

LIGHTING ENGINEERING CENTER – LEC

an excellence center for consultancy and continuing education in the lighting field in direct link with the needs of the labour market

Florin POP, Professor Dr.

UTCN – Universitatea Tehnică Cluj-Napoca

Ramon SAN MARTIN, Professor Titular Dr.

UPC – Universitat Politècnica de Catalunya, Barcelona

1. Background of the project

1.1 Needs and ways

The long recession encountered by the Romanian economy in the last years has dramatically changed the job market for graduate young people. Only about 10% of engineering graduates are able to find jobs in the first year after graduation. The growth of the percentage of the unemployed people has created great difficulties for mature former employees to find a new place of work. A distinct approach has to be made for the energy efficient lighting in Romania as a Central European country under the pressure of the former East European Communist block for about a half a century. The lighting installations of the greatest majority of buildings and cities are characterised by very low illuminance levels, poor lighting quality, and high energy consumption. The lighting quality is a part of the quality of human life. The European specialists discuss about an increase of the energy-efficiency of lighting systems, starting from a good current state of facts. In Romania, about all existing interior and public lighting installations are out of normal standards. We need to (almost totally) modernise lighting installations by their refurbishment, to introduce energy-efficient measures (according to the inhabitants' requirement and in correlation with the daylight), to promote the lighting maintenance (generally ignored even today). There are four matters that have arisen as a result of an analysis of many cases: the

improvement of the existing old lighting, the development of a lighting quality and maintenance system, the increase of the daylight use, the accomplishment of an energy-efficient approach.

The question is “*Do we have the means for doing all of these?*”. The first answer is set by the state of fact of the lighting education in our country. The training of a specialist in light and lighting engineering is realised in the technical universities by a course of Electrical Installations with about 20% devoted to lighting, in the fourth year of study. There is a postgraduate course in lighting engineering at the UTCB - Universitatea Tehnica de Constructii (Technical University of Civil Engineering) Faculty of Building Installations, Bucharest, where the co-ordinator of this proposed CMEs project has developed a teaching co-operation. Being the only postgraduate course in country, the participation is very difficult for the people living far. A short postgraduate lighting course is developing nowadays in the UTCN. Entitled ‘*Lighting Installations Management*’, it covers a limited area of topics. And the second answer is done by an intense activity for information and prospection on the lighting reality in foreign countries, at the university departments, enterprises and photometric laboratories during the last years. The members of the UTCN team have developed a gradual activity by participating at international conferences and symposiums, research stages, short visits, scientific activity under the frame of individual mobility grants - TEMPUS, DAAD, SOROS,

Ministry of Education of Spain, a joint activity with a PECO-JOULE contract, a ROMLISS programme and a personal invitation to the LBNL - Lawrence Berkeley National Laboratory. Many direct contacts with university staff, lighting institutions (The Institution of Lighting Engineers - Rugby, England), international bodies (CIE - Commission Internationale de l'Eclairage - Vienna), lighting companies (Philips, Siemens, AEG, Tridonic) were established. So, we had the possibility to obtain more information about the ways to follow in order to obtain successful results in our preparatory activity to develop new postgraduate courses for continuous or alternative formation of the employees, to help our students to have contacts with the job market, to obtain information and scientific materials.

2. Partners

- Universitatea Tehnică din Cluj-Napoca, România, Catedra Instalații pentru Construcții
Dr. **Florin POP**, Profesor, coordonator
- Universitat Politècnica de Catalunya, Barcelona, Spania, Departament de Projectes de Enginyeria
Professor Titular Dr. **Ramon SAN MARTIN**, contractor
- Helsinki University of Technology, Finlanda, Department of Electrical and Communications Engineering
Professor **Liisa HALONEN**
- Università degli Studi di Napoli "Federico II", Italia, Dipartimento di Ingegneria Elettrica
Professor **Luciano DI FRAIA**
- Universitatea "Babeș-Bolyai" Cluj-Napoca, România, Departamentul de Informatică
Ass. Prof. Dr. **Horia F. POP**
- Universitat Politècnica de Catalunya, Barcelona, Spania, Oficina d'Orientació i Inserció Laboral de la UPC
S-ra **Teresa BOFILL GORINA**, Directora general
- CONEL – S.C. Electrica S.A., Sucursala de Distribuție a Energiei Electrice Cluj
ing. **Gabriel RUGA**, director
- S.C. EnergoBit Schröder Lighting S.R.L. Cluj-Napoca
ing. **Pál PETER**, director

Participants on the programme

- Mircea CHINDRIȘ, Prof.dr., Catedra Electroenergetică
- Virgil MAIER, Prof.dr., Catedra Electroenergetică
- Viorel COSTEA, Ass. Prof.dr.ec., Catedra Instalații pentru Construcții
- Dorin BEU, Lecturer Prof., Catedra Instalații pentru Construcții
- Silviu ȘTEFĂNESCU, Lecturer Prof., Catedra Electroenergetică
- Sorin PAVEL, Lecturer Prof., Catedra Electroenergetică
- Marilena MĂIEREAN, Energobit Schröder Lighting
- Eino TETRI, Helsinki University of Technology
- Carlos SIERRA GARIGA, Universitat Politècnica de Catalunya
- Eduardo MANZANO, Universitat Politècnica de Catalunya
- Mireia de la RUBIA, Universitat Politècnica de Catalunya

3. Description of the project

3.1 Objectives

The main objective of the project is the development of the *Lighting Engineering Centre - LEC - an excellence center for consultancy and continuing education*, a centre of excellency in lighting field in North-Western Romania in direct link with the needs of the labour market and the improvement of education curricula.

The *specific objectives* reveal the above aim:

- (1) to support graduates to have contacts with enterprises and offices with lighting activities;
- (2) to offer continuous formation for employees with lighting activities;
- (3) to disseminate the results achieved through other European projects and programmes.

The objective (1) is according to the Tempus priorities for Romania "*to support the opening up of higher education institutions towards their environment – to support the interface role between Romanian universities and Romanian enterprises creating new structures within the universities - project focused on*

continuing education courses for enterprises and other organisations, and market research and consultancy services for enterprises”, (2) is concerned with “studies into the future perspectives for the development of ‘colleges’ (short term superior education), in keeping up with the changing economic and social needs of the country”, and (3) follows CME1 objective “to support the process of university reform at management level with a view to develop managerial and administrative skills aiming strategy development at university management level and co-operation with external bodies” (from the Guide for applicants – Guidelines for Compact Measures Grants, Academic year 1997/98).

To obtain their achievement means having to follow the **secondary objectives**:

- ❑ To develop short visits for documentation, co-authoring lighting guide, improvement of curricula.
- ❑ To organise conferences and teaching intensive courses modules, work-shops and round-tables.
- ❑ To re-create the Student Contests in the benefit of well-designed lighting installations.
- ❑ To print Lighting Guide, a Lighting Engineering review and Info - booklets.
- ❑ To collect and process the data on personnel policies, vacancies and abilities and competencies required to engineering graduates from enterprises, offices and from other organisations with lighting activities.
- ❑ To establish a permanent link between UTCN and the lighting job market in order to know the specific needs for training and curricula improvement, to encourage direct contacts for obtaining sponsorship of graduates.
- ❑ To offer job placement service by qualified advice for students in planning their careers and finding jobs.
- ❑ To advise on professional integration of the employees by supporting their continuous formation.
- ❑ To organise job-shops in lighting field and join job-shops for engineering graduates.

- ❑ To initiate a study for a future Lighting Engineering College as a proper form of education for lighting graduates.
- ❑ To organise the Internet Lighting Engineering Centre users group and web pages.

The 2000 Strategy Plan of the UTCN University Senate on 14 points also includes the following aspects:

- the education activity is targeted at the present and future needs of Romanian economy, developing the links with industrial companies;
- the continuing improvement of the instruction system and modalities, organising new forms of higher-education, short postgraduate courses, continuing education;
- the organising centres for offering consulting for undergraduates to find jobs suitable to their abilities and competencies;
- the development of a modern computer system by creating own specific software;
- the creation of the centres of excellency for developing knowledge transfer, for offering new courses tailored as to meet the real needs of the economic and/or public sector.

CIE Lighting Education (1983-1989) Technical Report (Publ. No. CIE 99) mentioned between its conclusions the following, strongly concerned with the objectives of the proposed project:

- (1) (1) *What hinders the development of good lighting?* Good lighting is mainly hindered by economic factors. This is followed, as a reason, by unsuitable qualification - lack of education and, in some places, lack of means. Lack of demand (no demand for modern lighting, mainly because the possibilities and benefits of modern lighting are not known) also occurs frequently, which can be attributed to educational insufficiency.
- (2) (2) *What measure do you consider necessary for development of lighting design?* Publication of good lighting solutions. General lighting education introduction for electrical engineers. Awarding prizes for good lighting design. Interest of communication media - newspapers,

television - in lighting questions. Better education of architects. Organising lighting courses. Educational of good lighting teachers. Informing manufacturers and managers of the necessity of lighting. Illustration and criticism of bad lighting solutions. Extension of education - information about all users, primary and secondary education, education of skilled workers.

3.2 Activities

The **CME-03551-97 Lighting Engineering Centre - LEC** project is accepted for a duration of 15 months, between December 15, 1998 – March 14, 2000. It is necessary to develop an intense activity to change an erroneous mentality, to focus on the specific topics of lighting education, to induce a new approach of working style through the graduates, employees, local authorities and other users.

1. *Short visits* of university academic staff from UTCN (Technical University of Cluj-Napoca) and UBB (“Babes-Bolyai” University) to EU partners for documentation, co-authoring lighting guide, updating, improvement of curricula.
Outcome: Reports containing the information acquired in the visits, proposals for setting-up the LEC project activities - student contest, workshop, round-table, job-shop, proposals for the future development of a Lighting Engineering College

2. *Lighting Conferences, Courses, Seminars Modules* organised at and by the UTCN

Outcome: Dissemination of the latest issues on lighting equipment, design, management, maintenance, energy-efficiency systems, lighting quality system evaluation.

3. *Lighting Workshop* organised by UTCN, Philips Romania-Lighting Division and EnergoBit Schröder Lighting. Participation: Romanian partners and local enterprises and manufacturers in lighting field.

Outcome: Dissemination of the practical experience gained by the Romanian academic staff under the previous

programmes. Promotion of energy saving measures. Presentation of the new competencies and skills of graduates and the needs of the lighting market. New trends in lighting education and research.

4. *Lighting Round-tables* organised by UTCN and EnergoBit Schröder Lighting. Participation: Romanian partners, local authorities, lighting experts, electrical contractors and managers concerned with lighting field.

Outcome: Knowledge of the national and European legislation and recommendations concerning the lighting field and work laws. Dissemination of the experience gained under the previous lighting programmes developed by the authorities. Presentation of the new European Union’s policies and programmes for inter-regional co-operation, the mechanisms for financing innovative regional development measures on the lighting market. Monitoring the lighting job market specific aspects.

5. *Lighting Engineering Centre Student Contest* organised by the UTCN. Participation: Romanian partners.

Outcome: Adjustment of student preparation to the requirements of design offices. Creation of a team spirit of competition. The student teams will be formed by engineering and architectural graduates and an academic staff wishing to be involved in this kind of activity.

6. *Lighting Engineering Centre Job-shop* organised by Romanian partners.

We will join the job-shops organised by the Student Association Carriers Offices: BEST - an international agency and CEPS of UBB.

Outcome: To promote employment services for graduates.

7. *Lighting Engineering Centre Advanced Guide* consists of four parts and provides an overview of specific lighting technologies and design application techniques using energy-efficient lighting practice. All the partners are co-authoring

on its elaboration under the general coordination of Professor Florin POP.

Outcome: To assess energy-efficient lighting strategies. It is intended for use by all the people involved in lighting field - utility personnel, electrical engineers, architects, contractors, lighting manufacturers' representatives, and other lighting professionals.

tome 1 "Lighting Fundamentals & Lighting Equipment" – September 1999, coordinated by Professors Mircea CHINDRIS and Florin POP

tome 2 "Interior Lighting" – November 1999, coordinated by Professor Liisa HALONEN and Lecturer Professor Dorin BEU

tome 3 "Public Lighting" – February 2000, coordinated by Professors Luciano DI FRAIA and Virgil MAIER

tome 4 "Energy Management & Lighting Economics" – March 2000, coordinated by Professor Ramon SAN MARTIN, Associate Professor Viorel COSTEA and Professor Florin POP

8. *Lighting Engineering Centre Information Booklets.* A three monthly Romanian-English issue, LEC Info presents the programme, activity and results of the centre, and useful information related to the lighting market. The LEC Database and Round-tables results will be summarised, disseminated through graduates, employees and other interested people.

Outcome: The LEC Info issues will be delivered to all partners and disseminated to lighting market.

9. *Lighting Engineering Centre review.* A six monthly Romanian-English (partially) issue, the LEC review hosts the papers concerning the topics of the lighting education, technology and design.

Outcome: The three issues of review will be delivered to all partners and disseminated to lighting market.

10. *Lighting Engineering Centre Database* consists both of database of students interested in lighting area (brief CVs, professional capabilities and skills), and of

Romanian lighting market - companies, agencies, dealers, contractors, manufacturers. Created by the Romanian partners.

Outcome: A registered information for both parts of a job market - job seekers and prospective employers. Helps graduates placement in public and private companies.

11. *Lighting Engineering Centre Software* is an accomplishment of our own IELD – Interior and Exterior Lighting Design computer program elaborated for didactic purposes. Two modules are to be developed - Daylighting Calculations and Energy Management & Lighting Economics to achieve a complete Computer Program for Lighting Systems Design - LSD. Created by the Romanian partners UBB and UTCN.

Outcome: A feasible computer lighting tool, very useful for didactic purposes

12. *Lighting Engineering Centre Internet* is necessary in order to have direct access to the information throughout the world. The Internet computer account is obtained at the begin of the CMEs programme.

Outcome: Use of an invaluable mean of modern information and education system. Creation of the LEC users group. Join of other lighting groups on the Internet.

13. *Lighting Engineering Centre Web* is the electronic presentation of the LEC. It will offer an electronic version of the LEC Info booklets and will have also a six monthly updating, with an English short version. Created and updated by the Romanian partner UBB.

Outcome: Permanently updated World Wide Web home-page as a mean to present through Internet our research, programmes, co-operation.

14. *LEC Reports* will assemble the intermediate and final results of the project, together with the conclusions of the partners. The reports will be distributed to partners involved in the project. The final report will be also distributed to major enterprises, companies and offices, to local authorities, to governmental bodies

and to Departments of Buildings Services, Electrical Engineering and Architecture at other universities from Romania.

4. Impact and expectations

4.1 Level of impact

Creation of the *LEC - Lighting Engineering Centre – an excellence center for consultancy and continuing education* is anticipated to have a major impact on the multiple levels:

a) on the process of graduates employment, offering a chance to match between their skills and the job market needs, and following it, developing future careers in accordance with abilities and competencies.

b) on the short-term, the partners and other bodies involved in the project will directly benefit from the opening up of new communication channels, the opportunity for exchange of information and know-how as well as the opportunity to develop autonomous activities into a large network of collaboration between educational institution and partners from job market in lighting field.

c) many people involved in lighting applications, users, employees will benefit by knowing the multiple aspects of good and energy-efficient lighting systems.

d) on long-term, an old mentality is to be change and *will be changed* by the accomplishment of the project.

e) establishing a permanent collaboration with the lighting market and creating a feed-back mechanism, the university is able to improve continuously its curricula.

f) a large database with the lighting market data and with the graduates capabilities created for the first time offers many reciprocal possibilities to make easier the matching process between graduates and employers.

g) the opportunity for employees to obtain a continuous formation.

h) acceleration of the integration of short undergraduate continuous formation courses

into a coherent educational system and in the consciousness of employees who may face to a change of their previous work-placement.

i) increased experience in co-ordination and well-running of international projects

4.2 Dissemination of results

Dissemination of the achievements by the LEC Info booklets, LEC Internet group and LEC Final Report will make the project known to the university medium from Romania, to the lighting market and to the local authorities. The LEC Advanced Guide will offer an extremely useful tool for engineering new lighting installations with a high energy-efficient approach. Some articles concerned with the project, its objectives and results will be published in the LEC Review, official journal of electrical engineers and will be submitted at the national and international conferences.

4.3 Expectations for continuity

The *LEC - Lighting Engineering Centre* have to be transformed into a permanency in our country, and especially, in our north-western area. On this characteristic and very special form, or under the frame of a University *Lighting Engineering College* or under the frame of a Higher Education System of a University *Master of Engineering in Lighting*, both of them with the national or Tempus-Phare financial support.

5. Conclusion

The strong encouragement received from lighting specialists or university staff from Europe and US is an excellent support to look for many efforts to obtain a continuity for a certain higher lighting education form. All the costs needed will be provided by the university involved and by the lighting market sponsorship.