Objectives of Continuing Engineering Education in Libya

Objectifs de la formation permanente des ingénieurs civils en Libye

Ziele einer weiterführenden Ingenieurausbildung in Lybien

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SUMMARY
This paper describes the needs, objectives and the various methods of implementing engineering continuing education programs in Libya and that of motivating the engineers to update and advance their technical knowledge to face the challenges of the modern world. Recommendations are made to organise scientific teams on a continuous basis, between industry, research centers and universities, for achieving results which will have a positive impact on the country's development.

RÉSUMÉ
L'article présente les besoins, les objectifs et les civerses méthodes d'application des programmes de formation permanente des ingénieurs libyens, ainsi que les motivations de ces derniers pour poursuivre et parfaire leurs connaissances techniques face à la compétition mondiale actuelle. Il indique également les recommandations prévues pour organiser des équipes scientifiques, d'efficience continue, composées de spécialistes de l'industrie, des centres de recherche et des universités, en vue de parvenir à des résultats concrets ayant un impact positif sur le développement du pays.

ZUSAMMENFASSUNG
Der Aufsatz beschreibt die Anforderungen, Ziele und verschiedenen Methoden der Einrichtung von Weiterbildungsprogrammen für Ingenieure in Libyen. Es geht um ihre Motivierung, ihr Wissen aufzufrischen, zu erweitern und sich den Herausforderungen der modernen Welt zu stellen. Es wird empfohlen, permanente Teams von Wissenschaftlern aus Industrie, Forschungszentren und Universitäten zusammenzustellen, um für die Landesentwicklung positive Ergebnisse zu erreichen.

1. INTRODUCTION

First degree engineering education curriculum at a university or at a technical institute is meant to introduce principles of engineering science followed by their applications in various disciplines of engineering and leading ultimately to a specialised branch of career engineering. A fresh engineering graduate possesses all the technical ingredients and is ready for moulding into a professional engineer. His engineering career starts in the industry where he is faced with real problems which make him think to apply his classroom knowledge to solve some of the field problems. He begins to learn the techniques of the trade from his supervisors. Surrounded by rapidly developing industrial environments he finds himself lost with his present academic background. Very soon he realises a need for more information, more practical training and more knowledge to adopt to the challenges of the industry. He feels the necessity of engineering continuing education (ECE) program to keep himself upto date and abreast with the latest technical and innovative developments of the industry.

To-day's new graduate engineers are better grounded technically, know more theory and are more analytically inclined than their predecessors. These "old" engineers need to be exposed to new methods of computer aided analysis and design, rapid advances in materials and construction processes, communication, environment, energy conversion and electrical sensing and measurements. The goal of keeping these engineers well informed and upto date is by launching well planned programs of ECE.

The need for starting ECE programs is felt much more in third world countries where most of the sophisticated industries set up by importing advanced technology from developed countries demand creative and skilled designers and supervisors which the local engineering education curriculum cannot provide. Libya is suffering from same sort of situation. Technical universities and higher technical institutes in the country are mainly geared towards turning out engineering graduates with a B.Sc. degree who are not capable of managing highly sophisticated industries like steel plants, refineries, cement plants and many other important factories. So the need and importance of ECE programs to train and further educate the Libyan engineers cannot be over emphasized.

2. OBJECTIVES OF CONTINUING EDUCATION

Infrastructure of modern industrial society in this competitive world demands computer orientation, automation and artificial intelligence, utilisation of new sources of energy, discovering of new materials and their construction processes, fast modes of transportation, space technology, communication systems, onland and offshore exploration, microbiological studies and management skills. It is not possible to cover all these aspects in the engineering curriculum. Exposure of engineers to these innovative ideas is the main objective of ECE programs so that these engineers become the part of national asset of the country. Further development of engineering sciences is a continuous

process. Continuing education programs support the concept of "AS LONG AS I LIVE SO LONG DO I LEARN" (1).

3. PROGRAMS OF CONTINUING EDUCATION

ECE programs for developing countries like Libya have to be specially tailored to produce well trained and well informed skilled type of engineers responsible for supervision, maintenance and management, whereas in developed countries the main objective of continuing education is to cater for two types of engineers, creative engineers responsible for research and development and skilled engineers responsible for operation, supervision and management. It is the intention of this paper to focus more attention on ECE programs for engineers in developing countries. This objective can be achieved through:

1. Short term refresher courses to be organised by university in collaboration with industry.
2. Workshops organised by Training Institutes and Industries to introduce new construction and manufacture processes.
3. Seminars and Symposiums.
4. Participation in National and International conferences.
5. Visits to universities and research centers.
6. Higher education.
7. Exchange programs between industry and universities.
8. Activities of the engineering societies.
9. Lectures by guest speakers.
10. Visits to site and factories in the country and abroad.
11. Tailored training programs for a group of engineers, and
12. Technical collaboration with engineering societies of developed countries.

Further special programs of ECE have to be planned for executives and planners. They require exposition to latest techniques of management, socio-economic problems and environmental sciences in addition to their own field of specialisation.

4. IMPLEMENTATION OF ECE PROGRAMS IN LIBYA

Although need and objectives of ECE programs are clear in the minds of planners in this country but implementation of these programs has certain restraints. A short introduction to the engineering education system in Libya is necessary before

embarking upon the mechanism of implementing ECE programs in the country.

Engineering education in Libya started from the fall of 1961 with an enrolment of 13 students in the engineering college set up with the aid of UNESCO. Later in 1967, this college became the faculty of engineering as part of the University of Libya established in 1957 which lately came to be known as the University of Al Fateh. At a later time another faculty of engineering was set up within the University of Gar Younis in Benghazi. In addition to these universities, many other higher technical institutes were started in different parts of the country during seventies and eighties. Recently a university at Sebha has also been started which has a school of engineering affiliated to it. Postgraduate programs offering higher diploma were started at AL Fateh University back in 1974 which was replaced by an M.Sc. program in 1976. These postgraduate programs have not been so successful due to lack of students since the demand of engineers in the industry is much more than the supply due to country's many ambitious development plans being executed simultaneously.

It can be seen from the list of various modes of conducting ECE programs, the role of universities is very important and they can help in collaboration with industry to organise refresher courses, workshops, seminars, symposiums, exchange programs and higher study courses. But so far it has not been fully possible to achieve this goal. Main reasons attributed to this partial success are lack of organisation and motivation, lack of financial support from higher authorities, lack of laboratory equipment and research facilities, social constraints and missing of a link between industry and the university. Since the universities are traditionally the place for most research, and industry necessarily the place for more technology, what is required is more interaction between the two. The level of productive cooperation between industry and universities is low because of mutual underestimation, that is, practicing engineers believe that university professors are more academic and are not aware of the problems and challenges of industrial research. This concept has led the practicing engineers not making full use of ECE programs organised by universities in Libya from time to time. Another reason of small attendance of engineers to these courses is fear of having forgotten their theoretical background.

To encourage ECE programs, a scientific society of engineers (SSE) was established in Tripoli in 1978. The main objectives of this society are to arrange lectures by invited experts, organise seminars and symposiums in different fields of applied science and engineering, organise technical visits for a group of engineers and to encourage some interaction among engineers and other members of the society. The society has 400 members. Unfortunately the attendance to weekly guest lectures is very poor. The spread of practicing engineers all over the country, the existence of a wide gap among industry, universities, research centers and SSE are some of the main reasons for poor attendance.

The experience so far mentioned has not been promising, and so new means of implementation of ECE programs are required to be planned for Libya. Creation of local chapters of SSE in different parts of

the country and improving interaction between industry and engineering educators by organising refresher courses, workshops and seminars in different industrial centers may be the answer. In addition, technical collaboration with engineering societies of developed countries can be used to provide guest speakers and means to upgrade ECE programs from time to time, and can be a source of interaction for providing management and industrial training, and mutual contacts for organising refresher courses, seminars and conferences.

5. RECOMMENDATIONS

To meet the growing demands of modern Industries the updating of engineers through well organised ECE programs is essential.Such programs have to be specially planned for oil rich developing countries like Libya where motivation among engineers is lacking due to absence of competition in the employment market. Efforts are required to reach the engineers and provide them incentives and easy access to ECE programs.

Objectives of ECE programs can be achieved by:

1. Providing promotion incentive to motivated and deserving engineers.

2. Setting up local chapters of SSE in different parts of the country and organising weekly meetings.

3. Improving interaction between Industry and educational institutes by organising workshops, refresher courses and seminars at industrial centres and universities.

4. Providing scholarships to engineers to pursue higher studies in their field of interest.

5. Setting up industrial training and research centres.

6. Technical collaboration with engineering societies of developed countries which can provide guest speakers, opportunities for industrial training and technical visits abroad.

It is also recommended that the best means of implementing ECE programs in developing countries is to set up an agency at national level to plan and organise ECE programs for engineers to enhance the economic and industrial development of the country and keeping abreast with the new scientific and technical developments of the industrial world.

REFERENCES

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