

# The Cooperation Experience in Educational Process between the Faculty of Electrical Engineering and Informatics - TUO and Companies in the Northern-Moravian Region of Czech Republic

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**ABSTRACT** - *The Faculty of Electrical Engineering and Informatics of the Technical University of Ostrava was founded in 1991 and has boldly developed in harmony with the need for restructuring of industry in the Northern-Moravian region of the Czech Republic.*

*The present bold technical development and expansion of possibilities for international collaboration in the Czech Republic after the year 1989 has brought about the necessity for close cooperation with industry, in particular with those companies within the region of the University.*

*Cooperation between the Technical University of Ostrava and the Northern-Moravian Power Company was actually launched in 1970 when the branch of electrotechnical studies and the University were founded.*

The cooperation between the Faculty and companies is currently advantageous to both sides. The companies employ graduates who have been prepared at the greatest level for their needs. It also ensures a flow of technical information, and the Faculty is financially supported by the companies at a maximum level.

International dialogue between the representatives of industry and the University can greatly contribute to the increase of effectiveness in cooperation as a means of approach to new teaching methods, as a means to become acquainted with new technology, and to contribute to the discovery of new possibilities of how to support the University from the industrial side.

## INTRODUCTION

After 1989 the Czech Republic, a country in Central Europe, underwent a number of political and economic changes. It is possible to summarise briefly these economic changes in two areas:

- Restructuring of industry

- Privatisation of industry, commerce and services

The change of industrial structure has considerably touched upon the Northern-Moravian region of the Czech Republic where the Technical University of Ostrava is located. In this region the heavy engineering and metallurgy industries predominated (and still predominate) because in the region which is commonly called Silesia there are quality black coal beds.

The privatisation of majority of the industrial companies in the Czech Republic through the commonly called "coupon method" was done very quickly. However, the restructuring of industry is a long-term matter. It is necessary to up-date out-dated technologies, to modernise and to automate operations, and eventually change the whole structure of the companies. This is narrowly related to the change of the employees qualification system in these companies.

After seven years of right-wing policy and relatively rapid development, the economy has been stagnating in the last couple of years. The economic problems such as: the increase of the trade gap, 20% currency devaluation, and the level of inflation over 10% brought about the necessity for the change in policy, from the conservative right-wing to the political centre, in CR represented by the Social-Democratic Party.

The unrealistic (falsely optimistic) expectations of development and the political unsteadiness have their negative impact on the amount of finance released from the state budget and provided for the educational purposes.

A number of current economic and political difficulties are caused due to the inconsistent right-wing policy, and first of all due to the little courage

for radical changes such as: the price adjustment of energy and rent, and unfinished privatisation and restructuring of key industrial companies. A number of big joint-stock companies are still owned by the State which appears to be the worst owner, especially because of the incompetence of the agents

in the statutory bodies of these companies, and the unwillingness to make professional decisions.

The Technical University of Ostrava reacted very quickly to the changing needs of industry. The syllabuses of subjects were gradually modernised, new subjects were introduced, and new study branches were prepared. These alterations are reflected in the whole change of the University structure so that in 1991 the independent Faculty of Electrical

Engineering and Informatics was established after the division of the original Faculty of and Electrical Engineering into two independent faculties.

The restructuring of industry in the Northern-Moravian region cannot be carried out without changing the qualifying structure, and without a considerable contribution from the Technical University.

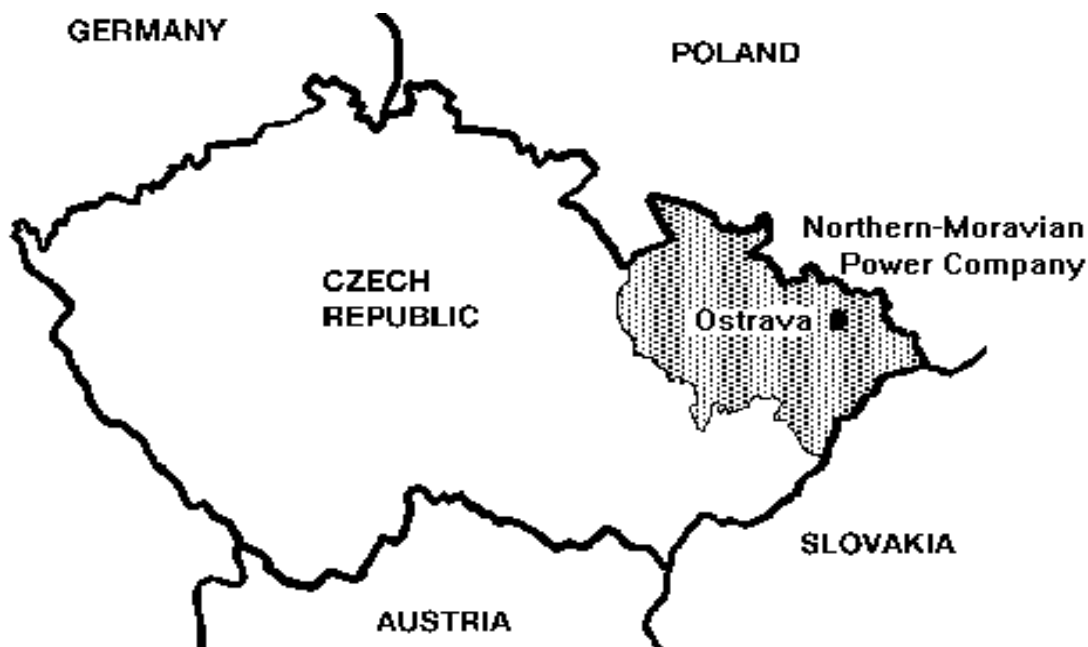


Fig. 1 Region Northern-Moravian, Czech Republic

In the same way the restructuring and modernisation of the University cannot be carried out without close cooperation with industry in this region. From the development point of view of the FEEL, the Northern-Moravian Power Company has been the main partner, cooperating in various forms, for a long time, since 1970 when the Electrical Power Engineering branch of study was introduced.

## PRESENTATION

### The Faculty of Electrical Engineering and Informatics - Technical University of Ostrava

The Faculty officially commenced on January 1, 1991, after the division of the original Faculty of Mechanical and Electrical Engineering into two independent faculties. The newly established faculty recognises the century-old history of the University. It builds upon its tradition and is integrated with the existing Faculties of Mining and Geology, Metallurgy and Material Engineering, Mechanical Engineering and Economics. In the last year, the new Faculty of Civil Engineering was established.

The history of the Technical University of Ostrava (Mining University) goes back to the year 1717, when the first mining

school was established in Jáchymov by the Emperor's decree. In 1849 it moved to Příbram, and in 1865 it was given the right to use the name Mining Academy. In 1894 it was declared to have all the rights of a university. In 1904 it changed its name to the Mining University. After the end of the Second World War, in 1945, it moved to Ostrava.

The teaching of electrical engineering at the University has been given significant meaning since the very beginning of its bold passage into the production processes in mining, metallurgy and engineering. The students have met with electricity and magnetism since the year 1860 within the framework of lectures in physics. In 1904 two independent electrotechnical courses were introduced. In 1945 the independent Department of Electrotechnics was established, and in 1970 the branch of Electrical Power Engineering was instituted at the Faculty of Mechanical Engineering. In the year 1977 the Faculty changed over to the Faculty of Mechanical and Electrical Engineering, and finally in 1991 the Faculty was divided and the independent Faculty of Electrical Engineering and Informatics was founded.

The Faculty has been developing very well. For example, the number of students accepted into the first year has increased from 100 in 1989 to 550 in 1997. In this year the Faculty has 1450 students and 105 teachers. Gradually, the offer of

study branches has increased, and at present the Faculty ensures an engineering study in five branches:

- Electrical Power Engineering
- Electrical Machines and Drives
- Measuring and Controlling Engineering
- Telecommunications
- Informatics

The Faculty thus ensures a study within the whole scope of Electrotechnics and Informatics. At the same time the Faculty ensures a postgraduate study in the branches of:

- Electrical Power Engineering
- Electrical Machines and Drives
- Informatics and Applied Mathematics
- Electronics

In the area of scientific research the Faculty staff is involved in the grant projects of the Czech Republic. It is also involved in international TEMPUS projects, and last but not least, it is in close collaboration with other workplaces in Europe and the USA.

### **The Northern-Moravian Power Company, Ostrava**

The present Northern-Moravian Power Company is among the companies with the longest history in Northern Moravia. Its foundation date is considered to be the year 1919, when the Middle-Moravian Power Plant in Prerov, the Moravian-Silesian Power Plant in Moravian Ostrava, and the Northern-Moravian Power Plant in Zábřeh in Moravia were founded by means of the State contribution and private capital, as universally useful companies.

The company operates in Northern Moravia and Silesia, in the area of 11 066 km<sup>2</sup> and almost two million inhabitants. The organisational company structure has adjusted to this. Besides the company management, six distribution plants ensure the energy distribution.

The Northern-Moravian Power Plant is the biggest energy distributor in the Czech Republic. It supplies energy to 985 thousand consumers, among those are:

- 64% large scale users (mines, metallurgical plants, heavy engineering companies, railways)
- 12 % businessmen
- 24% inhabitants

These energy supplies are provided at different voltage levels. The Company has 110, 22, and 6 kV distribution network, and low voltage distribution network. The geographical location of the distribution area at the border of three states (Czech Republic, Slovakia, Poland) brings about the opportunity for advantageous purchase of electrical energy abroad, and the competition in its supply. In 1997 the

Company supplied its users with 9.1 GWh of electricity, with the turnover of 0.414 bill. USD.

The Northern-Moravian Power Company was established on January 1, 1994, after the transformation of the state company. It is owned by:

- The State (48%)
- Villages and towns (34%)
- Eastern Group European, the biggest British distributor (12%)
- Small shareholders (6%)

At present, the Government is preparing the final part of the privatisation. Its implementation will depend on the political climate of the country.

The Czech Ministry of Trade has declared its interest to support the liberalisation of the energy market that has started in Europe. Gradually, the market-oriented environment in the Czech Electrical Power Engineering is being implemented, and an optimal function model, which should ensure the customer's choice of low-cost suppliers, is being looked for.

Within the framework of legislative changes and regulation, the changes in the management of society are taking place. Also, the expertise knowledge of employees, flexibility and fierce competition are required more and more. The change in behaviour of employees is also influenced by the close cooperation with other universities in the region, and first of all with the Faculty of Electrical Engineering and Informatics of the Technical University of Ostrava. Its high quality young graduates, who have no prejudices as far as the past is concerned, work for the Northern-Moravian Power Company. And they act as the driving force of society.

The competitive environment also requires costs reduction, better quality organization and improvement in services. That is why the Company management decided to conduct an in-depth re-engineering study of the company. Part of it is the implementation of modern Information Technology. Because of the low-quality Informatics in the Czech Republic before 1989, this key area has been under rapid development in the last couple of years. This is also narrowly connected with the necessity for the development of new telecommunication networks. The Company has significant prerequisites for it because it owns pylons and electrical networks. Optical transmission lines can be fitted on them and used also for the commercial purposes of other subjects. That is why the telecommunication company "Aliatel" was set up. Its owners are all the regional power companies and the German company RWE. The construction and operation of the information network is very demanding for the experts in Information Technology. We may be proud of the fact that these specialists come from the Faculty of Electrical Engineering and Informatics of the Technical University of Ostrava .

### **COOPERATION**

The Faculty of Electrical Engineering and Informatics has been developing in harmony with the needs for restructuring of industry in the Northern-Moravian region of the Czech Republic. The present mutual cooperation with big industrial companies and private firms is essential for the Faculty:

- The Faculty has access to the latest information about the need for education of highly specialised experts, and thanks to the fully implemented credit system, the Faculty can ensure that the education of such experts is finished very quickly (within two years)
- The economic situation of higher education institutions has not enabled quick implementation of technical equipment in new laboratories, and renewal of out-dated equipment in old laboratories. Understanding of this situation and financial support from industry will be able to solve this problem more quickly.

There are also other, not less important problems. They can be solved in cooperation with industry. For example, financial support for socially disadvantaged students, the offer of vacancies for graduates, cooperation in solving grant scientific research projects, etc. The study support of physically handicapped students at the University is also important (especially financial support for the necessary technical adaptation of the University campus and Halls of Residence).

Along with the Faculty development, the cooperation with various firms has been expanding. Among those are also branches of leading international concerns such as Siemens, ABB, American firm Texas Instruments and National Instruments. Of course, the most fruitful is the cooperation with firms in the nearby surroundings of the University that is in the North-Moravian region.

The Faculty management supports links with these firms, in most cases between individual departments and firms.

In order to expand these links, the regular Faculty management meetings with the firms' representatives take place annually. On the agenda:

- The Faculty informs about the new study possibilities (new study branches for the Bachelor, Engineer and Ph.D. degree, new specialist courses)
- The firms' representatives inform about the need for education extension in particular areas (e.g. legal and economic education for the technically oriented students). The Faculty responds to this by means of the credit system preparation of its students in the necessary specialisation.
- The firms' representatives have the chance to contact the Faculty students, and to offer them suitable job opportunities

Consequently, this offer has been playing a more significant role in cooperation between the Faculty and the firms. The recent economic difficulties and the necessity for the completion of industrial restructuring have created the increase of the level of unemployment in the Northern-Moravian region. The lack of working opportunities has also affected graduates.

The University Information Center, which was established last year, has significantly contributed to a better flow of information. Its main task is to provide information about the firms' needs, not only in the region, but also in the whole of the Czech Republic.

The direct contacts between the students and the representatives are very important:

- They enable the firms to find suitable perspective employees who can then be prepared for their future jobs in advance (e.g. diploma work)
- The students are motivated to improve their study results, because during their studies they realise that the well prepared students are given a much better chance to find professionally and economically advantageous jobs.

### **The forms of cooperation are as follows:**

#### *a, pedagogical area*

- expert education (Ing., Ph.D.) according to the needs of industry and power engineering (lately, the extra studies in Informatics, Telecommunication, Economics and Law have become an integral part of the syllabuses for the electro-technical students)
- diploma work (the majority of dissertation topics are given by field specialists)
- lectures of field specialists in engineering and postgraduate studies (the topical needs of practice are presented)
- specialist lectures and courses organised by the Faculty for the purposes of industry and power engineering

#### *b, scientific research area*

- cooperation in solving technical problems of industry and power engineering
- project evaluation by the experts
- cooperation in solving scientific tasks by means of a grant system

At its present level, the cooperation between the Faculty, industry and power engineering is advantageous to both sides:

- graduates are prepared for the needs of practice at the greatest level
- the flow of technical information is ensured to all sides
- industrial, power companies, as well as private firms financially support the Faculty at a maximum level. Especially as far as the development of new and the renewal of old laboratories are concerned.

As mentioned above, the most fruitful and longest cooperation is with the Northern-Moravian Power Company. It started at the beginning of the electrotechnical studies at the University that is in 1970. The contract signed by the General Director and the Rector specifies the points of mutual cooperation.

The very good personal contacts between the management of the Technical University of Ostrava and the Northern-Moravian Power Company also ensure the successful cooperation.

## **EXPECTATIONS**

The Faculty of Electrical Engineering and Informatics educates experts in all study branches for the regional industrial companies. It also educates specialists according to the needs and requirements of firms. For example, specialists educated in Informatics, Telecommunication and Economics in power engineering.

The contacts with other universities abroad are very useful. They enable us to get the latest information. The teachers can study at prestigious foreign workplaces, where they have access to the latest literature in their field of study. The first experience of short-term and long-term (once even three years) visits of foreign visiting professors is very positive.

The international dialogue between the representatives of industry and universities can significantly contribute to the increase of effectiveness in the above mentioned cooperation areas. It will ensure access to new educational methods, new technologies, and last but not least, it will contribute to find other possibilities of the University support from the side of industry and power engineering.