Chapter 20
Development of Non-Technical Skills Required by Future Global Practitioners in MSE and Corrosion Engineering

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ABSTRACT

Traditionally, engineers have been taught a subject specific curriculum that would have made them technically proficient in their specialist area. In this chapter, the author argues that currently a broader educational base is needed to prepare them for work in the global environment. Engineers need to become aware of, and be able to embrace, issues such as sustainability, ethics, human rights, social justice and at the same time develop their own skills through continuing professional development. They need to be able to continue keeping themselves technologically aware, take control over their own future career paths, and as their career progresses, they have to think strategically. The chapter covered the following subject matter: The Global Engineer, Strategic Thinking, Global Ethics (Engineering, Business, Social, and Environmental), sustainability, and career planning. It discussed the best approaches to deliver the materials on these topics to engineers from the author's reflections on his own experiences.

INTRODUCTION

Traditionally, engineers have been taught a subject specific curriculum that would have made them technically proficient in their specialist area. Currently a broader educational base is needed to prepare them for work in the global environment. Engineers need to become aware of and be able to embrace issues such as sustainability, ethics, human rights, social justice and at the same time develop their own skills through continuing professional development. They need to be able to continue keeping themselves technologically aware, take control over their own future career paths, and as their career progresses, they have to think strategically.

This chapter focuses on the issue of developing the global engineer and examines the preparation

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of both undergraduates and postgraduates for the global work environment. It discusses different approaches for delivering the subject matter on the following issues: The Global Engineer, Strategic Thinking, Global Ethics, and innovative ways of developing the learning materials and their delivery by non-traditional means. It also examines the roles of professional bodies and their importance in helping engineers throughout their careers. The chapter firstly defines the context of the global engineer then provides detailed descriptions of how the concepts inherent in the definition of the global engineer can be delivered in undergraduate and postgraduate programmes. Finally, it highlights the skills required and discusses how they can be developed.

The author has taught the subject matter at undergraduate and postgraduate level at the University of Derby (UK). The subject matter was explicitly taught in named modules and also embedded into other modules. He also has experience of delivering the material as part of distance learning programmes. The author firmly believes the time has come for a broader educational base to be taught to engineers to prepare them for the ever changing working environment.

BACKGROUND

The global engineering concept covers the sum of the social, political, technological, cultural and environmental issues which are shaping engineering at the worldwide level. It also covers the context of ethics and may influence the individual engineer's career planning. When the author graduated in 1980, a common concern amongst peers was deciding whether they could work for home (domestic, national) nuclear or defence industries on moral grounds. Rarely did undergraduates consider working abroad apart from positions with high-paying oil exploration companies. Nowadays with the notion of a global economy it is common for graduates to cast their nets wider in their search for employment. This still has a moral dimension to it, for instance would graduates want to work in a country with a dubious human rights record? It is clear that today's graduates must be much more globally aware than those of the past. Maybe also they have to be able to ethically argue a decision like planning a new rail track that would run through the centre of a traditional countryside environment at a public enquiry.

Another concern for graduates is that the notion of a job for life is one of the past. In the UK, it used to be the case that sons and daughters would follow in their parents' footsteps. Employment opportunities might have arisen because of family ties to organizations and secure employment could be guaranteed. Mining communities are good examples as well as traditional industries such as textiles. However in the UK, these industries have declined because of the global nature of business. As a result, people have to seek several career changes. With new graduates coming into to the market each year it is important that they keep up to date to cope with life's changes. The engineering institutions encourage their members to engage in continuing professional development (CPD) throughout their careers and to record them formally. Typical skills required by graduates as they progress are related to management and strategic thinking as well as keeping abreast with technological advances.

EXTERNAL ENVIRONMENT AWARENESS

It is important for global engineers to have awareness of wider issues as this will have influence on the country they work in and the way they can operate within an organization. Strategic management as a subject offers many tools and techniques to assist in this. A useful starting point is an awareness