

Contents

Preface: F. G. BELL, M. G. CULSHAW, J. C. CRIPPS & M. A. LOVELL	v
Obituary, Dr Roy Kenneth Taylor: P. B. ATTEWELL	vii
Organizing Committee	ix
Acknowledgements	ix
SESSION 1: INTRODUCTION	
F. G. BELL, J. C. CRIPPS, M. G. CULSHAW & M. A. LOVELL: A review of ground movements due to civil and mining engineering operations	3
R. J. FIRMAN & M. A. LOVELL: The geology of the Nottingham region: a review of some engineering and environmental aspects	33
SESSION 2: GROUND MOVEMENTS DUE TO TUNNELLING	
P. B. ATTEWELL: An overview of site investigation and long-term tunnelling-induced settlement in soil	55
W. H. WARD: Ground movements due to tunnelling in hard rocks	63
A. R. SELBY: Surface movements caused by tunnelling in two-layer soil	71
W. J. RANKIN: Ground movements resulting from urban tunnelling: predictions and effects	79
J. N. SHIRLAW, S. DORAN & B. BENJAMIN: A case study of two tunnels driven in the Singapore 'Boulder Bed' and in grouted coral sands	93
A. R. GRIFFIN: Tunnelling through frozen ground: a case history at Iver, Buckinghamshire	105
Discussion	113
SESSION 3: GROUND MOVEMENTS DUE TO DEEP EXCAVATIONS	
I. F. SYMONS, J. A. LITTLE & D. R. CARDER: Ground movements and deflections of an anchored sheet pile wall in granular soil	117
G. G. THOMAS & M. S. MOJABI: Ground losses during bored piling through weathered Keuper Sandstone in Bristol	129
C. H. DE G. PRICE & T. F. H. LEGGE: A case study illustrating the use of boundary element stress analysis in deformation prediction	135
Discussion	149
SESSION 4: GROUND MOVEMENTS AND CONSTRUCTION OPERATIONS	
B. J. GREGORY, I. S. VENTER & L. J. KRUGER: Grouting-induced ground movements	153
K. J. L. STONE & D. M. WOOD: Model studies of soil deformations over a moving basement	159
G. G. THOMAS: A cost-benefit analysis for stabilizing shallow Bath Stone mine workings at Corsham, Wiltshire	167
Discussion	175
SESSION 5: GROUND MOVEMENTS DUE TO ABANDONED MINE WORKINGS	
G. F. G. GARRARD & R. K. TAYLOR: Collapse mechanisms of shallow coal-mine workings from field measurements	181
D. G. PRICE & P. N. W. VERHOEF: The stability of abandoned mine workings in the Maastrichtian Limestone of Limburg, The Netherlands	193

C. N. EDMONDS: Induced subsurface movements associated with the presence of natural and artificial underground openings in areas underlain by Cretaceous Chalk	205
A. C. VAN BESIEEN & J. D. ROCKAWAY: Influence of overburden on subsidence development over room and pillar coal mines	215
Discussion	221
 SESSION 6: GROUND MOVEMENTS DUE TO LONGWALL MINING	
Y. TSUR-LAVIE, S. A. DENEKAMP & G. FAINSTEIN: Surface subsidence associated with longwall mining: two and three dimensional boundary element model .	225
A. K. ISAAC & I. L. FOLLINGTON: Geotechnical influences upon longwall mining .	233
J. N. VAN DER MERWE: A study of the effects on mining relatively shallow overlying longwall panels with staggered inter-panel pillars at Sigma Colliery, South Africa	243
G. H. ROSCOE: Saint Wilfrid's Church, Hickleton: mining subsidence and remedial works	257
F. G. BELL & J. M. COULTHARD: Subsidence prediction by the use of influence functions	265
Discussion	275
 SESSION 7: ABANDONED LIMESTONE MINES IN THE WEST MIDLANDS	
P. A. BRAITHWAITE & K. L. SEAGO: Regional study of the West Midlands area to locate old limestone mine workings	279
A. FORSTER: The geology of Castlefields Mine, Dudley and its effect on the stability of the mine roof	287
J. A. RICHARDS & A. MILLER: Roof-fall observations at Castlefields Mine, Dudley .	293
T. I. LONGWORTH: Monitoring of ground movement above an abandoned limestone mine	299
W. H. WARD: Full-scale mixing, pumping and surface spreading trials of rock paste for filling mines	307
A. MILLER, J. A. RICHARDS & D. M. McCANN: Microseismic monitoring of the infill trial at Castlefields Mine, Dudley	319
Discussion	325
 SESSION 8: INVESTIGATION OF GROUND MOVEMENTS	
M. J. SMITH & J. A. SUTHERLAND: The monitoring of underground open mine workings beneath a major road construction	329
J. A. EVANS & M. S. LAWRENCE: A case study on past shortwall mining methods and the risk of ground subsidence in the Lanarkshire Coalfield, Scotland .	337
M. J. BALDWIN & M. A. NEWTON: Basal Permian Sand mines and associated surface movements in the Castleford and Pontefract area of West Yorkshire .	351
Discussion	359
 SESSION 9: GROUND MOVEMENTS DUE TO THE ABSTRACTION OR INJECTION OF FLUIDS	
F. G. BELL: Subsidence associated with the abstraction of fluids	363
D. L. GUDGEON, M. F. WARNER & J. STOWELL: Prediction of settlement due to dewatering for deep excavations	377
A. H. COOPER: Subsidence resulting from the dissolution of Permian gypsum in the Ripon area; its relevance to mining and water abstraction	387
Discussion	391

SESSION 10: INDUCED SEISMICITY

D. M. McCANN: Induced seismicity in engineering	397
D. W. REDMAYNE: Mining induced seismicity in UK coalfields identified on the BGS National Seismograph Network	405
A. S. P. GREEN, R. BARIA, A. MADGE & R. JONES: Fault-plane analysis of micro- seismicity induced by fluid injections into granite	415
P. STYLES, S. J. EMSLEY & T. JOWITT: Microseismic monitoring for the prediction of outbursts at Cynheidre Colliery, Dyfed, South Wales	423
R. CIESIELSKI: Dynamic surface effects of underground copper ore mining in the Legnica Copper District, Poland	435
Discussion	445
Subject index	447
Index of authors and contributors to discussions	454