



**The application of engineering geology to dam construction or what experience has taught us.**  
**Otto Horský and Pavel Bláha**

The book consists of 296 pages of text, supplemented by 225 figures and photos and 30 tables. The content of the book, along with the introduction and conclusion, contains nine technical chapters. The book also includes a list of locations investigated, with names of

riders, countries, and even their geographical coordinates, a list of references, both printed and web-based, as well as abbreviations used.

Chapter 2 – Basic Criteria of Dam Design discusses site selection based on the geological factors (these naturally taking the largest share), the morphological ones, and the effect of climatic conditions, seismicity and construction materials the site selection. The chapter finishes with discussion on how the ecological factors affect the construction of reservoirs and a description of Environmental Impact Assessment (EIA).

Chapter 3 – Methods Used to Carry out an Engineering Geological Survey is devoted to the tasks and rules of an engineering geological survey. The chapter serves as a guide to gaining basic knowledge the role of an engineering geological survey and the logistical procedures used in such a survey. Illustrated tables are helpful, giving an overview. The basic strategy of an engineering geological survey is also set out.

Chapter 4 – Engineering Geological (EG) Mapping – this section deals mainly with the definition of tasks of engineering geological mapping, rather than with the compilation and presentation of engineering geological maps. Generous space is reserved for outlining the work flow path in the compilation of EG maps. This part is written clearly and may serve as suitable guidance beginners in this area.

Chapter 5 – Hydrogeological Survey. As in the previous chapter, this section is divided into preliminary and detailed survey. Greater space is obviously reserved for discussion of a detailed survey; nevertheless, the general procedures criteria and necessary information for a preliminary survey are also treated in depth. This type of survey is indispensable in the process of dam construction and underrating such a survey may cause a serious dam failure, as correctly noted by the authors. A good number of figures serves helps give guidance for the effective completion of such surveys.

Chapter 6 – Geophysical Surveys. Because a geophysical survey utilizes a broad spectrum of physical methods in different combinations during the entire course of engineering geological work, this chapter is reasonably extensive. At the beginning of this chapter we note that Table 6.2.1 on page 119 is valuable as an initial overview of the use of geophysical methods – which methods, and at which stage of a survey, are suitable for which use, and the reader is given a rating of their applicability. Similarly, recommendations regarding average spacing and depth of exploration workings for various categories of engineering geological methodologies are useful. Besides the traditional use of geophysical methods for ground conditions, there is also an emphasis on checking concrete structures that form part of a dam wall and ancillary facilities.

Chapter 7 – Direct Survey Work deals with drilling surveys, mining and stripping works, especially the excavation of pits and trenches for the purposes of assessing the thickness and character of the superficial sediments (cover) and the character of the pre-Quaternary basement. All these activities are described in detail and it is emphasized that they must provide reliable data to guide proper decisions for dam construction. Reference to the Japanese standard providing a practical defini-

tion of the dam site selection is synoptic and useful. A remarkable amount of space is devoted to the Comprehensive Documentation of Exploratory Workings, which is justified by the fact that at this stage the basic data is of utmost importance for the proper operation of a dam.

Chapter 8 – Geotechnical Surveys begins with general rules covering the surveys prior to the beginning of construction, dealing with geodynamic phenomena that might be generated during dam construction and after filling of a reservoir. The descriptive Table 8.1.1 exhaustively reports which activity is appropriate for which tasks at the individual stages of investigation. The next section is devoted to the rock environment as a determining factor in dam design, where the authors have synthesized their rich experience. In the following text – subchapter 8.3 – are introduced all the methods that can be used to minimize problems during dam construction and to obtain representative parameters of strength/strain and permeability. The next subchapter 8.4 deals with correlations between the parameters obtained. The chapter is concluded by subchapter 8.5, offering examples of these methods in practice.

Chapter 9 – Engineering Geological Survey of the Reservoir Areas. Almost the whole chapter is focused on dynamic features of a reservoirs banks and slopes as they adjust to new conditions – mostly negatively, generating slides, slumps, abrasion and erosion. However, no attention is given to permeability parameters for reservoirs situated within karst areas. There are a number of dams in the world situated in such areas and a considerable number of new ones have been proposed. This chapter offers also solutions of reservoir bank stabilization and further remedial procedures which can be applied to improve the environment of hydro-engineering works.

As a whole, this book is well-structured, and provides synoptic information about the engineering geological challenges connected with dam construction. Perhaps the book should contain also a separate chapter/subchapter (Lessons from our mistakes) dealing with catastrophes related to dam constructions. There is also a lack of information concerning dam disasters clearly connected with ignorance or an underestimate of geological conditions (San Francis, South Fork, Baldwin Hills, Teton), where hydraulic piping played decisive role.

There are some minor errors. Figures are in some cases too small, at the expense of clarity, some are missing a legend, while many are not referred to.

For us, as the Slovaks and neighbours, it is disappointing that the information on the most important Slovak dams (Gabčíkovo – the run-of-the-river hydro power plant on the Danube River and the pumped-storage power plant Čierny Váh, both with installed power capacities above 700 MW), is lacking. Similarly, a description of the world's largest hydropower plant (The Three Gorges dam on the Yangtse River in China) would have been worthwhile.

However, this book is a useful step forward and we have to express our admiration to the authors, including contributors, reviewers and supporters that they had the courage to tackle a complex problem, thus leaving a significant foot-print within the sphere of applied geology, which is in need of books like this one, directly connected as it is with the practical and urgent needs of our society.

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LUDOVIT KUCHARIČ, PAVEL LIŠČÁK  
SGUDS, Slovakia