

THE UKOOA RISK BASED DECISION FRAMEWORK

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This paper describes the work undertaken by the United Kingdom Offshore Operators Association (UKOOA) to develop a framework to facilitate and guide the process of decision making. Within a risk based regulatory environment the oil and gas operators have had to state their own objectives and then demonstrate how they have achieved them, this framework provides a transparent protocol to facilitate that demonstration. The offshore safety regulations have required the UK Offshore Community to develop a series of approaches to managing major hazards within a risk based context and that community is legally bound to demonstrate the effectiveness of that management. This framework describes how prescriptive standards and goal setting can be mutually supportive and how the process of defining decision types and then resolving them can be described in this one framework thus facilitating the decision making process for all parties.

The paper will describe the key drivers to that process and the related context of each decision and how the context will affect the decision process itself. It will also provide some of the background to the project, why it was necessary and who has contributed to it.

Keywords: risk based, decision making, hazard management, UKOOA

INTRODUCTION

The offshore community has over the last 10 years shown great imagination in adopting and generating ideas and approaches that have helped safety practitioners and regulators move from a prescriptive to a goal-setting safety regime. The move has run in parallel with a change of public mood where there prevails an atmosphere of low trust in large organisations. The general public as well as the affected workforce now rightly demand more information on issues affecting them and have moved through stages of informing and awareness from “tell me” through “show me” to “involve me”. Thus information has to be open and decisions have to be transparent. It does not mean however, that the public has always put the information presented into a proper context, that is where we the practitioners in the safety industry have our role to play. Figures 1 and 2 clearly show one aspect of public perception of risk and the climate of low trust still prevailing.

Thus for this project to succeed it had to have some quite clear objectives;

- To consult widely on current practice in and expectations of the decision making process,
- To develop a decision framework which incorporates current best practice and meets the needs of the offshore industry,
- To achieve, through the consultation process, a high degree of buy-in to the decision framework developed.

The project set up through UKOOA was awarded to AEA Technology and a project wide approach was set in motion. The process was guided by a technical steering committee, the members of which discussed approaches with AEA Technology and attended workshops and interviews as part of the information gathering process. The information gathering and

consultative process encompassed many interests and organisations, all of whom are acknowledged in figure 3. The completed work is now available from UKOOA¹.

CONSTRUCTING THE MODEL

THE KEY DRIVERS AND SETTING THE CONTEXT

The Model assumes that solutions that derive from technological bases or values bases are not diametric opposites but are stages on a continuum. The model anticipates that solutions will fit within a range from the purely technological at one end to those embodying personal, corporate or societal values at the other. There are then, drivers that begin to position each decision on that continuum; these have attributes such as;

- Are there already well established solutions?
- Are the risks attached to this decision well understood?
- Is the problem or are the potential solutions very novel?
- Are there significant risk trade-offs attached to the problem or resulting from the potential solutions?
- Are there strong views and perceptions among the stakeholders associated with this issue?

As the drivers move from the technological end of the continuum to the values end, it is important that the seniority of management making the decision also increases. Decisions in this area will stem from company policies and will impinge on company reputation, such areas are rightly the province of senior management. Figure 4 shows the transition of the decision into senior management enabling us to place a decision into context at the appropriate level of authority.

A major benefit of this model is that the process of defining the decision and placing it in context prior to choosing a solution is itself a valuable process. Often defining the problem in a common form to all stakeholders represents a major step towards finding the solution.

CALIBRATION, CHECKING THE DECISION

A key issue when making decisions is to confirm that the solution is appropriate. Objective decision-makers will set their deliberations against a background of experience, precedent and expert recommendation. In practice this means that they will refer to;

- Applicable Codes and Standards
- A Verification process
- Peer Review
- A Bench-Marking exercise
- Internal Stakeholder consultation
- External Stakeholder consultation

It should be noted that these calibration exercises themselves also move along the “technology/values” continuum. Purely technological solutions lend themselves readily to calibration against existing codes and standards, when elements of standard practice and engineering judgement come into play, the decision maker will naturally look at a formal verification of their decision and will seek the approval of their peers. As judgements start to

dominate the decision process, almost certainly a benchmarking exercise will be initiated, to confirm the appropriateness of the data, the assumptions and the modelling. As the decision moves into the realms of values, consultation becomes a natural process. It can be seen at this stage that the decision model is not telling us to do anything differently, it is capturing the thought processes and practices of much current decision making.

THE DETAILED FRAMEWORK

We now have a range of elements of the model to bring together to create the detailed framework. Namely;

- A continuum from “Technology to Values”
- A range of drivers to define the decision and place it in proper context
- An underlying principle governing where the decision should reside in the management seniority
- A calibration hierarchy for reviewing decisions and their context

However, some of these elements require further detail or “fleshing out” to make them work. The “Technology to Values” continuum does not show any steps or changes of emphasis as the context moves from one end to the other. Let us look at the factors that populate that continuum before we fill in the pieces.

THE “TECHNOLOGY TO VALUES” CONTINUUM

There are a number of categories of reference material that should be used when considering the decision, some of which have already been alluded to. These sources of data, information and experience should reflect the drift on the “Technology to Values”. A common reference point in determining an engineering solution is to refer to existing codes and standards. These may be international or national standards, and they may be industry codes or company standards/codes of practice. They will have been developed as part of industry’s or a company’s operating experience on certain types of installation or plant or equipment.

There are “standards” or “practices” of a lesser authority which all engineers use, these are generally captured under the term “good practice”. It is often a method of accumulating experience that does not quite have the bona fides of a published standard. This category of information is often the undercurrent that is making its way into a standard, this movement of information across categories is one all professional engineers are familiar with and it plays an important part in the use of this decision model as is discussed later in the paper.

Following this hierarchy of information through, when faced with slightly unusual situations or novel applications, engineers will often break the available data into their component parts and apply those parts that are still applicable. From this dissembling of information, judgements can be made on situations that have no ready answer. This category of information or knowledge also plays its part in the dynamism of knowledge capture into published standards.

When faced with finer judgements on issues of risk, a next step is to review the situation numerically. This may entail the use of risk analyses and associated cost benefit analyses, this will be the application of base data applied in a probabilistic manner to assist a decision. As

all practitioners of Quantified Risk Analysis (QRA) and Cost Benefit Analysis (CBA) know, these analyses are indicators in the general sense and should not be applied in the specific.

The data and knowledge reference material has now moved firmly through the realms of the probabilistic and must now acknowledge issues of belief and expectation, i.e. values. First and foremost, a company will apply its own values, those attributes of its company culture. They may not necessarily be written down but they are always there. They will include expectations on how to treat their employees and their neighbours in the community. They will include issues of openness of information, assessments of each employee's worth, not just as an individual with liabilities and responsibilities but as a contributing member of the company with specific knowledge and skills to continue contributing over the rest of their working life. In all areas where decisions are elusive, management will always bring their perception of company values to bear, the decision framework model merely recognises this step and places it on the "Technology to Values" continuum.

This brings us to the next step in the continuum, what society expects of us all, both in our role as engineers and as members of our particular industries. These values change alarmingly, they can be unpredictable, they are often irrational but we ignore them at our peril. If they are values that stand the test of time, generally, they are incorporated into good practice and ultimately standards, but at any time they do reflect an expectation of our behaviour and as such must be considered in the decision making framework at the appropriate time.

All of these reference sources are brought together in their appropriate sequence to give some body to the "Technology to Values" continuum. They require an appropriate level of weighting when applied to each decision, the shapes shown in figure 5 represent this level of weighting. The weightings shown are indicative only, there should be no impediment to amending the framework to suit the characteristics of the situation, the context and the culture of the company and politics prevailing in its chosen place of operation. The user should feel free to modify the framework to suit their needs, it does not detract from the framework becoming an open vehicle to guide or capture the decision making process.

DEFINING THE DECISION TYPE

There are certain attributes of the use of technology and values that apply throughout the continuum to varying degrees.

- **Uncertainty:-** At the technological end of the continuum, the uncertainty is low, solutions are based on existing practice, national and industry standards. The solutions are proven and there is operating experience based on those solutions.
- **Familiarity:-** This attribute is almost the converse of uncertainty. Merely because an issue is familiar does not mean it has zero or negligible uncertainty. It does mean however, that we have become familiar with the level of uncertainty attached to this practice. It is therefore right and proper that this attribute is treated separately. Familiarity will result from decisions having been solved by good practice or engineering judgement or the application of standards. It should mean that the shortcomings and strengths of the solutions are well known and that the associated activities to achieve success are well understood. However, it also requires a truthful understanding on the limitations of any

application, thus as decisions move into novel areas, we must recognise that the likelihood of our being familiar with the potential solutions will diminish.

- Perception:- This attribute refers to the educated (or uneducated) perception of the problem and the potential impact of the solution. Perceptions have tended to be stronger where issues relate more closely to values. That is, situations where values are not seen to have been upheld or novel situations where values have yet to evolve. Thus the impact of perception will be stronger on decisions affecting values than on proven technological solutions.
- Risk:- This is the common theme throughout the whole “Technology to Values” continuum and all the associated attributes. There remain various issues that must be addressed when looking at the decision types, these are typically but not exclusively;
 - Are the risks well understood?
 - Are risks being traded-off between various stakeholders?
 - If risks are being traded-off, are there significant risk transfers between various stakeholders?
 - Are there large uncertainties associated with this decision especially attached to the risks?

All of the preceding decision attributes have been graded alongside the “Technology to Values” continuum. The issues and drivers were then categorised into 3 grades to facilitate the selection of the decision type. As can be seen from figure 5, decision types A, B or C can be categorised by posing the questions associated with each grade. It should be noted that this process is not always straightforward and decisions do not always fall neatly into one type. The process of defining the question is in itself valuable. Where attributes of a decision type fall into more than one category, the process of noting why the placing of the decision into a particular context indicates how the decision maker(s) perceive the questions and the issues. Recording this process is a key part of using the decision framework.

As discussed earlier, the “technology to values” provides an indicative level of weighting when applied to each decision. The shapes shown in figure 5 represent this level of weighting. For example, in decision context A, Codes and Standards dominate the category, Good Practice and Engineering Judgement more or less complete the rest of that context grade. Only as the decision context starts to move towards more reliance on probabilistic methods does the band representing Risk Based Analyses start to become evident. The weightings shown are indicative only, there should be no impediment to amending the framework to suit the characteristics of the situation, the context and the culture of the company and politics prevailing in its chosen place of operation.

THE LIVING FRAMEWORK

We have discussed the various constituent parts of the framework and how they interact and contribute to the decision making process. We have hinted thus far at the ability of the framework to change and to accommodate an evolution of standards and values. The framework recognises that decisions and situations arising at the values end of the “Technology to Values” continuum reflect company and other stakeholder views and perceptions, decisions arising in this area tend to have less consistency across other industry

and other stakeholders. However, as we have seen so often in the past, one industry tends to export its practices to others where those practices have common benefit. So, where commonality is found, the standards and practices will be consolidated and incorporated into codes and standards. The framework acts as a living reference point, reflecting changes and evolution, and capturing changing expectations.

This ongoing process is illustrated in figure 6.

CONCLUSION

Thus, in conclusion, the Risk Based Decision Making Framework provides protocols and guidance for defining decisions and using reference material for seeking solutions. It provides for some key attributes that will facilitate all decision processes, namely;

- It provides transparency in the decision making process.
- It shows that values can be integrated with technology, that they are part of a continuum.
- It supports consistent a decision making process, but because the decisions are context dependent, it should be noted that they may not necessarily be consistent decisions.
- By bringing together the use of standards, judgement, QRA and values, the framework supports the determination and demonstration of setting risks to As Low As Reasonably Practicable (ALARP).
- By providing a consistent process and protocol, the framework will improve decision making.
- The framework accommodates the evolution of expectations and the subsequent continuous improvement.
- It provides for participation as appropriate, by including consultation as a key reference point at the appropriate juncture.

COMMUNICATION AND USE OF THE FRAMEWORK

The framework will be considered successful if it is widely communicated and widely adopted, thus, a programme has been set in place for communication to a wider audience. So far we are part way through this programme and indeed this paper is part of that programme.

So far this programme has proceeded as follows;

- It has been introduced at the “**Changing Health & Safety Offshore** The Agenda for the Next 10 years” conference 1998²
- Feedback has been received from further consultation within the offshore industry, namely the Health & Safety Executive and the Inter Union Offshore Oil Committee, etc. (there were follow up meetings with the HSE earlier 1999)
- The finished framework and document was presented to the UKOOA Council in Feb 1999
- Issue No.1 of the document was published in May 1999
- Further conferences have been, Fire and Blast Information Group (FABIG) in Jan 1999
- The Electrical Research Association (ERA) conference in Nov 1999

Further exposure is still being planned where the opportunities arise, the framework must be visibly adopted to add value to the health & safety business.

There was an additional follow-up workshop to review success and application at the end of 1999.

APPLICATION OF THE FRAMEWORK

The application of the framework is not always straightforward and some discussion of our experience may be useful at this stage.

Generally, following a simple review of previous types of issues found in offshore platform design, the range of design decisions would be expected to follow a certain type of distribution. That is, in any design project, there are lots of design decisions relating to the use of codes and standards, there are substantially fewer requiring numerical risk analysis and judgement and fewer still requiring reference to company and societal values. An example of one such review is shown in figure 7. This illustrates the sequence of decisions that should be considered when taking steps to reduce the likelihood and consequences of explosions. Each decision associated with that step in the protection hierarchy has its decision type shown alongside.

The expected distribution of these decisions by type is illustrated in figure 8.

IN CONCLUSION

The framework has appeared to those of us involved with its development to be worthwhile, it is another tool in the armoury of the safety professional and indeed of anyone in the management team to help them fulfil their function better. It has been built from the way that people think so it should be no surprise that it matches much existing experience. Its strength has been to capture the best of current practice, set out a framework to encompass the best of what is developed. Those of us involved with its development hope you find it useful.

REFERENCES


1. UKOOA (UK Offshore Operators Association), 1999, Guidelines on A Framework for Risk Related Decision Support, UKOOA Publication (Issue No.1)
2. Health & Safety Executive Offshore Safety Division, 1998, HSE Conference, Changing Health & Safety Offshore – The Agenda for the Next Ten Years Report of Conference Proceedings, 22-24 July

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Risk Climate



Report claims safety figures are worthless

Offshore workers 'still at risk'

HERALD 8/7
KIRSTY SCOTT

TEN years after the Piper Alpha disaster new research suggests the UK offshore oil industry is putting further lives at risk by continuing to exclude the workforce from proper involvement in crucial health and safety issues.

Dr Charles Woolfson, of Glasgow University, the conference organiser and co-author of the new study with Dr Matthias Beck, of St Andrews University, said they believed UKOOA's figures on safety were "worthless" and it was important the


significant downturn in incidents from the mid-1980s at the point at which the Norwegian safety regime adopted the advanced principles of safety management which involve the entire workforce and its trade unions. What the

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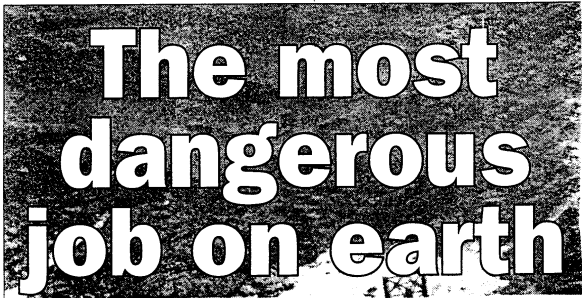
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Figure 1 - Report in the Aberdeen Herald 8th July 1998

Risk Misinformation



'Complain too loudly and you could find yourself ashore'



The most dangerous job on earth

2.57 million barrels a day — it is in getting to and from those rigs that some of the most poignant tragedies have occurred.

the black, freezing waters just seconds after it had lifted off. Eleven of the 17 men aboard perished despite the almost

and Safety Executive which polices safety at work. By November this year it will be illegal for anyone to operate

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Figure 2 – National Daily Newspaper Report

Approach

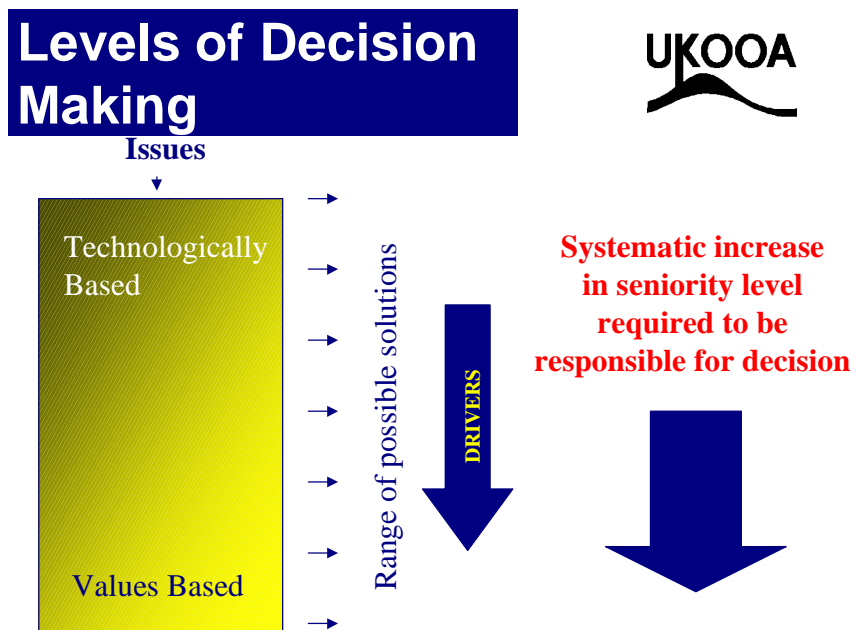


- Workshops and interviews
 - HSE, BCECA, BROA, IADC, EERTAG, OCA
- Workforce stakeholders
 - Safety Reps, Inter Union Offshore Oil Committee
- UKOOA committees
 - E&D, Safety, Aviation, FPSO, HMSC
- Other Industry sectors
 - Railtrack

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Figure 3 – Approach and Consulted Parties



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Figure 4 – Levels of Decision Making appropriate to the Drivers

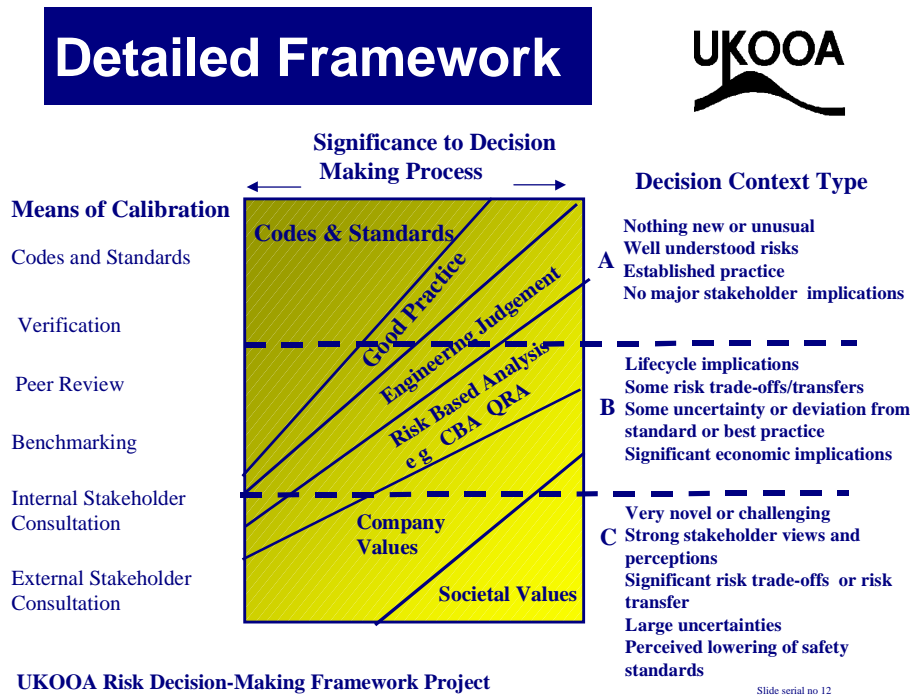


Figure 5 – The Detailed Framework

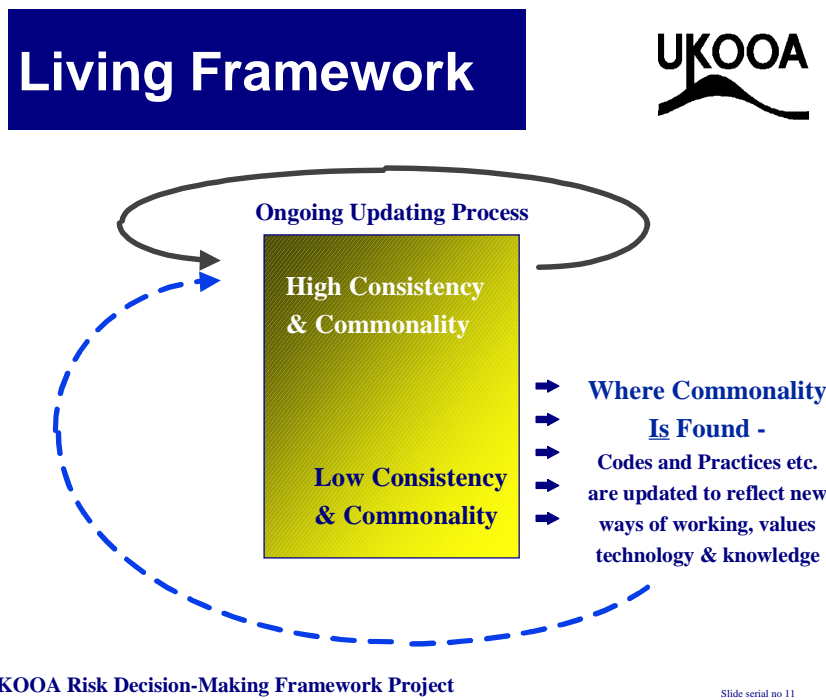
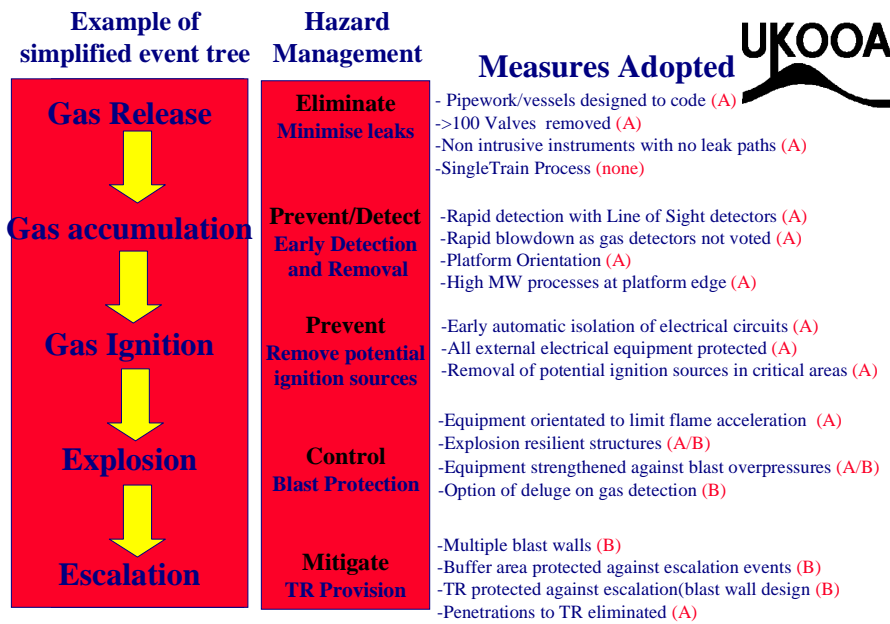


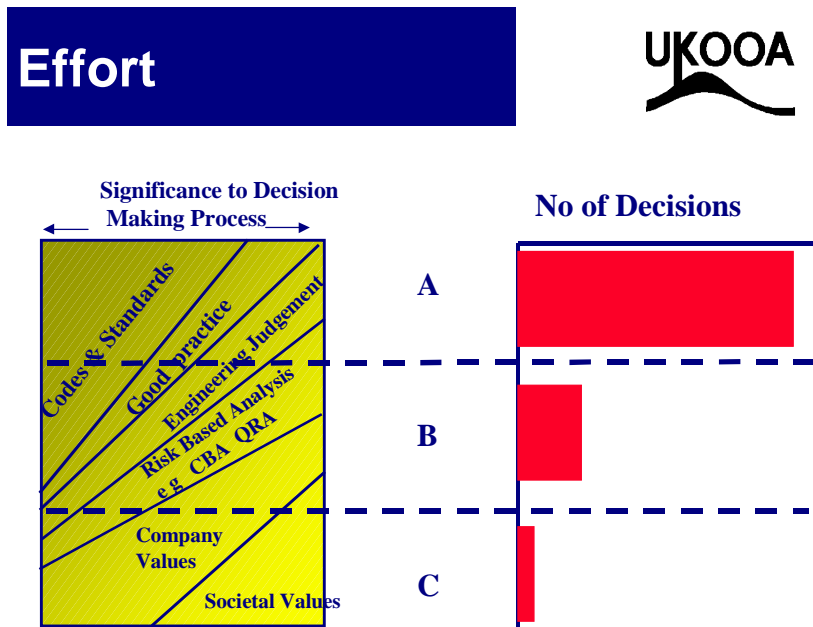
Figure 6 – The Living Framework



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Figure 7 – Split of Decisions



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Figure 8 – Distribution of Decision by Type