

UK ENGINEERING 2016

Independent review led by Prof. John Uff CBE QC

1. I welcomed the opportunity to carry out this review since it gave me the opportunity, for the first time in a very long career including civil engineering and many other activities, to acquire a detailed and up to date knowledge of the workings of the Engineering profession. It gave me direct access to the opinions of a large but representative section of those with detailed knowledge of the profession, whose views I had the task of reviewing and collating. It also required the drawing of conclusions from the material presented and then of drafting recommendations aimed at putting into effect those conclusions, with the aim of achieving real improvement in the many areas covered by the Terms of Reference.
2. The Terms of Reference themselves were very diverse and far reaching and required, in addition to individual contributions, a review of recent reports and other literature bearing on the issues as well as research going back to the more remote events of the 1970s and 1980s, and even much earlier than that, in order to understand why things are as they are. Having gone through those stages the task was then to draft conclusions and recommendations which were capable of achievement and implementation within a reasonable timeframe. The objective was to seek to move the profession from where it currently stands towards a model more suited to the needs of a society which depends on engineering services; and to the needs of those entering or contemplating entering the profession, whose future careers will be dependent on the developing structure of the profession.
3. In drafting the report the first task was to analyse and collate the wide range of views, opinions and evidence provided to me by the many contributors. This involved organising and summarising those views into a coherent narrative which is set out in Sections B through to G following the broad topics contained in the Terms of Reference. Many of the consultees also provided their own conclusions and these were collated and summarised in Section H. Then, for the purposes of maintaining due process, since many of the contributions contained criticism of the principal institutions and bodies comprising the engineering profession, those principal parties were invited to respond to the contributions received and their responses are summarised in Section I of the Report. The final sections of the Report then contain my analysis and conclusions drawn from all the material received, concluding with a list of recommendations in response to the Terms of Reference.
4. It needs to be emphasised that whilst the enquiry was set up by the three principal professional engineering institutions representing between them 70% of the registered engineering profession, all the professional institutions and other bodies comprising the engineering profession have been consulted and their views taken into account. This has included a number of face to face meetings with representatives of those bodies who have been the subject of comment or criticism. The final conclusions and recommendations, however, are the independent product of my analysis of the material gathered, without input from any other source. I take responsibility for those conclusions and, while it is up to the professional bodies and their members to accept those conclusions or not, they are put forward as being based on the individual and collective views put forward by the membership of the engineering profession to this enquiry.

5. The conclusions of the Report are set out in the form of an Executive Summary. If that material is to be further summarised in the form of a few bullet points they are the following:

- The UK Engineering profession needs to change and only the major professional engineering institutions are capable of bringing about that change.
- The most important change needed is for the existing 35 PEIs to come together not necessarily through mergers but through the progressive combining of their functions and activities so as to become more representative of what engineering is today and will become in the future.
- The PEIs must also take urgent action to bring into the fold some 3 million people who work as Engineers and have no affiliation with the present institutions, which means that the Institutions currently represent less than 20% of the whole profession.
- Current arrangements by which the engineering profession is self-regulated through the Engineering Council with powers devolved to the institutions work well and must be maintained as an alternative to government imposed regulation which applies to many other professions.
- The promotion of Engineering and the study of STEM subjects, which is undertaken by Engineering UK, The Royal Academy of Engineering and many other bodies, conversely, does not work well and is of such vital importance that a thorough overhaul of all promotional activities as called for.
- Everyone agrees that the Engineering profession must speak with one strong voice and the general view is that that voice should be or be coordinated by The Royal Academy of Engineering which has recently achieved much in terms of presenting a coordinated message on behalf of the profession, notably in the report to Government on BREXIT. More coordination is required, however, and the Royal Academy should seek to be more representative of the whole profession .
- The generally accepted view that there is an acute shortage of qualified engineers has to be questioned: first because needs vary greatly across different sectors; and secondly because the statistical basis of many projections is questionable particularly in terms of the almost complete absence of knowledge about the missing 3 million engineers. The only certainty is we must continue to replace those engineers whose careers have run their course.
- Education and Training of Engineers represents a widely diverse pallet ranging from some of the world's top technical institutions, whose expertise and reputation must be maintained at all costs, to a lively and continuing debate as to the status of technical or employment- based training, as to which there is a recent and valuable report of a Committee chaired by Lord Sainsbury.
- Finally, despite all its problems, it must be recorded that UK Engineers enjoy a very high reputation internationally, where they enjoy a status probably higher than that recognised in this country. That reputation must be maintained and I believe the recommendations contained in the Report will contribute to its maintenance and enhancement if adopted.

6. It is important that any report on the profession should address the future of Engineering in terms of those entering or contemplating entry into the profession. The first thing they will encounter is a truly bewildering array of professional institutions some representing seemingly specialist branches of expertise and the largest, including the 3 commissioning PEIs, representing the great historical divisions of Engineering in this country, namely Civil Engineering, Mechanical Engineering and Electrical Engineering. Aspiring students will be expected to join one of these institutions and to follow a training path based on the traditional areas of expertise of that institution.
7. The strong message of this Report is that the situation just described must change urgently for a number of obvious reasons:
 - Very few Engineers work in only one branch of engineering.
 - Engineers who start in one branch of the profession are very likely to gravitate into other branches during the course of their career.
 - Many Engineers will work across different branches and specialisms, some of which are not represented by any professional institution.
 - Some engineers will find themselves specialising and working, in the course their careers, in fields which did not exist at the time of initial qualification.
8. For all these reasons, the merging and combining of the institutions is of vital importance. Indeed, the extent to which the recommendations of this Report gain any serious traction will be marked by the extent to which the institutions do achieve degrees of merger and combining of activities. It should not be supposed that this will be achieved without unwelcome change and resistance. The degree of institutional inertia cannot be overstated. Many of the larger institutions now operate as substantial commercial businesses, so that any changes will face opposition in commercial terms as well as professional terms. To achieve the necessary changes the Report recommends the setting up of a new body independent of the institutions themselves. This is currently not one of the proposals which have been put forward by the PEIs. The extent of their resolve to accept the recommendations and to achieve real change will be demonstrated by whether this recommendation for a new independent body is taken seriously.
9. Finally, I must record that it has been an honour as well as an exciting journey to explore the detailed workings of this great and honourable profession, which represents a substantial slice of our nation's economy. It must be recalled that many earlier reports and inquiries, including the Government sponsored Finniston Enquiry of the 1970s, achieved very little and sometimes the opposite of what was recommended. The recommendations of this report are not as radical as those of many earlier reports. Wherever they are accepted, they will be a step in the right direction.

John Uff
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