SUMMARY

Any academic career involves a wide spectrum of activities, but the most important components are teaching and research, which must be in constant interaction

In terms of teaching, I have contributed on training many generations of students, both in mining and environmental engineering. Interactive lectures, debates at laboratory and seminar classes were the tools of transmitting theoretical and practical knowledge. These methods have proved their effectiveness, given that many of the graduates I have worked with are now performing on labor market and their feed-back is a positive one. I went through all promoting stages by competition, from the academic rank of assistant professor to full professor, the latter being obtained in 2007 (M.Ed.C.T. Order no. 1013).

Regarding the scientific research, since the beginning of my career I was involved in joint projects of the university's research teams. Initially, I worked in the mining field, the research being oriented towards slope stability issues, techniques and technologies for the exploitation of useful minerals deposits and dewatering of aquifer formations. During this stage, in 1998, I completed my doctoral thesis entitled "**Recovery and capitalization of thin lignite layers from Oltenia open cast mining perimeters**", obtaining the title of Doctor in Technical Sciences (M.E.N. Order no. 5182). In the thesis I approached technical issues related to the optimization of coal reserves extraction from thin layers in order to minimize reserves losses and lignite dilution, also dealing with the environmental issues. At this point I began the transition towards the field of environmental engineering, a field in which I progressed following postgraduate and postdoctoral courses performed at prestigious universities in Europe. The new research directions, that have joined those mentioned before, are directed towards environmental impact assessment and restoration of land degraded by industrial activities.

If obtaining the didactic degree of professor validated my teaching activity and my scientific activity has been confirmed by obtaining the title of doctor of technical sciences, I believe that obtaining the title of doctoral advisor, after sustaining my habilitation thesis entitled "**Research on stability and ecological reconstruction of lands affected by mining**", can be regarded as the coronation of my academic career.

The habilitation thesis is structured as a logical summary of main results of research in the fields of mining and environmental engineering, and is divided into three parts, including: a short description of the didactic and scientific activity, researches regarding the environmental impact assessment caused by mining (particularly on land); mining waste deposit's stability assessment; solutions to increase and ensure the stability of waste deposits; assessment of the impact generated by dewatering works and solutions on restoring the groundwater regime; ecological reconstruction of mining waste deposits and former quarries, as well as the career development plan in the future. The results presented in this paper are based on a series of research materialized in scientific papers published in international journals or conferences, as author or co-author.

The first part of the thesis presents a synthesis of didactic and scientific results obtained throughout my academic career, as well as elements of national and international visibility. Also, this part highlights my permanent concerns for documentation and training in teaching and research interest areas.

The second part of the habilitation thesis presents the contributions resulting from scientific research, is divided into four chapters, and consist in a brief presentation of theoretical foundations and the elements of analysis, research and interpretation specific for the addressed theme.

The first chapter is dedicated to identifying and analyzing the effects of mining activities on the environment, particularly on land, at all stages of a mine development (especially for a quarry). This chapter clarifies the concept of "land" (as defined by scientific literature), explains the functions that give value to the land and describes the main mining activities generating impact on the land in various operating stages. It also provides information on land areas occupied and degraded by mining activities in Romania and the main associated risks. Chapter one is rather an introductory one that aims at problematizing and imposing specific research in order to ensure the stability of the mining works, monitoring of groundwater regime and ecological reconstruction of the affected areas.

The second chapter deals with the issue of mining works stability, especially stability of mining waste deposits, which store impressive volumes of material and whose sliding can endanger not only the natural and/or anthropic environment, but also the lives of people living in their area of influence. During my work as a researcher at the Technical Mining and Geology Department and, later, at the Management, Environmental Engineering and Geology Department, slope stability problem was one of the main lines of research that I've covered. The main contribution in this area concern, in particular, results of stability analyzes, their interpretation and establishing measures to prevent landslides. To have more evaluation opportunities, I have worked to implement unconventional methods of analyzing the technical condition of mining waste deposits (probabilistic methods and based on fuzzy logic), which provides additional information regarding the likelihood of various forms of instability. Starting from these premises, I have developed a specific methodology for assessing the environmental risk in the event of a landslide, developing a matrix on which there are established several categories of environmental vulnerability for different assumptions on the technical condition of analyzed waste deposits. I also conducted comparative analysis between the results for the same conditions (geometry, physical and mechanical characteristics) using different categories and types of stability analysis methods (classical methods, methods based on the theory of finite elements and differences). Another contribution in this area is the development of an Excel application (when the now existing specialized software were in a pioneering phase), which allows a rapid analysis of stability (for circular and polygonal sliding surfaces), application that has proved to be extremely useful both for research work and for teaching seminars.

The third chapter presents the results of research on the changes in groundwater hydrodynamic regime, for freatic aquifers and captive aquifers (pressurized or unpressurised) as a result of the dewatering work. The analysis presented refers to the hydrogeology of Rosia de Jiu quarry, which operates under the protection of the most advanced dewatering system in Romania. Also, the research described in this chapter are directed towards the possibilities of limiting the negative effects of the dewatering of aquifer formations (lowering hydrostatic level, the occurrence of aridity phenomena inside the depression area, reducing groundwater resources, subsidence phenomena) on environmental and the possibility to use the water (from dewatering work) for different purposes. The main contributions in this area concern the development of a new hydrogeological classification of lignite deposits (used for the classification of the main quarries from Oltenia), studies on the effects of dewatering works on groundwater hydrostatic level variations, the infiltration mechanism of rainfall into mining waste deposits, solutions to reduce the impact on the environment and on restoration of the hydrostatic level in waste deposits.

Chapter four is dedicated to research regarding the necessity of using an integrated approach in ecological restoration activities of the lands affected by mining activities (waste dumps or former quarries). Contributions in this area concern the development of a holistic approach model for the rehabilitation of a mining basin in which several lignite quarries operates, done using MineSight software, during a research internship conducted at Bergakademie Freiberg, model on which I built an app for Rovinari mining basin
Also, in this chapter, is presented a model for the rehabilitation of the remaining hole of lignite quarries, developed for Urdari quarry, model that leads to the ecological reconstruction

of adjacent areas, and, following the formation a lake in the remaining hole, accelerates the restoration of the hydrodynamic regime of groundwater. Because of the difficulties encountered in several projects regarding the optimal restoration type of lands affected by mining (determined strictly on the basis of several principles), I developed a methodology for the establishment of the optimal type of ecological reconstruction of degraded lands, which goes through several stages and take into account a series of indicators.

Part III of the habilitation thesis presents the career development plan and sets out the main directions of research that can be addressed in the future doctoral theses. In this part, there are also highlighted the objectives regarding the teaching and mentoring activities, and future dissemination of the research results.

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