

Contents

1. Introduction	5
2. Failures in masonry structures located on undermined territories	6
2.1 Effects of the underground mining on the earth surface	6
2.1.1 Continuous deformation of the landscape	6
2.1.2 Discontinuous deformation of the landscape	8
2.1.3 Categorisation of construction sites on the undermined territory	9
2.1.4 Time factor in continuous deformation of the landscape	10
2.1.5 Rock bumps	11
2.2 Protection of buildings and structures against undermining effects	11
2.3 Steps to be taken during preparation and design phases for the building and structures on the undermined territory	14
2.4 The undermining effects on the masonry	22
2.4.1 General terms	22
2.4.2 Protection of masonry buildings and structures against undermining effects	22
2.4.3 Mining damage caused by the subsidence	25
2.4.3.1 Non-mining damage which is similar to the mining damage caused by subsidence of landscape	27
2.4.4 Mining damage caused by relative horizontal deformation of the landscape	30
2.4.4.1 Protection against effects of the relative horizontal deformation ($\pm \epsilon$)	34
2.4.5 Mining damage caused by the landscape inclination	42
2.4.5.1 Protection against effects of the landscape inclination	45
2.4.6 Mining damage caused by the landscape curvature	46
2.4.6.1 Protection against effects of the landscape curvature ($\pm R_{min}$)	47
2.5 Mining damage caused by discontinuous deformation of the landscape	47
2.5.1 Protection against discontinuous deformation of the landscape and rock bumps	48
2.6 Non-mining damage	48
2.7 Structural protection of sacral buildings on the undermined territory	48
2.7.1 Concept of structural measures	49
2.7.2 Structural protection	50
2.7.2.1 Protection against continuous deformation of the landscape	50
2.7.2.2 Protection against discontinuous deformation of the landscape and rock bumps	55
3. Failures in masonry structures located in flood plains	56
3.1 Basic terms	56
3.2 Protecting the existing buildings against effects of the flood wave	57
3.2.1 Modifications in existing masonry buildings	58
3.2.2 Historic and listed buildings	61
3.2.3 Modification of dilatation joints	61

3. 2. 4 Protection against pressurised water	62
3. 2. 5 Modification of internal lines/pipes for technical facilities	63
3. 2. 6 Other measures	63
3. 3 Redevelopment of brick buildings after the flood	64
3. 3. 1 Redevelopment of the bearing system	64
3. 3. 2 Redevelopment of wet masonry	64
3. 3. 2. 1 Redevelopment of the moist masonry where the reason is only the water from the flood wave	64
3. 3. 2. 2 Moisture in partition walls	66
3. 3. 2. 3 Redevelopment of the moist masonry where the reason is not only the water from the flood wave	66
3. 4 Underground structures	67
3. 5 Flood plains on undermined territories	67
3. 6 Loading of the structures during passage of a flood wave	67
3. 6. 1 The load caused by uneven subsidence of foundations because the flood wave makes the subsoil wet	68
3. 6. 2 The load caused by the vertical lifting force of water from the flood wave	69
3. 6. 3 The load caused by the hydrostatic pressure of the water column for the flood wave height h [m]	70
3. 6. 4 The load caused by the dynamic pressure of water from the flood wave for the flood wave depth h [m] and velocity w [m.s^{-1}]	71
3. 6. 5 The load caused by the dynamic effects of a floating object, p_{dp} [Pa], with the weight of m [kg], which floats on the flood wave with the velocity of w [m.s^{-1}]	72
4. Failures in masonry structures on sites with occurrence of technical seismicity	74
4. 1 Introduction	74
4. 2 Seismic resistance of the buildings	74
4. 3 Failures in masonry structures caused by technical seismicity	76
4. 4 Structural principles for reconstruction of the buildings located in technical seismicity territories	79