demonstrate to stakeholders how their concerns have been addressed, what weighting is given to them in the analysis.

Governance structures are needed to provide a transparent but effective trade-off between different interests and competing criteria, i.e. a way of overseeing and directing the overall programme at different levels. In the RAMP framework, the sponsor is responsible for ensuring trade-offs reflect stakeholders’ views. But at option appraisal stage sometimes neither the sponsor nor the project scope have been identified (i.e. the choice between different options remains open). A failing of some projects is the lack of a clearly defined sponsor (in terms of someone with responsibility and power) or clearly defined outcomes. Re-opening options at a later stage in the project is often impossible (e.g. changing a single carriageway to a dual carriageway half way through construction).

The governance structure, or institutional framework, should clarify the command chain and how policy is translated into the real world. This is always politically inconvenient and in practice the structure is often weak or retro-fitted (e.g. Crossrail, Olympics, perhaps because projects people are too technical to be interested in institutions), but is essential for project outcomes and for their long term sustainability.

In terms of sustainable development, whether to intervene or not will become a key decision and success will need to be measured other than just in economic terms. However, we’re not measuring success at all yet, post-project evaluation is rare and has been inconclusive (e.g. Jubilee Line Extension).

The governance framework also affects the type of toolkit you need to deliver analysis to decision makers. The toolkit has to be flexible to adapt to the different institutions involved in decision making.

The role of the Infrastructure Planning Commission moves decisions on mega projects forward in that the basic principle of development becomes national policy. But the (draft) National Policy Statements to date have treated project initiation as up to the market, whereas in reality a lot of projects are funded by, or subject to the approval of, the public sector. Conversely the outcome of the Eddington Report and Network Rail's five year control period provide stability in infrastructure development.

Highways Agency, with the introduction of sponsorship, now focuses more on accountability for investments, clarifying scheme objectives. This helped change priorities and cut the cost of the overall programme.

Projects need to be framed in a broader context - should RAMP begin with a definition of context (e.g. specific national government requirements) and the need to place the project within it?

Currently there is very little guidance on assessing social impacts such as health and education, on whether project interventions can change trends and deliver benefits in these areas. Some government policies, such as school academies, are unsustainable in extending travel distances – this raises the issue of balancing individual choice against the centralised need to control choices.

Giving weightings to minor changes in environmental impacts can often lead to spurious answers and unnecessarily detailed analysis – asking the public to vote on project priorities might be as effective.

Social benefits might include employment generation (e.g. on the 'Shard of Glass' building – Southwark Council estimate that training a local unemployed person saves substantial amounts in housing and other benefits). Black economic power in South Africa provides lessons on using World Bank funded construction projects to generate employment and encourage SMEs (NB this requires some flexibility on World Bank rules about competition).

Context can define how ambitious to be in methodology – i.e., what can and can't be forecast. Worked examples would be useful, one with a well developed forecasting process and one without.

Guidance would also be useful on how to combine different layers of multi-criteria analysis (i.e. stakeholder impacts, business impacts, impacts on adjacent non-users etc). What indicators could/should be used to measure sustainability (ie should it be over the whole life cost cycle, construction phase, very long-term)?

Discussion Group 2

The private sector perspective focuses on enhancing value for shareholders. Public institutions have a different perspective. MCA is used for decision makers, mainly in government, but a different approach is needed for private sector sponsors. There is an increasing focus amongst institutional investors on shareholder value over the long-term as well as (or in preference to) the short-term; this should influence the appraisal process.

One criticism of the report is that environmental and social dimensions are treated as an add-on and a tension that has to be resolved. Current thinking views these as opportunities to find a business solution that meets all the objectives (of sustainable development), e.g. ICI producing a better paint in terms of function as well as social and environmental impacts. The report needs to reflect current thinking more.

Or are these new requirements, new methodologies and tools, just creating added complications without delivering better projects? The report should recognise that environmental and social dimensions introduce various constraints on the project (across a spectrum from historic monuments to carbon emissions). Some constraints may not be absolutes but may be perceived as absolutes by a group of stakeholders – can you trade off the future of the human race for a 30 second time saving? MCA is criticised for this sort of thinking.

Politics can influence environmental impact assessments, e.g. Obama, by drilling off the coast of Virginia, is giving concessions offshore to get through his green policies through the Republicans onshore. The judge's recent decision on Heathrow's Third Runway suggests that systems need to be flexible to allow a fundamentally revised appraisal to reflect the results of engagement.

Does policy determine decisions or is it politics? For example, the Central London Rail Study used multi-criteria analysis and concluded that the Chelsea-Hackney Line should be first priority, Crossrail second and the Jubilee Line Extension third, but development actually happened in reverse order.

The report focuses on two axes of cost-benefit analysis and stakeholder engagement, but the latter seems to be prioritised – should there be a more balanced assessment of sustainability objectives including economic and societal issues, perhaps involving Pareto efficiency? Is the emphasis on stakeholders a cop-out? Is it a denial of leadership and analysis, giving power to those who shout loudest?

Some projects would never have a positive cost-benefit analysis but should still be done (eg the Olympics, hospitals). But efficiency is necessary even for charities, to deliver value.

In planning now all the focus is on stakeholder engagement and making consensus decisions but this doesn't necessarily produce the best or fastest decisions. It's vital but not enough (necessary but not sufficient). The report describes companies as seeing sustainability as damaging to profitability when many have explicit sustainability goals. However, the objectives of government sector sponsors also have to be understood. And it won't be enough for companies to set their own sustainable objectives as ultimately the economic bottom line may not be a sustainable solution. Sustainable objectives have to take precedence over commercial ones, even where they conflict.

But implementation also raises difficult issues. The US didn't sign up to Kyoto because they understood it would mean sacrificing jobs. Similarly, a bypass might reduce through traffic and accidents for the bypassed villagers – are we ready to sacrifice this for the long-term good of the planet?

Option identification is the key – the direction depends on what questions you start with. The DfT's 'delivering sustainable transport' studies are looking at non-transport solutions as well as transport (a much wider initial scope). However, option identification has often been flawed and indeed superficial, and clients can be committed to pre-determined ideas. Whereas on large projects, many different solutions could potentially address the same objectives.

How to work out where the boundaries to an open system are? Although there are no boundaries in an open system, practically it's necessary to set some in order to make the system manageable.

How can the key findings be applied when appraising projects? Key questions are: what are the constraints? Is business or government taking the decision? Who is the sponsor? What other options have been considered? The holistic approach, considering environmental and social as well as financial, is useful but it isn't always possible to quantify broader risks.

Appraisal is context driven and is affected by timing – is there such a thing as an absolute appraisal? Is there a duality between appraisal for the board (financially focused) and multi-criteria analysis for external stakeholders – what happens when they have different conclusions? Projects that don't tick the non-financial boxes wouldn't get off the ground. Commerciality is only the third axis. Other objectives ensure the company's reputation and long-term sustainability.

The final beneficial output from all the research could be greater attention to option generation and appraisals, to the need to weigh all aspects of projects necessary to make them successful, serious assessment of sustainability. The transition from open to closed systems is not systematic but is driven by politics.

Discussion Group 3

The report discusses the use of multi-criteria analysis to address non-economic factors and sustainability issues in appraisal. These could include the role of e.g. transport projects in delivering social objectives, although it's difficult to establish causal links between transport and e.g. alleviating poverty in a specific area because other agencies are also working on this. In general, measuring these factors is difficult. The available guidance only covers impacts, e.g. increased noise in deprived areas, in the year of opening.

DfT also now (e.g. on Crossrail) include wider economic benefits in the Treasury's statement of agglomeration principles. The report has been changed to reflect this development but does it just de-contextualise it as something generic? No, because using local data ensures that the specific context is reflected for a particular scheme.

The report deals with decision making, but has little discussion of decision makers. Decision making is based on CBA and affordability (and on how Ministers will be judged in public), so the impact of real world constraints on appraisal needs to be addressed. For example, how do the Public Accounts Committee and National Audit Office assess government decision making and risk management?

Although the MCA process is established at one level (a technical level?), public sector decisions are ultimately based on VCR (value-cost-ratio?/CBA?). Politicians' agendas can be completely unrelated to technical appraisals, but multi-criteria analysis is an attempt to bring both together within the same framework, e.g. the Thames Gateway 'vision', which leads to government financing a project way beyond its initial budget, could be incorporated within multi-criteria analysis. However, although the framework aims to open up this interface, the use of multi-criteria analysis does not imply political factors can be reduced to objective measurement, as decisions are ultimately political policy interventions and beyond measurement. It's useful to distinguish between policies and the strategies or projects that deliver them.

Politicians need to be made aware of how different decisions interact, e.g. the deregulation of aviation created unanticipated competition for the Channel Tunnel Rail Link.

One criterion for assessing projects should be the flexibility to make changes in the future. This relates to freezing projects, the politician's short life compared with the mega transport scheme, and the sustainability of politics and institutions. This is particularly important in the UK, where decision making processes are peculiarly complex and lengthy. However, there are examples in other countries (e.g. the USA) of similar difficulties in deciding on major projects; the countries that do it better are a minority. Even where rational processes exist (e.g. the UK's National Policy Statements and Infrastructure Planning Commission), in reality, decision making is dictated by the institutional regime in the country.

Research by SPRU (Sussex) on multi-criteria analysis in other sectors suggests it is a learning process, and one lesson of including the institutional dimension is the impact that fragmented or thinly resourced institutions have. So multi-criteria analysis can also analyse new institutional arrangements and government power structures, e.g. in the UK the Treasury have had too much influence compared to other countries, and other government departments have been reluctant to engage with Treasury, because they haven't been properly briefed. On Crossrail, joint Treasury/DfT workshops were a big breakthrough, and the current economic situation is likely to create more change in government style.

Can/should project appraisal be part of RAMP (which is about risk)? It's about robustness to institutional changes, such as impending change of government resulting in new policy approaches, e.g. the Tyne & Wear Metro design could have reflected the risk of bus deregulation. Incorporating sustainability in project appraisals heightens the complexity and risk, but also the robustness of the appraisal. Sustainability involves a more complex set of risks which have to be taken into account in the project business cycle.

This is a more holistic view of risk than RAMP – it includes the organic, frozen stage. Multi-criteria analysis for monitoring and evaluation also allows tracking of changes in policy goalposts. It shows open and closed systems are related, so the project can't be treated just as a closed system. Perhaps RAMP should be incorporated into MCA, rather than vice versa, including social as well as economic risks.

The premise is that the current RAMP procedures and framework exclude social and environmental dimensions of sustainability (and institutional), whether it's an open or closed system.

The Office of Government and Commerce (OGC) procedures influence Government's management of projects and have some similarities to this approach. In practice OGC procedures help you focus on objectives, the business case, evaluation measures, but preclude taking certain things into account.

In the French case, with government moving towards regulation rather than decision making, the report could interest people from government in the regulatory field and also private companies and agencies.

If we're serious about sustainable development then a version of option five is the only possible appraisal typology. The starting point has to be the sustainability of the proposal – the options appraisal and application of MCA is a second stage and only accessible if the proposal is sustainable. This should apply at policy level as well as a programme/project level. If decisions contrary to the analysis are taken for political reasons, the process of doing so should be open and transparent so that it can be challenged.

Plenary session

Reg: key findings and analysis: the group moved on and picked up other points in terms of project sustainability, project management, institutional and contextual issues. How the key findings have been applied: we're not good at forecasting, even financial. The significance of stakeholder engagement, what defines them, managing and categorising, does it include government? Stakeholders almost generate what matters and what does not: a fundamental of any project is why you're doing it, the context. Institutional aspects: projects are led by technical people, or don't have a sponsor within the sponsoring organisation. On research, the environmental side is now covered but wider social, health, education, community issues remain difficult to measure and apply weights to. On research outputs, an annex with worked examples, identifying measures and timescales.

John: key findings and analysis: in planning, inclusiveness and consensus is a popular direction but perhaps not the right one. The private sector have sustainability goals, they weren't picked up enough. It would be nice if sustainability was the same as economic outcomes, there is a duality in how it is assessed. Option identification is key: if you phrase the options in a different way you get different answers. We are at the boundaries: how do you define the boundaries of an open system? How the key findings can be applied: establishing constraints early in the assessment. Who takes decisions, project sponsors or policy, political decisions? Appraisal and key stakeholder involvement should happen before too much money is spent. We can't quantify many broader risks. Analysts focus on financial appraisal, the board is more strategic, can they merge? On research outputs: attention to appraisal and legitimising projects, enhancing awareness of weighing all aspects of projects, serious assessment of sustainability, tools for the transition from open to closed systems – currently decisions are driven by politics.

Tim: MCA and the recommendations were familiar but there were differences within the group, assessing and weighing factors is always controversial. MCA isn't an enclosed measuring style conceptualisation, it's an opening out tool, bringing things out for debate and emphasising transparency. How the risk side of RAMP links to sustainability and MCA, is there a two-stage process (if you tick the sustainability box, move on to MCA)? Secondly, from the outside in, the real world institutional constraints - the OGC, Audit Office, value for money, will this approach fit with their institutional agendas? Institutional sustainability factors, the Treasury's power in relation to the spending Departments. One valuable output would be to promote a new language, to go beyond CBA and MCA, overcome reverting to the business case, in the same way as 'sustainability' has become acceptable rhetoric, over about 20 years.

Speaker 1: the benefit of MCA is being able to engage a broader stakeholder group and get their input into shaping things, it's not about measurability.

Speaker 2: we did have concerns that measurability was an issue, but also that context played a part in measurability and that wasn't reported back.

Speaker 3: the RAMP guide might be prefaced by a context stage, including institutional issues and relevant stakeholders. We should understand the context, how ambitious we should be, before we narrow down, and be realistic about our ability to forecast even fundamental financial things. Social and environmental impacts are also difficult to measure. The research output might be worked examples, one ambitious, with a forecasting and appraisal framework and one without. We should first ask why, then what matters, and find out by talking to stakeholders - this is the key to making progress.

Speaker 4: the extra chapter for RAMP will move from straight, marginal economic analysis towards sustainable development. But there are unknowns or uncertainty about that process, and how it might be improved, so proposals for further research and development should come out of this.

Speaker 5: we should be not timid, the assumption that most people will take decisions on cost-benefit analysis was challenged 20 years ago and in public policy it's not there at all.

Speaker 8: this holistic view of appraisal was around in the 70s and 60s, but banks still use CBA, and there's been an opaqueness about formal procedures being CBA-led and the decisions don't match. MCA is holistic, retaining CBA but drawing out stakeholders' prioritisation of issues in a transparent form. It has a hard core quantification school doing optimisation models, and the soft side like SPRU, you can use both to arrive at measured decisions.

Speaker 5: I can't think of a single major public sector project decided by cost-benefit analysis, not one.

Speaker 9: The RAMP handbook was addressing the typical business case, which is expressed in financial terms, despite talk of incorporating environmental and social factors within it - the triple bottom line. in this research we wanted a more systematic, transparent, replicable approach to project appraisal and to defining project goals, defining and measuring success. Does it take us forward in that journey?

Speaker 10, I'm not sure who 'us' is in this context, there are at least three groups involved; government and regulators decide if the project will go ahead and may finance it, financiers may be interested in short term or long term returns, and then the businesses running the project, they've got different approaches. MCA can bring those out, but its application will vary, so you need to work out who 'us' is.

Speaker 11: In RAMP and this initiative, we're looking at risk from the sponsor role, the person who is accountable for the outcome has to take account of different interests, but there is a trade-off. we were looking at a systematic, transparent way of dealing with this and meeting as far as desirable and possible the expectations of various stakeholders.

Speaker 12: you need to think about stakeholders in a more holistic way than applied here, the traditional approach is to think of them as NIMBYs, but they decide if the project is viable, e.g. investors, or OFWAT in relation to water projects. Unless you understand where they're coming from, the investment isn't going to happen and/or isn't going to make a return.

Speaker 13: I've seen a change in attitude to stakeholders over the last 20, 30 years, to dealing positively with stakeholders, managing their expectations and contributions within the programme management.

Speaker 14: we're assuming we've got the right criteria, they've been objectively measured, and there's a weighting, how do we get those weightings? They're subjective, we're all different and they'll change over time, priorities change in a recession, so sensitivity tests on weightings are fundamental, with the public sector now risk averse, you're looking for a project with a robust viability under a range of scenarios.

Speaker 5: we've charted the journey from CBA to MCA, but if we'd started there we would have got deeper into objective setting, option identification, weightings, the stuff that really vexes sponsors.

Speaker 8: SPRU's research on MCA in other sectors shows that it brings stakeholders together in a way that opens dialogue and shares knowledge from different perspectives (reinforced by experience of Crossrail), and that this is as important as the technical appraisal process. We're trying to engage a movement towards MCA rather than impose it.

Chairman: another significant initiative, between the actuarial professions and the Institution of Civil Engineers, is to bring together separate strands of RAMP into a holistic picture, 'enterprise risk management'. I agree we're not nearly ambitious enough: I believe we should expect every project, programme, major investment in infrastructure or business change to be wholly successful every time. We need to know, in each case what success means: it's not what you define at the outset, the world changes and you have to reflect change, I see this as very important to help deal with a changing emphasis between purely economic considerations and other values.