

ENGINEERING ETHICS CONFERENCE

Thursday 6 September 2018, University of Leeds

Bringing engineering ethics to life in education,
professional development and industry

Starting point....

Change pervades our lives, brought about by the rapid advances in science, technology, engineering and computing. The decisions that engineers and technicians make are becoming ever more complex, broader and deeper in their impact. Engineers and technicians have long recognised their ethical responsibilities and, to rise to that challenge in the future, we must commit not only to doing the right thing, but also to objective analysis and to continuous dialogue both inside and outside our profession.

This document sets the scene by summarising some of the key developments in engineering ethics over the past 15-20 years, to provide a basis on which to develop a vision for the next ten years that will help the profession prepare for the ethical challenges of the future.

Regulatory matters

The current UK Standard for Professional Engineering Competence (UK-SPEC), published in 2014, includes a standard of competence: '*exercise responsibilities in an ethical manner*'. This was a new inclusion resulting from the 2013-2014 review and, importantly, uses exactly the same wording for all categories of registrant: EngTech, ICT Tech, IEng and CEng. The review also led to an increased focus on matters related to ethics such as safety, sustainability and risk.

However, there was mention of ethics within the profession's standards well before this. For example, in 1990, the 'definitions, roles and responsibilities' for registration as CEng states: *In their work, Chartered Engineers have a responsibility to society with regard to the ethical, economic and environmental impact of technical needs and changes.*



To complement the 2014 version of UK-SPEC, and to underpin the development of ethical competence, the requirements for Engineering Council accredited degrees were also revised with the addition of 'ethical' within the area of learning 'Economic, legal, social, ethical and environmental context'.

Adherence to an individual's own engineering institution's code of conduct has long been a requirement for all categories of registrant. The Engineering Council currently requires certain inclusions in those codes, many of which could be viewed as elements of 'ethics'.

* Engineering Technician (EngTech), Incorporated Engineer (IEng), Chartered Engineer (CEng) and Information and Communication Technology Technician (ICT Tech)

Guidance and support for engineers and technicians

In support of its regulatory standards, the Engineering Council has produced a range of guidance, including guidance covering whistleblowing, risk and ethics.

In 2003, the Royal Academy of Engineering established a working group on professional ethics. This working group was stimulated, in part, by the Lloyd's Register lecture 'Do engineers owe duties to the public?' by Professor John Uff CBE QC FREng, and by a number of articles by John Uff in the Academy's journal, *Ingenia*, on ethics in engineering practice (<http://www.ingenia.org.uk/>).

In 2005, the Engineering Council and the Royal Academy of Engineering launched their joint *Statement of Ethical Principles*. This is intended to be a statement of the values and principles that guide engineering practice and to supplement the codes of practice published by the various engineering institutions.



This was well received and has since been updated, first to include specific mention of technicians, and more recently to ensure it remains current. The latest review led to a re-ordering of the principles, and introduced some new emphases. This was launched in 2017 and is available here: www.engc.org.uk/ethics

Support for engineering educators

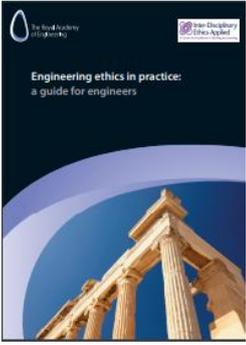
2005 also saw the launch of the Inter-Disciplinary Ethics Applied (IDEA) Centre of Excellence in Teaching and Learning at the University of Leeds. A central part of the Centre's work is to help students and professionals (in a range of areas, including engineering) to identify, analyse and respond effectively to ethical issues as they arise in their disciplines, and in their personal and professional lives.

During the period 2005-2011, the Royal Academy of Engineering and the Engineering Professors' Council established a Teaching Engineering Ethics Group (TEEG) to identify and share practices in the teaching of engineering ethics across UK Higher Education. A number of tools and resources were developed to support engineering educators who wish to incorporate ethical issues into their teaching, including the engineering ethics curriculum map, an example of how ethics can be incorporated into an engineering degree.

Workshops were held sharing practice on teaching engineering ethics with the IDEA Centre (including two national conferences at the University of Leeds in 2006 and 2011), and on engineering ethics and accreditation, in collaboration with the Engineering Council.

In 2001, an Engineers Without Borders presence was established in the UK by students who wanted to use their engineering skills and expertise for social good. This established as the charity Engineers Without Borders UK in 2004 and quickly captured the attention of hundreds of engineering students throughout the country. These were students who had grown up in a culture more aware of their global citizenship and the ethical implications of their choices and wanted to see this reflected in their career choice to become an engineer.

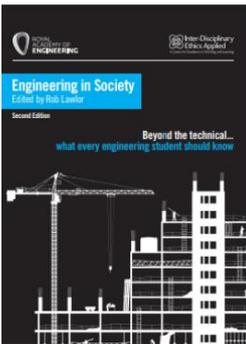
In 2011, Engineers Without Borders UK launched the EWB Challenge (now the Engineering for People Design Challenge) in universities throughout the UK and Ireland. It is a curriculum based, inter-university design competition specifically targeted at raising undergraduate engineers' awareness of the ethical implications of their decision making in engineering design, e.g. how well they understand and value the social, environmental and economic factors of the context they are designing for. In seven years, 28,000 students have participated in the programme and in 2018 approximately 20% of the engineering undergraduate intake will take part across 31 universities.



In 2011, *Engineering Ethics in Practice* was published by the Royal Academy of Engineering and the IDEA Centre.

The document aims to bring the *Statement of Ethical Principles* to life through a set of case studies drawn from real engineers' experience that show the relevance of the ethical principles to engineering practice. It is designed for engineers to work through practical ethical examples and to explore how ethics relates to their own working lives. A full set of case studies and a shorter summary document are available [here](#).

Emerging technologies can generate issues of concern around social and environmental impacts, and questions around governance, from concerns about safety to a desire to ensure equity of benefits. The Royal Academy of Engineering has produced work examining the social, ethical and governance relating to particular areas of engineering examples include [autonomous systems](#), [synthetic biology](#), [liquid biofuels](#) and the [Internet of Things](#). It has also produced work examining the issue of inclusivity and equity within the engineering profession itself, both in the [workplace](#) and in [education](#).



In 2013, the IDEA Centre, working with the Academy and other partners, produced an e-book, *Engineering in Society (Beyond the Technical...what every engineering student needs to know)*, on the place of engineering in society and what that it means for practising engineers and technicians, and for engineering education.

Engineering Ethics 2018 – a conference and a ten-year vision

The range of material described above provides the conference with a rich and solid base on which to take forward its discussions about the ethical issues facing engineers and technicians both now and in the future.

The main output from this conference will be a ten-year vision for embedding ethical principles in engineering practice. This vision, articulated by the IDEA Centre on behalf of the conference delegates, is intended to be a constructive invitation to the engineering sector, to build on the important work that has already been done to create a profession which is ready to meet the ethical challenges of the future. Following the conference, we will be looking to engage key stakeholders about the vision and how it can be taken forward. In this way, we hope that the conference will be the start of a conversation which effects change in the engineering profession throughout the next ten years and beyond.

