

## ACED Meeting

27<sup>th</sup> April 2010

### 1. Workshop Aims

This paper describes the background to the ACED workshop on health and safety risk management and sustainability. The aims of the workshop are to:-

- Establish what is expected of a graduate so that they can demonstrate a knowledge of risk management/health and safety/sustainability and understanding of that knowledge through application
- Establish what evidence should be provided to demonstrate that a graduate has an understanding of the concepts of health and safety/sustainability

### 2. Health and Safety Risk Management

#### 2.1 JBM Guidelines

The JBM guidelines state that *'Learning to recognise and manage risk, in its broadest sense, should be an integrated element of all courses. This will involve the student in technical assessment and management (including project and budgetary control), and an understanding of environmental and occupational health and safety risks. An understanding of health and safety issues and the need to design and operate safe systems of work is mandatory for practising engineers; programmes must expose students to the wider social, commercial and legal contexts and engender an appreciation of the value of design and of good practice in the reduction of risk'*

#### 2.2 JBM Guidelines on Health and Safety Risk Management

The JBM guidelines on health and safety risk management state that a graduate of an accredited course should be able to:-

- Attitude
  - a. Explain the interdisciplinary nature of safety.
  - b. Define and discuss critically concepts of safety, risk, hazard.
  - c. Describe how risk is part of everyday life.
  - d. Explain some of the complexities of individual risk perception.
  - e. Behave appropriately when on site.
  - f. Define safety culture and be aware of its influence on a project.
- Competence
  - a. Carry out a risk assessment and understand the hierarchy of risk control.
  - b. Design simple engineering systems for safety.
  - c. Explain the difference between 'hard' and 'soft' risk sources.
  - d. Demonstrate that at least one case study has been studied in detail.
  - e. Explain the importance of learning from failure.
  - f. Define and discuss critically natural and man-made risk sources.
- Knowledge
  - a. Describe relevant legal and professional responsibilities for safety.
  - b. Explain that there are limits to what we know and what that may imply for safety.
  - c. Describe the basic issues in a number (say five) of famous failures.
  - d. Discuss critically the balance between risk and benefit.
  - e. Describe a systematic risk management process, including who owns a risk, as a learning process.
  - f. Explain some of the complexities of organizational issues.

### 2.3 Health and Safety Executive

The health and safety executive prepared the following statement to encourage the embedment of health and safety in undergraduate programmes for professionals entering the construction industry.

*Architecture, Building, Engineering and Surveying (covering CIBSE, CIOB, ICE, IStructE, RIBA, RICS) are fundamentally about creativity and innovation, adding to the wealth of the nation and the wider world. They are professions involved with the derivation of solutions to our built environment, often utilising imperfect and incomplete data, and frequently within tight constraints of time, space and finance. Consequently, their activities are concerned with the management of risk, without which they cannot achieve their intended objectives.*

*Risk concepts have always been a part of undergraduate courses, although these may not in the past have been explicitly identified or assessed. For instance, the role of partial safety factors in structural design, the adequacy of project programmes and product durability, behavioural patterns of facility occupants, climate, and uncertainty of funding sources, are all concerned with risk management and are accepted as part of the academic learning process. This list may be readily extended and moulded to maximise relevance to specific disciplines across the built environment, but the principle of risk comprehension being an essential learning outcome is universally applicable. A review of project failures in any construction discipline will vividly illustrate the consequences of failing to manage risk, in both economic and human terms. Hence a qualitative education in the understanding of the uncertainty that accompanies these aspects of the built environment is essential to an undergraduate's learning experience. Subsequent industrial training and practical experience will bring competency in these fields.*

*The construction industry remains a high risk sector in terms of its impact on those who are affected by the projects we create. Decisions made in design and project offices, and on construction sites, can have a profound impact on those constructing or operating a facility, or on those who happen to be in the vicinity. These decisions however not only impact upon the well being of others (the prime aim of statute law, and an obligation on us all) but also affect the image of the industry, morale, and importantly the business success of the project. It is the case that the principles (principles are to do with education; the details are for industry to impart through training) set out in health and safety legislation espouse sound project management procedures, worthy of any business course, and reflect the intellectual essence of managing risk associated with the people, the process and the products involved in a project. Such principles include:*

- *The management of human and technical resource to ensure its competency, adequacy, and supervision.*
- *The advance identification of problems (hazards), and their management within practical limitations.*
- *The maintenance of communications between all parties.*

*These principles also allow individuals to comply with their institution code of conduct, to discharge their common law duty of care, and to minimise opportunity for civil action against themselves or their organisations. They also reflect corporate responsibilities (i.e. Turnbull, Corporate Social Responsibility). In other words, knowledge and understanding of health and safety risk management procedures provides an intellectual tool for managing all risks in an integrated manner. Hence the education of undergraduates in this field is often ideally suited to a cross curricula approach.*

*This industry has traditionally neglected the social and behavioural side of management – issues such as partnering, collaboration, gender, diversity – which come under the general umbrella of 'respect for people'. Health and safety risk management is an important vehicle in implementing this.*

*In conclusion, therefore, it is important that aspiring entrants to the industry are introduced early to these concepts so that their culture and mind set are formed for the future. The management of health and safety risks is an essential exemplar for these purposes.*

## 2.4 Workshop – Health and Safety

Despite the JBM guidelines there is ample evidence in JBM reports to show that much has to be done to ensure that graduates can demonstrate they have an understanding of the concepts of health and safety and the need to mitigate risk. This lack of understanding has also been identified by industry as cause for concern.

Therefore the workshop is an opportunity for departments to share best practice, identify the attributes that would show that a graduate has an understanding of health and safety and identify the evidence that could be used to demonstrate to the JBM that the programme is designed to help graduates achieve those attributes.

The HSE have identified the need to create a culture and mindset amongst graduates. JBM suggest that health and safety should be embedded in the programme in order to help create that culture and mind set.

There are four questions to be answered:-

- **What is meant by a culture of health and safety?**
- **What attributes is a graduate expected to have so that they can demonstrate knowledge of health and safety and understanding of that knowledge through application?**
- **What evidence should be provided to demonstrate that a graduate has an understanding of the concepts of health and safety?**
- **What are the barriers to developing that culture?**

## 3. Sustainability

### 3.1 JBM Guidelines

The JBM guidelines state that *'broadening subjects outside core engineering should form an important element in an accredited programme. The engineering subjects should be taught in the context of design with appropriate account of issues of sustainability and construction, so that each forms a continuous and integrating thread running through the programme. Sustainability issues in their broadest sense are of vital concern in professional engineering. It is important that graduates have an understanding of these and are able to take them into account in the design and construction processes.'*

### 3.2 JBM Guidelines on Sustainability

The JBM guidelines on sustainability state that a graduate of an accredited course should be able to:-

- Attitude
  - An overarching approach to engineering problems in the context of environmental, economic and social issues, and other dimensions including ethics and environmental justice.
- Skills
  - Ability to work with complex/ill-defined problems.
  - Team work and communications skills.
  - Ability to evaluate the merits and demerits of options/feasibility assessment.
- Knowledge
  - Technical.
  - Environmental.
  - Social processes.

- Legal.

These guidelines are not as specific as those for health and safety though the guidelines do give examples of topics that could be part of the programme.

### **3.3 Workshop – Sustainability**

Despite the JBM guidelines there is ample evidence in JBM reports to show that much has to be done to ensure that graduates can demonstrate they have an understanding of the concepts of sustainability. This reflects the fact that the concept is still being developed by industry as they face up to the challenges of climate change, security and scarcity of resources and social aspirations.

Therefore the workshop is an opportunity for departments to share best practice, identify the attributes that would show that a graduate has an understanding of sustainability and identify the evidence that could be used to demonstrate to the JBM that the programme is designed to help graduates achieve those attributes.

As with health and safety, JBM and industry wish to see the development of a mindset that means that graduates apply principles of sustainability to their work.

There are four questions to be answered:-

- **What is meant by a culture of sustainability?**
- **What attributes is a graduate expected to have so that they can demonstrate knowledge of sustainability and understanding of that knowledge through application?**
- **What evidence should be provided to demonstrate that a graduate has an understanding of the concepts of sustainability?**
- **What are the barriers to developing that culture?**

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