

## EUCEET – WORKING GROUP F

### **DEMANDS OF THE ECONOMIC AND PROFESSIONAL ENVIRONMENTS IN EUROPE WITH RESPECT TO CIVIL ENGINEERING EDUCATION**

EXTRACT FROM THE DRAFT SHORT REPORT dated DECEMBER 2001

#### INTRODUCTION

Working Group F (WGF) began its work in May 2000 during the EUCEET General Assembly, by considering preliminary ideas on the question of the relationship between the university sector and the industry/professions. It followed on from Working Group C, which had summarised the views of academics on the range, nature and value of links between academe and Industry. Group F set itself the task of seeking the views of industrial and professional organisations. At the outset Group F drew up the following aims and objectives:

- To understand better the needs of the construction/civil engineering industry in terms of their need for trained/educated personnel, skills, attributes and numbers required etc.
- To respond to these where appropriate, whilst not losing sight of the educational role of a university.
- To assist industry in understanding what the university sector can and cannot do for it.
- To build partnerships, so that industry and universities see themselves as collaborators in the profession, making complementary contributions to the development of civil engineering.

#### SUMMARIES

In considering the responses, many common themes and opinions emerged. This report tries to summarise the situation. Thus, it is written in a way that attempts to provide all-encompassing general answers to the questions posed in the 6point summary (above), though reference to specific countries is made where this is appropriate. Information about national industries and bibliographies is given on a country-by-country basis.

- *Is industry able to find the type of staff it needs, in the number required?*

Most of the fifteen countries in the survey have companies that seek to recruit a wide range of engineers with a broad range of capabilities stretching from technical competences to personal and transferable qualities skills such as abilities in management, communications, IT etc.

Of those that provided responses, the general opinion was that most countries found they could recruit the type and numbers of engineers needed. Most countries felt there was a reasonable pool of well qualified engineers at graduate level.

Although this seems to present a reasonably positive picture, it is also the case that there are problems in a significant minority of cases, some of which are country specific. For example, in the UK, local and public authorities that constitute a significant (*how much?/check*) proportion of the employment sector, experience considerably more problems in filling vacancies than do consultants and contractors. In Ireland, although there is no real problem in finding graduates to take starting positions, there is much more difficulty finding both experienced, mid-career engineers and enough competent and practical technicians. In Hungary, there are shortages in specific areas such as highways, traffic, structural, and water engineering, and in Germany, although the current situation seems reasonable,

problems are anticipated in the mid-term future particularly in relation to anticipated shortages in the types of skills provided by students of the Fachhochschulen.

There are other specifically national problems that cloud an otherwise manageable situation. Some countries say that although they can find staff, the people they employ are not necessarily an ideal fit. For example, most countries refer to weaknesses in transferable and personal skills (dealt with in detail elsewhere in this report), some (for example Hungary) talk about the lack of foreign language compatibility. Others (for example Italy and the UK) are concerned about the level of IT skills of the people they employ. Several countries (Germany, Italy, Ireland) seek to overcome shortfalls by making efforts to recruit foreign nationals, while others (Czech Republic) are sometimes obliged to recruit only authorised engineers. This is more likely to be the case in large companies rather than small or medium.

To summarise, the majority of companies in the majority of countries surveyed say that they can find the people they need in the numbers they need but this apparently optimistic picture hides a number of significant difficulties. Not all sectors in a given country are equally strong. There are common deficiencies in some of the staff employed, particularly in 'soft' skills. In some cases there is an increasing dependence on foreign labour or labour which is not qualified in the conventional sense and several countries are concerned about the supply of potential staff in the mid-term future.

- *If not, what are the problems and difficulties?*

Most countries admitted that the profession presents a poor image of itself, due in large part to working conditions and poor salaries compared to other professions. It seems that the profession is valued more highly in southern countries; Portugal, for instance, claims higher salaries in Civil Engineering.

The lack of certain skills such as transferable skills has often been highlighted but the shortage varies from one country to another. In a number of countries, the UK for instance, the need appears to be for the development of skills in communication, IT, finance and management, though the issue of environmental awareness was also raised. Italy and the Czech Republic also stress the importance of training more engineers with good IT skills. The problem in relation to IT is that civil engineering is in strong competition with other engineering professions to recruit good people. In central Europe, there is a definite shortage of engineers with new skills such as financial management, commercial competencies and communication practice, and a shortage of engineers with good foreign language skills.

Many countries, including Portugal, Romania and Lithuania, stressed the difficulty they have in finding engineers with practical experience. This situation seems somewhat contradictory, because it also seems to be the case that senior engineers sometimes find themselves unemployed and unavailable to find employment.

In some countries, such as Germany, the civil engineering education seems too technical and specialised for what industry says it needs.

The competencies in presentation and communication have been underlined by several countries including the UK and France. Demand for these skills is particularly strong at a time when public pressure on projects is high. These skills are not considered so important in southern and central Europe.

- *What is industry's view of the output of graduates from the University sector in terms of types of graduates, range of skills?*

Most respondents agreed that universities provided a good broad based education that was relevant to industry. However, the situation in Germany was that Civil Engineering education was too specific and specialised. There was a general acceptance that transferable skills are essential and that excessive specialisation was not helpful in this respect.

The survey has established that in addition to the specific knowledge of the main Civil Engineering subject matter, secondary, but no less important, was the development of personal qualities. These include team working and communication skills. It was considered essential that in addition to the teaching of technical skills, universities should also provide formal training in transferable skills. There was some implied criticism that universities were not providing this tuition. Some responses to the survey made reference to IT skills. Universities have been innovators in this respect and graduates have usually acquired the appropriate skills needed for use in industry.

Specific reference was made to an absence of personal tuition in the areas of management, health and safety, economics and a commercial appreciation of the engineering environment.

There was concern, particularly from Germany, that senior engineers did not always appreciate the culture of continuing professional development. Although this is not the main role of universities, it would seem natural that they made a provision for continuing professional development.

The two-tier system in Germany enables the Fachhochschulen to provide an education which is more closely related to the needs of industry than that provided by German universities. The general conclusion was that industry was satisfied with the quality of educational provision but that more emphasis should be placed on acquiring transferable skills.

- *What influence does industry actually have on the education and training of engineers in universities? What influence would industry like to have?*

Responses to this topic reflected the range and variety of countries surveyed, and also depended upon the historic developments of each country's education system. In Italy, the most important factor influencing what is taught is the law, whilst in the UK, France and Ireland the Professions directly, and Industry indirectly, have a strong influence upon university courses. The former Eastern European countries and Spain considered that there was some, but not much, influence whilst Cyprus reported no influence at all. Germany also reported no influence either from industry or the profession. It was unanimously agreed however, that positive external influence, and indeed involvement, was desirable.

The professional accreditation procedure in the UK and Ireland ensures that industry influences university courses. This is also the case in Hungary and Spain, but to a lesser extent. In Germany, because of the lack of influence by Industry and the Professions, German universities are not able to easily respond to the changes in Industry.

The influence of Industry may be felt in two ways. Firstly, through the accreditation of courses by visiting professional panels and secondly by direct involvement in teaching and research. All respondents reported some involvement through teaching and research. Details of these latter activities can be found in the report of Working Group C, Volume I of the EUCEET final report.

There was some comment that universities should try to have a better understanding of the needs of Industry and that this might be a suitable catalyst for involvement with industry.

- *What importance does in-house training of engineers have compared to education and training of engineers in the university sector?*

Not surprisingly, nearly all countries surveyed stressed the importance of in-house training and made it very clear that the training they provided was significantly different from what they expected the university sector to provide. Universities were expected to deal with the provision of fundamental scientific and technical material and to encourage the development of personal qualities and transferable skills in their students. Industry expected to provide training in skills and tasks of specific interest to them particularly management, safety, communication, business,

specialised IT etc. It is noteworthy that many of these items are considered to be absent from many university curricula. Indeed, universities would admit that they are not in the best position to provide all of this anyway.

However, despite making positive statements on the merits of in-house training, there are difficulties and not all countries have well developed systems. For example, Germany and Lithuania, while recognising the importance of in-house training, have not yet developed good systems. Several other countries (France, Czech Republic, UK) have patchy coverage. Some larger companies and consulting firms in these countries tend to have well developed programmes, whereas small and medium sized companies find it very difficult to devote resources to this, even though they recognise its importance.

Although the emphasis seems to be on company staff providing training, based on company needs and experience, there is a growing tendency for some countries e.g. Portugal, for the development of programmes based on collaboration with universities.

- *What opinion does industry have of the nature of its existing links with universities?*

Links with universities lead to controversial positions from industry. The situation varies greatly according to the structure of the profession in each country.

In some countries such as France, the main links with universities are secured through professional bodies. Within the UK and Ireland, the links are operated by the Institution of Civil Engineers, which aims to be aware of the needs of the profession.

In some countries such as Germany and Italy the links are weaker and their development is considered essential by Industry. In Central Europe, Industry is slowly becoming organised and as such, links have, until now, generally depended on personal contacts. In some cases such as the Czech Republic and Romania, co-operation between universities and industry has been set up as a signed formal agreement.

Most of the countries have underlined the need for improved links. Though it seems that the profession is well informed regarding study programs and curricula, industry often find that their needs are not always taken into account.

Many countries are encouraging strong links between universities and industry particularly in the field of continuing education. It seems that life-long learning may offer good opportunities to academics to update their knowledge of industry, while at the same time giving engineers working in Industry opportunities to develop and enhance their flexibility and extend their range of skills, something which is becoming increasingly important.

There is a general view, stressed by countries such as Romania and the Czech Republic, that there should be increased contacts between Industry and Universities.

## **INDUSTRY**

Of the fifteen countries which were surveyed, eight provided information about their home Industry. However, the responses were very varied in style and content, which made it difficult to draw conclusions and comparisons. In retrospect, it would have been better to have asked for specific information from each country. Representatives are therefore now asked either to provide information in the format now requested (See attached spreadsheet) or to reformulate the material they have already provided into the format we now require. We are sorry for asking for this extra work, but we believe that it should not be too onerous and will certainly make the final report more useful.