

# Post-Graduate Studies for Top Managers in Heavy Industry: Five Years' Experience

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**Abstract:** The demands of market economy bring about the necessity for both higher efficiency of production and lower costs. Thus restructuring and privatization in industry is indispensable. The process proves particularly difficult in the case of countries in economic transition from an extremely centralized economy, operating almost exclusively by state-owned enterprises, into a liberal free-market one, based mostly on the private sector. The situation is particularly difficult for heavy industry, especially when located in highly industrialized regions.

The restructuring of heavy industry proves to be such a complex issue because of its scope, a long-term perspective, and severe ecological and social consequences. It demands thorough knowledge and experience on the part of the managers involved in the process. Consequently, there is a pronounced need for intense training among the managers of large industrial units that are under restructuring. In 1994 American-Polish Post-Diploma Studies in environmentally friendly restructuring of industry were started in the Silesian University of Technology, a result of an agreement of cooperation between the Polish university and the Hubert H. Humphrey Institute of Public Affairs, University of Minnesota.

Over the past five years 126 people - presidents of companies as well as senior executives from various metallurgical plants, power plants and coal mining complexes - completed a two-semester course, gained vast managerial, ecological and technological expertise, and received a prestigious diploma issued jointly by both universities involved in the project. In the course of studies particular emphasis was put on the problems of state-of-the-art management, sustainable development, and environment-friendly technologies. The diploma research papers prepared by the students are of high theoretical and practical value, as they deal with organizational and technological issues important for the student's company. The sixth year of the post-diploma studies is currently in progress, involving 17 managers from various metallurgical plants and power plants.

**Keywords:** restructuring, sustainable development, training managers

The Polish economy has been undergoing a process of intense transformation for 11 years; the process started with the political change of 1989. When analyzing the beginnings one has to note that the economic changes have been connected with the shift from an extremely centralized economy characteristic of the communist system to the market economy of capitalism. Despite various difficulties, the passage has been very successful, which is reflected in high economic growth, and especially a constant steep increase in the Gross Domestic Product. On the other hand, the high level of unemployment, which has recently grown even more, is undoubtedly a negative factor. The process of restructuring proves particularly difficult and complex in the case of heavy industry. It is usually concentrated in highly industrialized regions. There are many examples of such areas in the world:

- the Ruhr (Germany)
- Pittsburgh (USA)
- Lille (France)
- Donbas (Ukraine)
- Upper Silesia (Poland)

The restructuring of industry in those regions is not only a financial, technological or organizational problem, but it also, or perhaps even first of all, entails serious social consequences (job cuts, the necessity to open new workplaces,

training). Many workers employed in heavy industry (miners, steelworkers, etc) are resentful towards seeking new qualifications, and attached to their work, which has sometimes been the traditional occupation in the family for generations.

The problem of sustainable development and environment protection forms an important aspect of industry restructuring. The dynamic development of heavy industry in the Upper Silesia in the past resulted in serious negative consequences for the ecology. At present, both an increase in ecological awareness in the society and the global character of the economy require that economic development be accompanied by respect for the environment. Poland, as a future European Union member, has to adjust its economy to the world standards, which visibly decrease the erosion of the natural environment. The change has to be done within a short period of time. Economic growth combined with the minimization of negative impact on the environment is particularly difficult to achieve in the Upper Silesia. The region lies in the south of Poland, near the Czech and Slovak borders. It covers only slightly more than 2% of the country's area but is inhabited by almost 10 million people. The area has numerous coal mines, metallurgical plants, power plants and chemical factories. The small region produces more than 10% of the Gross Domestic Product. The fast industrial development of the region that began early in the 20<sup>th</sup> century caused a great damage to the environment, which can still be felt today. The introduction of many pro-ecological installations brought a considerable reduction in the emission of gases and liquid waste, but solid waste and the contamination of the soil are still awaiting a solution. It is estimated that the small area of the Upper Silesia houses almost 50% of all solid wastes, some of which are very difficult to recycle or neutralize.

The American-Polish Post-Diploma Studies have undertaken the ambitious task of training directors and senior executives in Upper Silesian industry. In the course of two -semester studies they were supplied with a considerable amount of managerial and technological knowledge. The curriculum had been based on American models: similar programs applied in American universities were used. The curriculum for the American-Polish Post-Diploma Studies was developed by a team of experts from the Silesian University of Technology and the University of Minnesota as part of the Environmental Training Program for Central and Eastern Europe financed by the United States Agency for International Development. ETP covered 6 countries in the region (Poland, the Czech Republic, Slovakia, Hungary, Rumania and Bulgaria). It was supervised by a consortium consisting of a few American universities and other institutions, presided over by the Polish-born Prof. Zbigniew BOCHNIARZ - director of the Center for Nations in Transition at the Hubert H. Humphrey Institute of Public Affairs, University of Minnesota.

The American-Polish Post-Diploma Studies were inaugurated in the fall of 1994, after an agreement had been signed between the Faculty of Materials Science, Metallurgy and Transport of the Silesian University of Technology and the Hubert H. Humphrey Institute of Public Affairs, University of Minnesota. 38 students took part in the first year of the program – top managers in steel industry. The curriculum comprised of 210 hours of interactive lectures, in which various case studies were discussed, both from American and Polish industry. Polish was the classroom language; lectures delivered in English were translated consecutively into Polish. The lectures were grouped in blocks running on two consecutive days, not more often than four times a month. Half of the program was devoted to management, with elements of environment protection (Strategic Planning, Marketing, Market and Ecological Institutions, Strategy of Restructuring, Social Aspects of Industry Restructuring, Environment Management, Ecological and Economic Law). Most lectures in that group were delivered by American professors and experts (University of Minnesota, Carnegie Mellon University, University of Pittsburgh, Oregon State University, Duquesne University, University of Southern Indiana). The students also listened to short lectures by World Environment Center and Environmental Protection Agency experts. The other block of subjects concentrated on technological issues, with considerable emphasis put on environment (Ecological Reviews, Pollution Prevention, Waste Management and Recycling, Efficient Use of Energy, Modern Environment-Friendly Technologies). Most lectures in these subjects were delivered by professors and experts from the Silesian University of Technology, University of Silesia, Warsaw School of Economics, and other Polish institutions. The participants received full sets of handouts for all subjects taught in the course of studies. Most materials were subsequently published as a book, bound in identical green covers, the same graphic form used. Altogether 11 such books were published. Names of the organizers and the sponsoring institutions were printed on the cover:

- Faculty of Materials Science, Metallurgy and Transport, Silesian University of Technology,
- Environmental Training Project for Central and Eastern Europe,
- United States Agency for International Development,
- National Fund for Environmental Protection and Water Management in Warszawa,
- Voivodship Fund for Environmental Protection and Water Management in Katowice.

A number of other didactic materials had been made available as well.

35 students prepared diploma theses, utilitarian in character and relevant to their companies. All of the papers attained a very high level. Two of them were singled out as outstanding: one was devoted to waste management in foundries, while the other analyzed the negative impact of a metallurgical plant on the natural environment [1, 2].

The second year of the Studies was directed at managers from non-ferrous metals plants. 28 senior executives started the studies and 24 completed them. The curriculum had not been significantly changed; only small adjustments were made, notably, a lecture in Logistics had been introduced. According to the earlier agreements, most lectures were delivered by Polish professors and specialists. Some of them had cooperated with American colleagues in the preceding year as the so-called co-teachers. As before, the participants in the second year of the Studies received full sets of handouts in the form of a book. 16 books were published altogether. Additional teaching materials were also prepared. 3 diploma theses were marked as outstanding. One was devoted to economical aspects of the introduction of an environment protection program in a copper plant, another concentrated on a structural analysis of wastes in the zinc and lead plants. The author examined the sources of pollutants, their chemical composition, and the environmental risk accompanying storage. The third paper dealt with utilization of communal waste [3].

The third year of the Studies was directed at managers from power plants, heat power plants, and other institutions within the power sector. The curriculum was not significantly different from the preceding year. The only newly introduced elements were lectures in Public Relations and Human Resources Management. The third year of the Studies was completed by 30 people from 21 institutions. 6 diploma theses were considered outstanding. One of them was devoted to the technical and technological solutions for environment protection applied in the newest Polish power plant. Another dealt with the directions and methods of restructuring put in practice in the Bielsko power plant (southern Poland). Yet another concentrated on the plan for the development of companies undertaking modernization in the power engineering sector. The fourth paper dealt with environmentally friendly restructuring in a power plant planning to enter the stock market. The other papers discussed the technological and economic aspects of the reduction of SO<sub>2</sub> emission, and modernization and investments in a power plant that are based on the local fuel market [4, 5].

The fourth year of the American-Polish Post-Diploma Studies was directed at managers from various types of heavy industry. 15 people from 9 institutions participated in the program. The curriculum had been slightly modified by widening the scope of Environment Management Systems. 15 books and several complementary materials were published in that year. The level of the diploma theses was very high and, consequently, as many as 6 of them were awarded the outstanding mark. The first of those dealt with an environmentally friendly restructuring of a factory producing heading machines in the context of changes in the mining industry in Poland. Another paper discussed the environmental impact of steel works situated centrally in a large city. Yet another concentrated on the technological modernization of the hot-dip process in the production of crude lead for a higher cost efficiency and a less negative influence on the environment. The subject of the fourth paper was such a restructuring of a coal mine that would not only bring financial gains but also improve the natural environment. One more paper was devoted to the adjustments in the company in compliance with the Act of Environment Protection and Shaping. The last one dealt with economical aspects of environment management in steel plant [6].

23 participants from 17 institutions within heavy industry took part in the fifth year of the Studies. The curriculum had not been significantly changed. Only one subject was added to the "Management" block: Technology Management. Due to the co-operation with the Silesian University as many as 6 American professors were employed, which is more than in the preceding years. Lectures were also delivered by specialists from France, Spain, and Germany. Didactic materials accompanying all lectures were printed. 22 students produced diploma papers, 5 of which were found to be outstanding. Their subjects covered: the company information policy in crisis situations, meeting the demands of environment protection by the heaviest pollutants, the possibility of a crisis situation in a research-and-testing institution in the reality of economy transformation, an analysis of ecological productivity and cost-effectiveness of an installation for desulphurization of waste gases in a power plant, a pro-innovative policy in the power plant and its influence on ecological restructuring, particularly for the reduction of nitric oxides [7].

Currently, the sixth year of the Studies is in progress, boasting 17 participants from 10 institutions representing different branches of heavy industry. The completion of this cycle has been planned for December 2000.

Summing up: 156 people from 70 different institutions participated in the Studies in the years 1994-2000. Among the 126 alumni, directors and members of the board of directors in their respective institutions were in a clear majority (ca 65%). 59 books were published, as well as a few dozen of duplicated didactic materials. The lectures had been delivered by 16 American professors from 7 universities, 9 American experts from various institutions, 2 German lecturers, 1 French, 1 Spanish, 15 professors from the Polish universities, and 18 lecturers from other institutions. The alumni have established an Alumni Club, which serves as a platform for discussion and sharing one's views. Completing the studies had also positively influenced professional careers of many former students.

The co-operation between the Silesian University of Technology and the industry in the region had tightened up. The diploma papers successfully defended at the end of the Studies have been put in practice in the industrial environment and have brought huge economic gains and good ecological results. The demand for the Studies is still quite high, and despite the fact that US AID has stopped financing them, the 6<sup>th</sup> year is now in progress, and the 1<sup>st</sup> quarter of 2001 will see the beginning of the 7<sup>th</sup>.

It has been planned that in the future, the American-Polish Post-Diploma Studies will be turned into a standard university post-graduate program for engineers with a few years' experience in industry. Work has started too on the question of how to use the expertise from the Studies in the teaching of students and doctoral students.

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