

Contents

List of Figures.....	7
List of Tables.....	13
List of Symbols and Abbreviations	15
List of Terms	17
Foreword.....	18
Introduction	20
1 Mineral demand and mining production	23
1.1 Mineral demand in Europe.....	23
1.2 Mining in Europe	32
1.3 World mining industry.....	41
1.4 Marine Mineral Resources in shelf area.....	50
1.5 Deep sea resources	55
1.5.1 <i>Deep sea polymetallic nodules</i>	57
2 Selected mining technologies under the aspect of investment.....	62
2.1 Surface mining of minerals	62
2.2 Significance of surface mining minerals in the world.....	62
2.3 Specifics of surface mining.....	64
3 Primary parameters of surface mining	65
3.1 Fundamental terms in surface mining.....	65
3.2 Geotechnical parameters of a surface mine.....	67
3.2.1 <i>Quarry face material</i>	67
3.2.2 <i>Mining-influencing forces</i>	69
3.3 Conditions of a surface mine building	69
3.3.1 <i>Dynamics of a surface mine building</i>	69
3.3.2 <i>Work safety</i>	70
3.3.3 <i>Design and management of winning operations</i>	70
3.3.4 <i>Definitions of terms used in English version of the United Nations International framework classification for reserves/resources – solid fuels and mineral commodities</i>	77
3.3.5 <i>Theoretical and methodological issues in the classification of reserves</i>	80

3.3.6	<i>Problems connected with the definition of economic and potentially economic (balancing and non-balancing) reserves and resources.....</i>	84
3.4	Classification of reserves according to the conditions of using reserves by means of the reserve variant calculation methodology (case study)	87
3.5	Modelling of the industrial mineral deposits	91
3.5.1	<i>Estimation of the Chemical Composition</i>	93
3.5.2	<i>Defining the quantity of reserves in modular blocks of the model</i>	98
3.5.3	<i>Computer model of raw material extraction</i>	102
3.5.4	<i>Evaluation of deposit – extraction in the selected time period, case study</i>	108
3.5.5	<i>Economic consequences of the mining project, case study</i>	113
3.6	Modelling of mineral deposit – lignite deposit Nováky mine, case study according to Assoc. Prof. Peter Blišťan, M.Sc., PhD.	117
3.7	Deposit Evaluation.....	135
3.8	Position of mining studies and projects in the process of deposits evaluation.....	136
3.9	View of an investor	147
4	Analysis of investment in the mining industry	151
4.1	Study of the Basic Project.....	154
4.1.1	<i>Effect of taxes and depreciation</i>	154
4.1.2	<i>Effect of the loan</i>	158
4.2	Decision-making economic tools	164
4.2.1	<i>Cash-flow.....</i>	165
4.2.2	<i>Cash-flow diagram</i>	165
4.2.3	<i>Factors affecting cash-flow.....</i>	167
4.2.4	<i>Return on investment (ROI) and profit to investment ratio (PIR).....</i>	169
4.2.5	<i>Payback period (pBp).....</i>	169
4.2.6	<i>Time value of money – the current value concept</i>	170
4.2.7	<i>Updated cash-flow</i>	173
4.2.8	<i>Internal rate of return (IRR)</i>	174
4.2.9	<i>Net present value (NPV).....</i>	175
4.2.10	<i>Coverage rate.....</i>	178

4.2.11 Sensitivity analysis.....	178
4.2.12 Optimum lifetime of the project	180
4.2.13 Income estimation.....	183
4.2.14 Capital costs.....	186
4.3 Evaluation of deposits – Method of “discounted specific average costs”	193
4.4 Evaluation of deposits – Method of “discounted specific average costs” – case study	195
5 Financial valuation of mining remediation objects	204
5.1 Conditions for mine remediation.....	205
5.2 Financial valuation approach	207
5.3 Case study of financial valuation of mining remediation objects.....	212
5.3.1 Initial Data and Calculation	213
6 Environmental balance of technological options in mining	216
6.1 Hard rock extraction/loosening methods – case study	223
Conclusion.....	235
Summary	237
Bibliography	238
About the Authors	245
Subject Index	249