

## References

- Amos, A.J., A. Granero Hernandez, and R.J. Rocca. 1981. Problemas de meteorizacion del geneis en la Presa Principal del complejo hidroeléctrico Río Grande I. *Proc. VIII Cong. Geol. Arg. Actas* **2**, 123-135.
- Anon. 1977. Description of rock masses for engineering purposes. Geological Society Engineering Group Working Party Report. *Q. J. Engng Geol.* **10**, 355-388.
- Azzoni, A., La Barbera, G. and Zaninetti, A. 1995. Analysis and prediction of rockfalls using a mathematical model. *International Journal of Rock Mechanics and Mining Science and Geomechanics Abstracts*. Vol. 32., No. 7. pp. 709-724.
- Badger, T.C. and Lowell, S. 1992. Rockfall Control Washington State. In *Rockfall Prediction and Control and Landslide Case Histories, Transportation Research Record*, National Research Council, Washington, No 1342, pp 14-19.
- Bajzelj, U., Likar, J., Zigman, F., Subelj, A. and Spek, S. 1992. Geotechnical analyses of the mining method using long cable bolts. In *Rock support in mining and underground construction, proc. int. symp. on rock support*, Sudbury, (eds. P.K. Kaiser and D.R. McCreath), 393-402. Rotterdam: Balkema.
- Baker, D.G. 1991. Wahleach power tunnel monitoring. *Proc. 3rd Int. Symp. on Field Measurements in Geomechanics, Oslo, Norway*, in press.
- Balmer, G. 1952. A general analytical solution for Mohr's envelope. *Am. Soc. Test. Mat.* **52**, 1260-1271.
- Bandis, S.C. 1980. *Experimental studies of scale effects on shear strength, and deformation of rock joints*. Ph.D. thesis, University of Leeds.
- Bandis, S.C. 1990. Mechanical properties of rock joints. In *Proc. Int. Soc. Rock Mech. symp. on rock joints*, Loen, Norway, (eds N. Barton and O. Stephansson), 125-140. Rotterdam: Balkema.
- Barton, N. 1976. The shear strength of rock and rock joints. *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr.* **13**, 1-24.
- Barton, N. 1989. Cavern design for Hong Kong rocks. *Proc. Rock Cavern Seminar - Hong Kong* (eds A.W. Malone and P.G.D. Whiteside), pp. 179-202. London: Institution of Mining and Metallurgy
- Barton, N., By, T.L., Chryssanthakis, L., Tunbridge, L., Kristiansen, J., Løset, F., Bhasin, R.K., Westerdahl, H. and Vik, G. 1992. Comparison of prediction and performance for a 62 m span sports hall in jointed gneiss. *Proc. 4th. int. rock mechanics and rock engineering conf.*, Torino. Paper 17.
- Barton, N., Løset, F., Lien, R. and Lunde, J. 1980. Application of the Q-system in design decisions. In *Subsurface space*, (ed. M. Bergman) **2**, 553-561. New York: Pergamon.

- Barton, N.R. 1973. Review of a new shear strength criterion for rock joints. *Engng Geol.* **7**, 287-332.
- Barton, N.R. 1974. *A review of the shear strength of filled discontinuities in rock*. Norwegian Geotech. Inst. Publ. No. 105. Oslo: Norwegian Geotech. Inst.
- Barton, N.R. 1976. The shear strength of rock and rock joints. *Int. J. Mech. Min. Sci. & Geomech. Abstr.* **13**(10), 1-24.
- Barton, N.R. 1987. *Predicting the behaviour of underground openings in rock*. Manuel Rocha Memorial Lecture, Lisbon. Oslo: Norwegian Geotech. Inst.
- Barton, N.R. and Bandis, S.C. 1982. Effects of block size on the the shear behaviour of jointed rock. *23rd U.S. symp. on rock mechanics*, Berkeley, 739-760.
- Barton, N.R. and Bandis, S.C. 1990. Review of predictive capabilites of JRC-JCS model in engineering practice. In *Rock joints, proc. int. symp. on rock joints*, Loen, Norway, (eds N. Barton and O. Stephansson), 603-610. Rotterdam: Balkema.
- Barton, N.R. and Choubey, V. 1977. The shear strength of rock joints in theory and practice. *Rock Mech.* **10**(1-2), 1-54.
- Barton, N.R., Lien, R. and Lunde, J. 1974. Engineering classification of rock masses for the design of tunnel support. *Rock Mech.* **6**(4), 189-239.
- Bétournay, M.C. 1987. A design philosophy for surface crown pillars in hard rock mines. *Bull. Canadian Inst. Min. Metall.* **80** (903), 45-61.
- Bieniawski Z.T. 1989. *Engineering Rock Mass Classifications*. Wiley, New York. 251 pages.
- Bieniawski, Z.T. 1967. Mechanism of brittle fracture of rock, parts I, II and III. *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr.* **4**(4), 395-430.
- Bieniawski, Z.T. 1973. Engineering classification of jointed rock masses. *Trans S. Afr. Inst. Civ. Engrs* **15**, 335-344.
- Bieniawski, Z.T. 1974. Estimating the strength of rock materials. *J. South African Inst. Min. Metall.* **74** (8), 312-320.
- Bieniawski, Z.T. 1974. Geomechanics classification of rock masses and its application in tunnelling. In *Advances in Rock Mechanics* **2**, part A: pp.27-32. Washington, D.C.: National Academy of Sciences
- Bieniawski, Z.T. 1976. Rock mass classification in rock engineering. In *Exploration for rock engineering, proc. of the symp.*, (ed. Z.T. Bieniawski) **1**, 97-106. Cape Town: Balkema.
- Bieniawski, Z.T. 1978. Determining rock mass deformability - experiences from case histories. *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr.* **15**, 237-247.
- Bieniawski, Z.T. 1979. The geomechanics classification in rock engineering applications. *Proc. 4th. congr., Int. Soc. Rock Mech.*, Montreux **2**, 41-48.
- Bieniawski, Z.T. 1989. *Engineering rock mass classifications*. New York: Wiley.
- Bieniawski. Z. T., 1967. Mechanism of brittle fracture of rock, parts I, II and III. *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr.* **4** (4),395-30.
- Bouchier, F., Dib, E. and O'Flaherty, M. 1992. Practical improvements to installation of cable bolts: progress at Campbell Mine. In *Rock support in mining and underground construction, proc. int. symp. on rock support*, Sudbury, (eds P.K. Kaiser and D.R. McCreath), 311-318. Rotterdam: Balkema.
- Bowcock, J.B., Boyd, J.M., Hoek, E. and Sharp, J.C. 1976. Drakensberg pumped storage scheme, rock engineering aspects. In *Exploration for Rock Engineering* (ed. Z.T. Bieniawski) **2** , pp. 121-139. Rotterdam: Balkema
- Bozzolo, D., Pamini, R. and Hutter, K. 1988. Rockfall analysis - a mathematical model and its test with field data. *Proc. 5<sup>th</sup> International Symposium on Landslides, Lusanne*. July 1988, Vol. 1, pp. 555-560.

- Brady, B.H.G. and Brown, E.T. 1985. *Rock mechanics for underground mining*. London: Allen and Unwin.
- Brand, E.W. 1988. Special Lecture: Landslide risk assessment in Hong Kong. *Proc. 5<sup>th</sup> International Symposium on Landslides, Lusanne*. July 1988, Vol. 2, pp. 1059-1074.
- Brawner, C.O. and Hoek, E. 1977. Design, Construction and Maintenance of rock slopes on highway projects. *Proc. VIIIth International Road Federation World Meeting, Tokyo*. October, 1977,
- British Standard Code of Practice, 1987. BS 8081, *Ground Anchorage*, 89-115.
- Brown E.T., Bray J.W., Ladanyi B. and Hoek E. 1983. Characteristic line calculations for rock tunnels. *J. Geotech. Engng Div., Am. Soc. Civ. Engrs* **109**, 15-39.
- Brown, A. 1982. The influence and control of groundwater in large slopes. In *Stability in Surface Mining* (ed. C.O. Brawner), pp. 19-41. New York: Society of Mining Engineers, AIME
- Brown, E.T. 1970. Strength of models of rock with intermittent joints. *J. Soil Mech. Foundn Div., ASCE* **96**, SM6, 1935-1949.
- Brown, E.T. 1987. Introduction. *Analytical and computational methods in engineering rock mechanics*, (ed. E.T. Brown), 1-31. London: Allen and Unwin.
- Brown, E.T. and Bray, J.W. 1982. Rock-support interaction calculations for pressure shafts and tunnels. In *Rock Mechanics: Caverns and Pressure Shafts* (ed. W. Wittke) **2**, pp. 555-565. Rotterdam: Balkema
- Brown, E.T. and Ferguson, G.A. 1979. Progressive hanging wall caving at Gath's mine, Rhodesia. *Trans. Instn Min. Metall. (Section A: Min. industry)* **88**, A92-105.
- Brown, E.T. and Hoek, E. 1978. Trends in relationships between measured rock in situ stresses and depth. *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr.* **15**, 211-215.
- Brown, E.T., Bray, J.W., Ladanyi, B. and Hoek, E. 1983. Characteristic line calculations for rock tunnels. *J. Geotech. Engng Div., ASCE* **109**, 15-39.
- Bucky, P.B. 1931. Use of models for the study of mining problems. *Am. Inst. Min. Metall. Engrs , Technical Publication* 425.
- Bunce, C.M. 1994. Risk Analysis for Rock Fall on Highways. *MSc thesis submitted to the Department of Civil Engineering, University of Alberta, Canada*. 129 pages.
- Bywater, S. and Fuller, P.G. 1984. Cable support for lead open stope hanging walls at Mount Isa Mines Limited. In *Rock bolting: theory and application in mining and underground construction*, (ed. O. Stephansson), 539-556. Rotterdam: Balkema.
- Carter, T.G. 1992. A new approach to surface crown pillar design. *Proc. 16th. Canadian Rock Mechanics Symposium, Sudbury*, 75-83.
- Carter, T.G. 1992. Prediction and uncertainties in geological engineering and rock mass characterization assessments. *Proc. 4th. int. rock mechanics and rock engineering conf.*, Torino. Paper 1.
- Chan, Y.C., Chan C.F. and Au S.W.C., 1986. Design of a boulder fence in Hong Kong. *Conf. On Rock Engineering and Excavation in an Urban Environment*. Hong Kong: Institution of Mining & Metallurgy.
- Cheng, Y. 1987. New development in seam treatment of Feitsui arch dam foundation. *Proc. 6<sup>th</sup> Cong. ISRM, Montreal*, 319-326.
- Cheng, Y. and Liu, S.C. 1990. Power caverns of the Mingtan Pumped Storage Project, Taiwan. In *Comprehensive Rock Engineering* (ed. J.A. Hudson) **5**, 111-132
- Clegg, I.D. and Hanson, D.S. 1992. Ore pass design and support at Falconbridge Limited. In *Rock support in mining and underground construction, proc. int. symp. on rock support*, Sudbury, (eds P.K. Kaiser and D.R. McCreath), 219-225. Rotterdam: Balkema.
- Clifford, R.L. 1974. Long rockbolt support at New Broken Hill Consolidated Limited. *Proc. Aus. Inst. Min. Metall.*, No. 251, 21-26.

- Clough, R.W. 1960. The finite element method in plane stress analyses. *Proc. 2nd. ASCE Conference on Electronic Computation, Pittsburgh*, 345-378.
- Coates, D. 1966. *Rock Mechanics Principles*. Ottawa: Dept. Mines and Technical Surveys
- Cook, N.G.W. (1965) The failure of rock. *Int. J. Rock Mech. Min. Sci. Geomech. Abstr.* **2**, 389-403.
- Cording, E.J. and Deere, D.U. 1972. Rock tunnel supports and field measurements. *Proc. North American rapid excav. tunneling conf.*, Chicago, (eds. K.S. Lane and L.A. Garfield) **1**, 601-622. New York: Soc. Min. Engrs, Am. Inst. Min. Metall. Petrolm Engrs.
- Cording, E.J., Hendron, A.J. and Deere, D.U. 1971. Rock engineering for underground caverns. *Proc. Symp. on Underground Rock Chambers, 1971*, pp. 567-600. New York: American Society of Civil Engineers
- Coulomb, C.A. 1776. Essai sur une application des regles de maximis et minimis a quelques problemes de statique, relatifs a l'architecture. *Memoires de Mathematique & de Physique* **7**, 343- 82.
- Crouch, S.L. and Starfield, A.M. 1983. *Boundary element methods in solid mechanics*. London: Allen and Unwin
- Cummings, R.A., Kendorski, F.S. and Bieniawski, Z.T. 1982. *Caving rock mass classification and support estimation*. U.S. Bureau of Mines Contract Report #J0100103. Chicago: Engineers International Inc.
- Cundall, P.A. 1971. A computer model for simulating progressive large scale movements in blocky rock systems. In *Rock Fracture*, *Proc. Symp. ISRM, Nancy* **1**, Paper 2-8.
- Daeman, J.J.K. 1977. Problems in tunnel support mechanics. *Underground Space* **1**, 163-172.
- Davis, W.L. 1977. Initiation of cablebolting at West Coast Mines, Rosebury. *Proc. Aust. Inst. Min. Metall. conf.*, Tasmania, 215-225.
- Deere, D.U. 1989. *Rock quality designation (RQD) after 20 years*. U.S. Army Corps Engrs Contract Report GL-89-1. Vicksburg, MS: Waterways Experimental Station.
- Deere, D.U. and Deere, D.W. 1988. The rock quality designation (RQD) index in practice. In *Rock classification systems for engineering purposes*, (ed. L. Kirkaldie), ASTM Special Publication 984, 91-101. Philadelphia: Am. Soc. Test. Mat.
- Deere, D.U. and Miller, R.P. 1966. *Engineering classification and index properties of rock*. Technical Report No. AFNL-TR-65-116. Albuquerque, NM: Air Force Weapons Laboratory.
- Deere, D.U., Hendron, A.J., Patton, F.D. and Cording, E.J. 1967. Design of surface and near surface construction in rock. In *Failure and breakage of rock, proc. 8th U.S. symp. rock mech.*, (ed. C. Fairhurst), 237-302. New York: Soc. Min. Engrs, Am. Inst. Min. Metall. Petrolm Engrs.
- Diederichs, M.S., Pieterse, E., Nosé, J. and Kaiser, P.K. 1993. A model for evaluating cable bond strength: an update. *Proc. Eurock '93*, Lisbon. (in press).
- Dorsten, V., Frederick, F.H. and Preston, H.K. 1984. Epoxy coated seven-wire strand for prestressed concrete. *Prestressed Concrete Inst. J.* **29**(4), 1-11.
- Doruk, P. 1991. *Analysis of the laboratory strength data using the original and modified Hoek-Brown failure criteria*. MSc thesis, Dept. Civil Engineering, University of Toronto.
- Duncan Fama, M.E. 1993. Numerical modelling of yield zones in weak rocks. In *Comprehensive rock engineering*, ( ed. J.A. Hudson) **2**, 49-75. Oxford: Pergamon.
- Duvall, W.I. and Fogelson, D.E. 1962. Review of criteria for estimating damage to residences from blasting vibrations . *U.S. Bur. Mines Rep. Invest.* 5986. 19 pages.

- Endersbee, L.A. and Hofto, E.O. 1963. Civil engineering design and studies in rock mechanics for Poatina underground power station, Tasmania. *J. Instn. Engrs Australia* **35**, 187-209.
- Engelder, T. and Sbar, M.L. 1984. Near-surface in situ stress: introduction. *J. Geophys. Res.* **89**, 9321-9322. Princeton, NJ: Princeton University Press.
- Ewy, R.T. and Cook, N.G.W. 1990. Deformation and fracture around cylindrical openings in rock. Parts I & II. *Int. J. Rock Mech. Min. Sci. Geomech. Abstr.* **27**, 387-427.
- Fabjanczyk, M.W. 1982. Review of ground support practice in Australian underground metalliferous mines. *Proc. Aus. Inst. Min. Metall. conf.*, Melbourne, 337-349. Melbourne: Aust. Inst. Min. Metall.
- Fairhurst, C. and Cook, N.G.W., 1966. The phenomenon of rock splitting parallel to a free surface under compressive stress. *Proc. 1st Cong. ISRM, Lisbon* **1**, 687-692.
- Farmer, I.W., and Shelton, P.D. 1980. Review of underground rock reinforcement systems. *Trans. Instn Min. Metall. (Sect. A: Min. industry)* **89**, A68-83.
- Feat-Smith, I. 1982. Survey of rock tunnelling machines available for mining projects. *Trans. Instn Min. Metall. (Sect. A: Min. industry)* **91**, A23-31.
- Federal Highways Administration. 1993. *Rockfall Hazard Rating System, Participants Manual for NHI Course No. 130220*. Publication No. FHWA SA-93-057.
- Fell, R. 1994. Landslide risk assessment and acceptable risk. *Canadian Geotechnical Journal*. Vol. 31. pp. 261-272
- Fenner, R. 1938. Untersuchungen zur Erkenntnis des Gebirgsdruckes. *Glukauf* **74**, 681-695, 705-715.
- Fookes, P.G. and Sweeney, M. 1976. Stabilisation and control of local rockfalls and degrading of slopes. *Quarterly J. Engineering Geology*. Vol. 9, pp 37-55.
- Franklin, J.A. and Hoek, E. 1970. Developments in triaxial testing equipment. *Rock Mech.* **2**, 223-228. Berlin: Springer-Verlag.
- Franzén, T. 1992. Shotcrete for underground support - a state of the art report with focus on steel fibre reinforcement. In *Rock support in mining and underground construction, proc. int. symp. rock support*, Sudbury, (eds P.K. Kaiser and D.R. McCreath), 91-104. Rotterdam: Balkema.
- Freeze, A.R. and Cherry, J.A. 1979. *Groundwater*. Englewood Cliffs, NJ: Prentice-Hall 604 pages
- Fuller, P.G. 1981. Pre-reinforcement of cut and fill stopes. In *Application of rock mechanics to cut and fill mining*, (eds O. Stephansson and M.J. Jones), 55-63. London: Instn Min. Metall.
- Fuller, P.G. 1983. The potential for support of long hole open stopes with grouted cables. *Proc. 5th. Int. Cong. for Rock Mechanics, Melbourne* **2**, D39-D44. Rotterdam: Balkema
- Fuller, P.G. 1984. Cable support in mining - a keynote lecture. In *Rock bolting: theory and application in mining and underground construction*, (ed. O. Stephansson), 511-522. Rotterdam: Balkema.
- Gane, P.G., Hales, A.L. and Oliver, H.A. 1946. A seismic investigation of Witwatersrand earth tremors. *Bull. Seism. Soc. Am.* **36**, 49-80.
- Garford Pty Ltd. 1990. *An improved, economical method for rock stabilisation*. 4p. Perth.
- Greenwald, H.P., Howarth, H.C. and Hartman, I. 1939. Experiments on the strength of small pillars of coal in the Attsburg bed. *U.S. Bureau of Mines Tech. Rep.* No. 605.
- Griffith, A.A. 1921. The phenomenon of rupture and flow in solids. *Phil. Trans. Roy. Soc., London* **A221**, 163-198.
- Griffith, A.A. 1924. Theory of rupture. *Proc. 1st congr. applied mechanics*, Delft, 55-63. Delft: Technische Bockhandel en Drukkerij.

- Griggs, D.T. 1936. Deformation of rocks under high confining pressures. *J. Geol.* **44**, 541-577.
- Grimstad, E. and Barton, N. 1993. Updating the Q-System for NMT. *Proc. int. symp. on sprayed concrete - modern use of wet mix sprayed concrete for underground support*, Fagernes, (eds Kompen, Opsahl and Berg). Oslo: Norwegian Concrete Assn.
- Hagan, T.N. 1980. Understanding the burn cut - a key to greater advance rates. *Trans. Instn. Min. Metall. (Sect. A: Min. Industry)*, **89**, A30-36.
- Hagan, T.N. 1982. Controlling blast-induced cracking around large caverns. *Proc. ISRM Symp., Rock Mechanics Related to Caverns and Pressure Shafts*, Aachen, West Germany.
- Haimson B.C. 1978. The hydrofracturing stress measuring method and recent field results. *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr.* **15**, 167-178.
- Hammett, R.D. and Hoek, E. 1981. Design of large underground caverns for hydroelectric projects, with reference to structurally controlled failure mechanisms. *Proc. American Soc. Civil Engrs. Int. Conf. on Recent Developments in Geotechnical Engineering for Hydro Projects*. pp. 192-206. New York: ASCE
- Harr, M.E. 1987. *Reliability-based design in civil engineering*. New York: McGraw-Hill.
- Hatzor, Y. and Goodman, R.E. 1992. Application of block theory and the critical key block concept in tunneling; two case histories. In *Proc. Int. Soc. Rock Mech. conf. on fractured and jointed rock masses*, Lake Tahoe, California, 632-639.
- Hatzor, Y. and Goodman, R.E. 1993. Determination of the 'design block' for tunnel supports in highly jointed rock. In *Comprehensive Rock Engineering, Principles, Practice and Projects*. (ed. J.A. Houson) **2**, 263-292. Oxford: Pergamon
- Herget, G. 1988. *Stresses in rock*. Rotterdam: Balkema.
- Heyman, J. 1972. *Coulomb's Memoir on Statics*. Cambridge: at the University Press
- Hoek E and Brown E.T. 1988. The Hoek-Brown failure criterion - a 1988 update. *Proc. 15th Canadian Rock Mech. Symp.* (ed. J.H. Curran), pp. 31-38. Toronto: Civil Engineering Dept., University of Toronto
- Hoek E. and Brown E.T. 1980. *Underground Excavations in Rock*. London: Institution of Mining and Metallurgy 527 pages
- Hoek, E. 1965. *Rock fracture under static stress conditions*. PhD Thesis , Univ. Cape Town
- Hoek, E. 1968. Brittle failure of rock. In *Rock Mechanics in Engineering Practice*. (eds K.G. Stagg and O.C. Zienkiewicz) , pp. 99-124. London: Wiley
- Hoek, E. 1975. Influence of drilling and blasting on the stability of slopes in open pit mines and quarries. *Proc. Atlas Copco Bench Drilling Days Symp., Stockholm, Sweden*.
- Hoek, E. 1982. Geotechnical considerations in tunnel design and contract preparation. *Trans. Instn Min. Metall. (Sect. A: Min. industry)* **91**, A101-109.
- Hoek, E. 1983. Strength of jointed rock masses, 23rd. Rankine Lecture. *Géotechnique* **33**(3), 187-223.
- Hoek, E. 1986. Rockfall: a computer program for predicting rockfall trajectories. Unpublished internal notes, Golder Associates, Vancouver.
- Hoek, E. 1989. A limit equilibrium analysis of surface crown pillar stability. In *Surface crown pillar evaluation for active and abandoned metal mines*, (ed. M.C. Betourney), 3-13. Ottawa: Dept. Energy, Mines & Resources Canada.
- Hoek, E. 1990. Estimating Mohr-Coulomb friction and cohesion values from the Hoek-Brown failure criterion. *Intnl. J. Rock Mech. & Mining Sci. & Geomechanics Abstracts*. **12**(3), 227-229.
- Hoek, E. 1994. Strength of rock and rock masses, *ISRM News Journal*, **2**(2), 4-16.
- Hoek, E. and Bray, J.W. 1981. *Rock Slope Engineering*. 3rd edn. London: Institution of Mining and Metallurgy 402 pages

- Hoek, E. and Brown, E.T. 1980b. Empirical strength criterion for rock masses. *J. Geotech. Engng Div., ASCE* **106**(GT9), 1013-1035.
- Hoek, E. and Brown, E.T. 1988. The Hoek-Brown failure criterion - a 1988 update. In *Rock engineering for underground excavations, proc. 15th Canadian rock mech. symp.*, (ed. J.C. Curran), 31-38. Toronto: Dept. Civ. Engineering, University of Toronto.
- Hoek, E. and Brown, E.T. 1997. Practical estimates of rock mass strength. *Intnl. J. Rock Mech. & Mining Sci. & Geomechanics Abstracts.* **34**(8), 1165-1186.
- Hoek, E. and Moy, D. 1993. Design of large powerhouse caverns in weak rock. In *Comprehensive rock engineering*, (ed. J.A. Hudson) **5**, 85-110. Oxford: Pergamon.
- Hoek, E., and Brown, E.T. 1980a. *Underground excavations in rock*. London: Instn Min. Metall.
- Hoek, E., Kaiser, P.K. and Bawden, W.F. 1995. *Support of underground excavations in hard rock*. Rotterdam: Balkema
- Hoek, E., Wood, D. and Shah, S. 1992. A modified Hoek-Brown criterion for jointed rock masses. *Proc. rock characterization, symp. Int. Soc. Rock Mech.: Eurock '92*, (ed. J.A. Hudson), 209-214. London: Brit. Geol. Soc.
- Holland, C.T. and Gaddy, F.L. 1957. Some aspects of permanent support of overburden on coal beds. *Proc. W. Virginia Coal Mining Inst.* 43-66.
- Holmberg, R. and Persson, P-A. 1980. Design of a tunnel perimeter blasthole pattern to prevent rock damage. *Trans. Instn Min. Metall. (Sect. A: Min. industry)* **89**, A37-40.
- Hungr, O. and Evans, S.G. 1989. Engineering aspects of rockfall hazard in Canada. Geological Survey of Canada, Open File 2061, 102 pages.
- Hunt, R.E. 1984. Slope failure risk mapping for highways: Methodology and case history. In *Rockfall prediction and Control and Landslide Case Histories*. Transportation Research Record, National Research Council, Washington, No. 1343. pp. 42-51.
- Hunt, R.E.B. and Askew, J.E. 1977. Installation and design guidelines for cable dowel ground support at ZC/NBHC. *Proc. Underground Operators Conference, Broken Hill*, 113-22.
- Hutchins, W.R., Bywater, S., Thompson, A.G. and Windson, C.R. 1990. A versatile grouted cable dowel reinforcing system for rock. *Proc. Aus. Inst. Min. Metall.* **1**, 25-29.
- Hutchinson, D.J. and Diederichs, M.S. 1996. *Cablebolting in underground mines*. Vancouver: Bitech
- Hyett, A.J., Bawden, W.F. and Coulson, A.L. 1992. Physical and mechanical properties of normal Portland cement pertaining to fully grouted cable bolts. In *Rock support in mining and underground construction, proc. int. symp. rock support*, Sudbury, (eds. P.K. Kaiser and D.R. McCreath), 341-348. Rotterdam: Balkema.
- Hyett, A.J., Bawden, W.F. and Reichert, R.D. 1992. The effect of rock mass confinement on the bond strength of fully grouted cable bolts. *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr.* **29**(5), 503-524.
- Hyett, A.J., Bawden, W.F., Powers, R. and Rocque, P. 1993. The nutcase cable. In *Innovative mine design for the 21st century*, (eds W.F. Bawden and J.F. Archibald), 409-419. Rotterdam: Balkema.
- Ide, J.M. 1936. Comparison of statically and dynamically determined Young's modulus of rock. *Proc. Nat. Acad. Sci.* **22**, 81-92.
- Iman, R.L., Davenport, J.M. and Zeigler, D.K. 1980. *Latin Hypercube sampling (A program user's guide)*. Technical Report SAND79-1473. Albuquerque, New Mexico: Sandia Laboratories.
- Imrie, A.S. 1983. Taming the Downie Slide. *Canadian Geographic* **103**.

- Imrie, A.S., D.P. Moore and E.G. Enegren. 1992. Performance and maintenance of the drainage system at Downie Slide. *Proc. 6th Int. Symp. on Landslides, Christchurch, New Zealand*, in press.
- International Society for Rock Mechanics Commission on Standardisation of Laboratory and Field Tests. 1978. Suggested methods for the quantitative description of discontinuities in rock masses. *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr.* **15**, 319-368.
- International Society for Rock Mechanics. 1981. *Rock characterisation, testing and monitoring - ISRM suggested methods*. Oxford: Pergamon.
- Jaeger, C. 1972. *Rock Mechanics and Engineering*. Cambridge: at the University Press 417 pages
- Jaeger, J.C. 1971. Friction of rocks and stability of rock slopes. The 11th Rankine Lecture. *Géotechnique* **21**(2), 97-134.
- Jaeger, J.C. and Cook, N.G.W. 1969. *Fundamentals of Rock Mechanics*. London: Chapman and Hall.
- Jirovec, P. 1978. Wechselwirkung zwischen anker und gebirge. *Rock Mech. Suppl.* **7**, 139-155.
- John, K.W. 1968. Graphical stability analyses of slopes in jointed rock. *Proc. Soil Mech. Fndn Div.*, ASCE , SM2, paper no. 5865.
- Kaiser, P.K., Hoek, E. and Bawden, W.F. 1990. A new initiative in Canadian rock mechanics research. *Proc. 31st US rock mech. symp.*, Denver, 11-14.
- Kaiser, P.K., Yazici, S. and Nosé, J. 1992. Effect of stress change on the bond strength of fully grouted cables. *Int. J. Rock Mech.. Min. Sci. Geomech. Abstr.* **29**(3), 293-306.
- Kemeny, J.M. and Cook, N.G.W. 1987. Crack models for the failure of rock under compression. In *Proc. 2nd int. conf. on constitutive laws for engineering materials, theory and applications*, (eds C.S. Desai, E. Krempl, P.D. Kioussis and T. Kundu) 1, 879-887. Tucson, AZ: Elsevier.
- Kendorski, F., Cummings, R., Bieniawski, Z.T. and Skinner, E. 1983. Rock mass classification for block caving mine drift support. *Proc. 5th congr. Int. Soc. Rock Mech.*, Melbourne, B51-B63. Rotterdam: Balkema.
- King, L.V. 1912. On the limiting strength of rocks under conditions of stress existing in the earth's interior. *J. Geol.* **20** , 119- 138.
- Kirsch, G., 1898. Die theorie der elastizität und die bedurfnisse der festigkeitslehre. *Veit. Deit. Ing.* **42** (28), 797-807.
- Kirsten, H.A.D. 1992. Comparative efficiency and ultimate strength of mesh- and fibre-reinforced shotcrete as determined from full-scale bending tests. *J. S. Afr. Inst. Min. Metall.* Nov., 303-322.
- Kirsten, H.A.D. 1993. Equivalence of mesh- and fibre-reinforced shotcrete at large deflections. *Can. Geotech. J.* **30**, 418-440.
- Kompen, R. 1989. Wet process steel fibre reinforced shotcrete for rock support and fire protection, Norwegian practice and experience. In *Proc. underground city conf.*, Munich, (ed. D. Morfeldt), 228-237.
- Ladanyi, B. and Archambault, G. 1970. Simulation of shear behaviour of a jointed rock mass. In *Rock mechanics - Theory and Practice, Proc. 11th Symp. on Rock Mechanics, Berkeley, 1969* , pp.105-25. New York: Society of Mining Engineers, AIME
- Lajtai, E.Z. 1982. *The fracture of Lac du Bonnet granite*. Contract Report. Pinawa, Ontario: Atomic Energy of Canada.

- Lajtai, E.Z. and Lajtai, V.N. 1975. The collapse of cavities. *Int. J. Rock Mech. Min. Sci. Geomech. Abstr.* **12**, 81-86.
- Lang, T.A. 1961. Theory and practice of rockbolting. *Trans Amer. Inst. Min. Engrs* **220**, 333-348.
- Langefors, U. and Khilstrom, B. 1973. *The modern technique of rock blasting*. 2nd edn. New York: Wiley. 405 pages
- Langille, C.C. and Burtney, M.W. 1992. Effectiveness of shotcrete and mesh support in low energy rockburst conditions at INCO's Creighton mine. In *Rock support in mining and underground construction, proc. int. symp. rock support*, Sudbury, (eds. P.K. Kaiser and D.R. McCreath), 633-638. Rotterdam: Balkema.
- Lappalainen, P., Pulkkinen, J. and Kuparinen, J. 1984. Use of steel strands in cable bolting and rock bolting. In *Rock bolting: theory and application in mining and underground construction*, (ed. O. Stephansson), 557-562. Rotterdam: Balkema.
- Lau, J. S. O. and Gorski, B. 1991. *The post failure behaviour of Lac du Bonnet grey granite*. CANMET Divisional Report MRL 91-079(TR). Ottawa: Dept. Energy Mines and Resources, Canada.
- Laubscher, D.H. 1977. Geomechanics classification of jointed rock masses - mining applications. *Trans. Instn. Min. Metall.* **86**, A1-8.
- Laubscher, D.H. 1984. Design aspects and effectiveness of support systems in different mining conditions. *Trans Instn. Min. Metall.* **93**, A70 - A82.
- Laubscher, D.H. and Taylor, H.W. 1976. The importance of geomechanics classification of jointed rock masses in mining operations. In *Exploration for rock engineering*, (ed. Z.T. Bieniawski) **1**, 119-128. Cape Town: Balkema.
- Laubscher, D.M. and Page, C.H. 1990. The design of rock support in high stress or weak rock environments. *Proc. 92nd Can. Inst. Min. Metall. AGM*, Ottawa, Paper # 91.
- Lauffer, H. 1958. Gebirgsklassifizierung für den Stollenbau. *Geol. Bauwesen* **24**(1), 46-51.
- Leeman, E.R. and Hayes, D.J. 1966. A technique for determining the complete state of stress in rock using a single borehole. *Proc. 1st Cong. Int. Soc. Rock Mech, Lisbon* **2**, 17-24.
- Lewis, M.R. and D.P. Moore. 1989. Construction of the Downie Slide and Dutchman's Ridge drainage adits. *Canadian Tunnelling* (ed. Z. Eisenstein), 163-172. Vancouver: Bi-Tech
- Lin, D and Fairhurst, C. 1988. Static analysis of the stability of three-dimensional blocky systems around excavations in rock. *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr.* **25** (3), 139-147.
- Liu, S.C., Y. Cheng and C.T. Chang. 1988. Design of the Mingtan cavern. *Proc .symp. ISRM. on Rock Mech. and Power Plants, Madrid*, 199-208.
- Londe, P. 1965. Une methode d'analyse a trois dimensions de la stabilite d'une rive rocheuse. *Annales des Ponts et Chaussees* **135** (1), 37-60.
- Londe, P., Vigier, G. and Vormerenger, R. 1969. The stability of rock slopes, a three-dimensional study. *J. Soil Mech. Foundns Div., ASCE* **95** (SM 1), 235-262.
- Londe, P., Vigier, G. and Vormerenger, R. 1970. Stability of slopes - graphical methods. *J. Soil Mech. Fndns Div., ASCE* **96** (SM 4), 1411-1434.
- Lorig, L.J. and Brady, B.H.G. 1984. A hybrid computational scheme for excavation and support design in jointed rock media. In *Design and performance of underground excavations*, (eds E.T. Brown and J.A. Hudson), 105-112. London: Brit. Geotech. Soc.
- Løset, F. 1992. Support needs compared at the Svartisen Road Tunnel. *Tunnels and Tunnelling*, June.

- Lottes, G. 1972. The development of European pumped-storage plants. *Water Power* **24**, 22-33.
- Love, A.E.H. 1927. *A treatise on the mathematical theory of elasticity*. New York: Dover.
- Lutton, R.J., Banks, D.C. and Strohm, W.E. 1979. Slides in the Gaillard Cut, Panama Canal Zone. In *Rockslides and Avalanches* (ed. B. Voight) **2**, pp. 151-224. New York: Elsevier
- Mahar, J.W., Parker, H.W. and Wuellner, W.W. 1975. *Shotcrete practice in underground construction*. US Dept. Transportation Report FRA-OR&D 75-90. Springfield, VA: Nat. Tech. Info. Service.
- Marachi, N.D., Chan, C.K. and Seed, H.B. 1972. Evaluation of properties of rockfill materials. *J. Soil Mechs. Fdns. Div. ASCE* **98**(SM4), 95-114.
- Marshall, D. 1963. Hangingwall control at Willroy. *Can. Min. Metall. Bull.* **56**, 327-331.
- Martin, C.D. 1990. Characterizing in situ stress domains at the AECL Underground Research Laboratory. *Can. Geotech. J.* **27**, 631-646.
- Martin, C.D. 1993. *The strength of massive Lac du Bonnet granite around underground openings*. Ph.D. thesis, Winnipeg, Manitoba: Dept. Civil Engineering, University of Manitoba.
- Martin, C.D. and Simmons, G.R. 1992. The Underground Research Laboratory, an opportunity for basic rock mechanics. *ISRM News Journal* **1**(1), 5-12.
- Masur, C.I. and Kaufman, R.I. 1962. Dewatering. In *Foundation Engineering* (ed. G.A. Leonards), pp. 241-350. New York: McGraw-Hill
- Mathews, K.E. and Edwards, D.B. 1969. Rock mechanics practice at Mount Isa Mines Limited, Australia. *Proc. 9th Commonwealth min. metall. congr.*, Paper 32. London: Instn Min. Metall.
- Mathews, K.E., Hoek, E., Wyllie, D.C. and Stewart, S.B.V. 1981. *Prediction of stable excavations for mining at depth below 1000 metres in hard rock*. CANMET Report DSS Serial No. OSQ80-00081, DSS File No. 17SQ.23440-0-9020. Ottawa: Dept. Energy, Mines and Resources.
- Mathews, S.M., Tillman, V.H. and Worotnicki, G. 1983. A modified cablebolt system for support of underground openings. *Proc. Aust. Inst. Min. Metall. annual conf.*, Broken Hill. 243-255.
- Matthews, S.M., Thompson, A.G., Windsor, C.R. and O'Bryan, P.R. 1986. A novel reinforcing system for large rock caverns in blocky rock masses. In *Large rock caverns*, (ed. K.H.O. Saari) **2**, 1541-1552. Oxford: Pergamon.
- McCreath, D.R. and Kaiser, P.K. 1992. Evaluation of current support practices in burst-prone ground and preliminary guidelines for Canadian hardrock mines. In *Rock support in mining and underground construction, proc. int. symp. rock support*, Sudbury, (eds P.K. Kaiser and D.R. McCreath), 611-619. Rotterdam: Balkema.
- McIntyre, J.S. and Hagan, T.N. 1976. The design of overburden blasts to promote highwall stability at a large strip mine. *Proc. 11th Canadian Rock Mech. Symp.*, Vancouver.
- McMahon, B.K. 1971. A statistical method for the design of rock slopes. *Proc. 1st Australia-New Zealand Conf. on Geomechanics, Melbourne* **1**, 314-321.
- McMahon, B.K. 1975. Probability of failure and expected volume of failure in high rock slopes. *Proc. 2nd Aust.-New Zealand Conf. on Geomech., Brisbane*.
- Merritt, A.H. 1972. Geologic prediction for underground excavations. *Proc. North American rapid excav. tunneling conf.*, Chicago, (eds K.S. Lane and L.A. Garfield) **1**, 115-132. New York: Soc. Min. Engrs, Am. Inst. Min. Metall. Petrolm Engrs.
- Moore, D.P., A.S. Imrie and D.G. Baker. 1991. Rockslide risk reduction using monitoring. *Proc. Can. Dam Safety Assoc. Annual Meeting, Whistler, British Columbia*, in press.

- Moretto, O. 1982. Mecánica de rocas en el complejo hidroeléctrico Río Grande No. 1. *Proc. Primer. Cong. Sudamericano de Mecánica de Rocas, Bogotá, Colombia.*
- Morgan, D.R. 1993. Advances in shotcrete technology for support of underground openings in Canada. In *Shotcrete for underground support V, proc. engineering foundation conf.*, Uppsala, (eds J.C. Sharp and T. Franzen), 358-382. New York: Am. Soc. Civ. Engrs.
- Morgan, G.C. 1991. Qualification of risks from slope hazards. In *Landslide Hazards in the Canadian Cordillera*. Geological Association of Canada, Special Publication.
- Morgan, G.C., Rawlings, G.E. and Sobkowicz, J.C. 1992. Evaluation of total risk to communities from large debris flows. *Geotechnical and Natural Hazards*, Vancouver Geotechnical Society and Canadian Geotechnical Society, Vancouver, BC, Canada, May 6-9, 1992, pp. 225—236.
- Morgenstern, N.R. 1991. Limitations of stability analysis in geo-technical practice. *Geotecnia* **61**: 5-19.
- Morrison, R.G.K. 1942. Report on the rockburst situation in Ontario mines. *Trans. Can. Inst. Min. Metall.* **45**.
- Morrison, R.G.K. 1976. *A philosophy of ground control: a bridge between theory and practice*. rev. edn. Montreal: Department of Mining and Metallurgical Engineering, McGill University 182 pages
- Morriess, P. and Stoter, H.J. 1983. Open-cut slope design using probabilistic methods. *Proc. 5th. Cong. ISRM., Melbourne* **1**, C107-C113. Rotterdam: Balkema
- Moy D., Hsieh C.S. and Li, H.C. 1990. The introduction of steel fiber shotcrete to underground cavern support in Taiwan. *Shotcrete for Underground Support, Proc. of the Engineering Foundation Conf. on Shotcrete V , Uppsala, Sweden.* in press
- Moy, D. and Hoek, E. 1989. Progress with the excavation and support of the Mingtan power cavern roof. *Proc. Rock Cavern Seminar - Hong Kong* (eds A.W. Malone and P.G.D. Whiteside), pp. 235-245. London: Institution Mining and Metallurgy
- Muller, J. 1979. Josef Stini. Contributions to engineering geology and slope movement investigations. In *Rockslides and Avalanches* (ed. B. Voight), Part 2, pp. 95-109. New York: Elsevier
- Muskhelishvili, N.I. 1953. *Some basic problems of the mathematical theory of elasticity*. 4th edn, translated by J.R.M. Radok. Gronigen: Noordhoff.
- Nguyen, V. U. and Chowdhury, R.N. 1985. Simulation for risk analysis. *Geotechnique* **35**(1), 47-58.
- Nickson, S.D. 1992. *Cable support guidelines for underground hard rock mine operations*. MSc. thesis, Dept. Mining and Mineral Processing, University of British Columbia.
- Nielsen, N.M., Hartford, D.N.D. and MacDonald. 1994. Selection of tolerable risk criteria for dam safety decision making. *Proc. 1994 Canadian Dam Safety Conference, Winnipeg, Manitoba*. Vancouver: BiTech Publishers, pp 355-369.
- Obert, L and Duvall, W.I. 1967. *Rock Mechanics and the Design of Structures in Rock* . New York: Wiley 65 pages
- Ortlepp, D.W. 1992. The design of the containment of rockburst damage in tunnels - an engineering approach. In *Rock support in mining and underground construction, proc. int. symp. on rock support*, Sudbury, (eds P.K. Kaiser and D.R. McCreath), 593-609. Rotterdam: Balkema.
- Ortlepp, D.W. and Gay, N.C. 1984. Performance of an experimental tunnel subjected to stresses ranging from 50 MPa to 230 MPa. *Proc. symp. ISRM on Design and Performance of Underground Excavations, Cambridge*. pp.337-346. London: British Geotechnical Society
- Ortlepp, W. D.1993. Invited lecture: The design of support for the containment of rockburst damage in tunnels - an engineering approach. In *Rock support in mining and*

- underground construction, proc. int. symp. on rock support*, Sudbury,(eds P.K. Kaiser and D.R. McCreath), 593-609. Rotterdam: Balkema.
- Ortlepp, W.D., 1993. A philosophical consideration of support requirements in civil and mining tunnels. In *TUNCON '93, Proc. symp. Aspects of Control in Tunnelling, Johannesburg*. 49-54.
- Otter, J.R.H., Cassell, A.C. and Hobbs, R.E. 1966. Dynamic relaxation. *Proc. Instn Civ. Engrs* **35**, 633-665.
- Pacher, F., Rabcewicz, L. and Golser, J. 1974. Zum der seitigen Stand der Gebirgsklassifizierung in Stollen-und Tunnelbau. *Proc. XXII Geomech. colloq., Salzburg*, 51-58.
- Palmström, A. 1982. The volumetric joint count - a useful and simple measure of the degree of rock jointing. *Proc. 4th congr. Int. Assn Engng Geol.*, Delhi **5**, 221-228.
- Patton, F.D. 1966. Multiple modes of shear failure in rock. *Proc. 1st congr. Int. Soc. Rock Mech.*, Lisbon **1**, 509-513.
- Pearce G.E. 1988. Report on the Proc. 5th Int. Tunnelling Symp., Tunnelling 88, *Trans Instn Min. Metall. (Sect. A: Min. industry)* **97**, A149-159.
- Pelli, F., Kaiser, P.K. & Morgenstern, N.R. 1991. An interpretation of ground movements recorded during construction of the Donkin-Morien tunnel. *Can. Geotech. J.* **28**(2), 239-254
- Pierson, L.A., Davis, S.A. and Van Vickle, R. 1990. Rockfall Hazard Rating System Implementation Manual. Federal Highway Administration (FHWA) Report FHWA-OR—EG-90-01. FHWA, U.S. Department of Transportation.
- Pine, R.J. 1992. Risk analysis design applications in mining geomechanics. *Trans. Inst. Min. Metall. (Sect.A)* **101**, 149-158.
- Potvin, Y. 1988. *Empirical open stope design in Canada*. Ph.D. thesis, Dept. Mining and Mineral Processing, University of British Columbia.
- Potvin, Y. and Milne, D. 1992. Empirical cable bolt support design. In *Rock Support in mining and underground construction, proc. int. symp. on rock support*, Sudbury, (eds P.K. Kaiser and D.R. McCreath), 269-275. Rotterdam: Balkema.
- Potvin, Y., Hudyma, M.R. and Miller, H.D.S. 1989. Design guidelines for open stope support. *Bull. Can. Min. Metall.* **82**(926), 53-62.
- Priest, S.D. and E.T. Brown. 1983. Probabilistic stability analysis of variable rock slopes. *Trans. Inst. Min. Metall.(Sect. A)* **92**: 1-12.
- Rabcewicz, L. 1969. Stability of tunnels under rock load. *Water Power* **21**(6-8) 225-229, 266-273, 297-304.
- Read, J.R.L. and Lye, G.N. 1983. Pit slope design methods, Bougainville Copper Limited open cut. *Proc. 5th Cong. ISRM., Melbourne* pp. C93-C98. Rotterdam: Balkema.
- Riemer, W., Pantzartzis, P., Krapp, L. and Scourtis, C.. Investigation and monitoring of landslides at the Polyphyton project in Greece. *Proc. Intnl. Symposium on Landslides, Trondheim*. 1996
- Ritchie, A.M., 1963. The evaluation of rockfall and its control. *Highway Record*. Vol 17.
- Ritter, W. 1879. *Die Statik der Tunnelgewölbe*. Berlin: Springer.
- Robbins, R.J. 1976. Mechanized tunnelling - progress and expectations: 12th Sir Julius Werhner Memorial Lecture. In *Tunnelling '76* (ed. M.J. Jones), xi-xx. London: Institution Mining and Metallurgy
- Rose, D. 1985. Steel fibre reinforced shotcrete for tunnel linings: the state of the art. *Proc. North American rapid excav. tunneling conf.* **1**, 392-412. New York: Soc. Min. Engrs, Am. Inst. Min. Metall. Petrolm Engrs.
- Rosenbleuth, E. 1981. Two-point estimates in probabilities. *J. Appl. Math. Modelling* **5**, October, 329-335.

- Salamon, M.D.G. 1974. Rock mechanics of underground excavations. In *Advances in rock mechanics , Proc. 3rd Cong.ISRM., Denver 1B* , pp.951-1009. Washington, DC: National Academy of Sciences
- Salamon, M.D.G. and Munro, A.H. 1967. A study of the strength of coal pillars. *J. S. Afr. Inst. Min. Metall.* **65** , 55- 67.
- Salamon, M.D.G. and Oravecz, K.I. 1976. *Rock mechanics in coal mining*. Johannesburg: Chamber of Mines of South Africa. 119 pages
- Sarma, S.K. 1979. Stability analysis of embankments and slopes. *J. Geotech. Eng. Div., ASCE.* **105** (GT12), 1511- 1524.
- Savin, G.N. 1961. *Stress concentrations around holes*. London: Pergamon.
- Schmuck, C.H. 1979. Cable bolting at the Homestake gold mine. *Mining Engineering*, December, 1677-1681.
- Scott, J.J. 1976. Friction rock stabilizers - a new rock reinforcement method. In *Monograph on rock mechanics applications in mining*, (eds W.S. Brown, S.J. Green and W.A. Hustrulid), 242-249. New York: Soc. Min. Engrs, Am. Inst. Min. Metall. Petrolm Engrs.
- Scott, J.J. 1983. Friction rock stabilizer impact upon anchor design and ground control practices. In *Rock bolting: theory and application in underground construction*, (ed. O. Stephansson), 407-418. Rotterdam: Balkema.
- Serafim, J.L. and Pereira, J.P. 1983. Consideration of the geomechanical classification of Bieniawski. *Proc. int. symp. on engineering geology and underground construction*, Lisbon 1(II), 33-44.
- Shah, S. 1992. *A study of the behaviour of jointed rock masses*. Ph.D. thesis, Dept. Civil Engineering, University of Toronto.
- Sharp, J.C., Smith, M.C.F., Thoms, I.M. and Turner, V.D. 1986. Tai Koo Cavern, Hong Kong - performance of a large metro excavation in a partially weathered rock mass. In *Large Rock Caverns* (ed. K.H.O. Saari). **1** , pp. 403-423. Oxford: Pergamon
- Sheory, P.R. 1994. A theory for in situ stresses in isotropic and transversely isotropic rock. *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr.* **31**(1), 23-34.
- Shi G.H. and Goodman R.E. 1989. The key blocks of unrolled joint traces in developed maps of tunnel walls. *Int. J. Numerical and Analytical Methods in Geomechanics* **13** , 131-158.
- Shi G.H. and Goodman, R.E. 1981. A new concept for support of underground and surface excavations in discontinuous rocks based on a keystone principle. In *Rock mechanics from Research to Applications, Proc. 22nd. U.S. Symp. for Rock Mechanics, Cambridge*. pp. 290- 296. Cambridge, Mass.: Massachusetts Institute for Technology
- Silveira, A.F. 1990. Some considerations on the durability of dams. *Water Power and Dam Construction*, 19-28.
- Soos, I.G.K. 1979. Uplift pressures in hydraulic structures. *Water Power and Dam Construction.* **31**(5) 21-24.
- Spang, R.M. and Rautenstrauch, R.W. 1988. Empirical and mathematical approaches to rockfall prediction and their practical applications. *Proc. 5<sup>th</sup> International Symposium on Landslides, Lusanne*. Vol. 2. 1237-1243.
- Startzman, R.A. and Wattenbarger, R.A. 1985. An improved computation procedure for risk analysis problems with unusual probability functions. *Proc. symp. Soc. Petrolm Engrs hydrocarbon economics and evaluation*, Dallas.
- Stillborg, B. 1994. *Professional users handbook for rock bolting*, 2nd edn. Clausthal-Zellerfeld: Trans Tech Publications.
- Svanholm, B.O., Persson, P-A. and Larsson, B. 1977. Smooth blasting for reliable underground openings. In *Storage in excavated rock caverns, Rockstore 77: Storage* (ed. M. Bergman) **3** , pp. 573-579. Oxford: Pergamon

- Talobre, J. 1957. *La mecanique des roches*. Paris: Dunod
- Tatchell, G.E. 1991. Automatic data acquisition systems for monitoring dams and landslides. In *Proc. 3rd Int. symp. on Field Measurements in Geomechanics, Oslo, Norway*. in press.
- Terzaghi, K. 1925. Erdbaumechanik auf Bodenphysikalischer Grundlage. Vienna: Franz Deuticke.
- Terzaghi, K. 1936. Presidential Address. In *Proc. 1st Int. Conf. for Soil Mechanics and Foundations Engineering, Cambridge, Mass.* **1**, 22-3.
- Terzaghi, K. 1945. Stress conditions for the failure of saturated concrete and rock. In *Proc. Am. Soc. Test. Mater.* **45**, 777-801.
- Terzaghi, K. 1946. Rock defects and loads on tunnel supports. In *Rock tunneling with steel supports*, (eds R. V. Proctor and T. L. White) **1**, 17-99. Youngstown, OH: Commercial Shearing and Stamping Company.
- Terzaghi, K. and Richart, F.E. 1952. Stresses in rock about cavities. *Geotechnique* **3**, 57-90.
- Terzaghi, R. and Voight, B. 1979. Karl Terzaghi on rockslides: the perspective of a half-century. In *Rocksides and Avalanches* (ed. B. Voight), Part 2, pp. 111-131. New York: Elsevier
- Thorn, L.J. and Muller, D.S. 1964. Prestressed roof support in underground engine chambers at Free State Geduld Mines Ltd. *Trans. Assn Mine Mngrs S. Afr.*, 411-428.
- Tyler, D.B., Trueman, R.T. and Pine, R.J. 1991. Rockbolt support design using a probabilistic method of key block analysis. In *Rock mechanics as a multidisciplinary science*, (ed. J.C. Roegiers), 1037-1047. Rotterdam: Balkema.
- Tyler, D.B., Trueman, R. and Pine, R.J. 1991. Rockbolt support design using a probabilistic method of key block analysis. In *Proc. 32nd U.S. Symp. Rock Mechanics, Norman, Oklahoma*, 1037-47.
- Vandewalle, M. 1993. *Dramix: Tunnelling the world*. 3rd edn. Zwevegem, Belgium: N.V. Bekaert S.A.
- Vanmarcke, E.H. 1980. Probabilistic analysis of earth slopes. *Engineering Geology* **16**: 29-50.
- Varnes, D.J. 1984. Landslide hazard zonation: a review of principles and practice. *Natural Hazards* **3**. UNESCO, Paris, 63 pages.
- Vogele, M., Fairhurst, C. and Cundall, P.A. 1978. Analysis of tunnel support loads using a large displacement, distinct block model. In *Storage in excavated rock caverns* (ed. M. Bergman) **2**, pp. 247-252. Oxford: Pergamon
- von Karman, Th. 1911. Festigkeitsversuche unter allseitigem Druck. *Zeit d Ver Deutscher Ing.* **55**, 1749-1757.
- von Kimmelman, M.R., Hyde, B. and Madgwick, R.J. 1984. The use of computer applications at BCL Limited in planning pillar extraction and the design of mine layouts. In *Design and performance of underground excavations*, (eds E.T. Brown and J.A. Hudson), 53-64. London: Brit. Geotech. Soc.
- VSL Systems Ltd. 1982. Slab post tensioning. 12p. Switzerland.
- Warburton, P.M. 1981. Vector stability analysis of an arbitrary polyhedral block with any number of free faces. *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr.* **18**, 415-427.
- Whitman, R.V. 1984. Evaluating calculated risk in geotechnical engineering. *J. Geotech. Enng, ASCE* **110**(2), 145-186.
- Wickham, G.E., Tiedemann, H.R. and Skinner, E.H. 1972. Support determination based on geologic predictions. In *Proc. North American rapid excav. tunneling conf.*, Chicago, (eds K.S. Lane and L.A. Garfield), 43-64. New York: Soc. Min. Engrs, Am. Inst. Min. Metall. Petrolm Engrs.
- Windsor, C.R. 1990. *Ferruled strand*. Unpublished memorandum. Perth: CSIRO.

- Windsor, C.R. 1992. Cable bolting for underground and surface excavations. In *Rock support in mining and underground construction, proc. int. symp. on rock support*, Sudbury, (eds P.K. Kaiser and D.R. McCreath), 349-376. Rotterdam: Balkema.
- Wittke, W.W. 1965. Method to analyse the stability of rock slopes with and without additional loading. (in German) *Felsmechanik und Ingenieurgeologie*, Supp. 11, **30**, 52-79. English translation in Imperial College Rock Mechanics Research Report, no. 6, July 1971.
- Wood, D.F. 1992. Specification and application of fibre reinforced shotcrete. In *Rock support in mining and underground construction, proc. int. symp. on rock support*, Sudbury, (eds. P.K. Kaiser and D.R. McCreath), 149-156. Rotterdam: Balkema.
- Wood, D.F., Banthia, N. and Trottier, J-F. 1993. A comparative study of different steel fibres in shotcrete. In *Shotcrete for underground support VI*, Niagara Falls, 57-66. New York: Am. Soc. Civ. Engrs.
- Worotnicki, G. and Walton, R.J. 1976. Triaxial 'hollow inclusion' gauges for determination of rock stresses in situ. *Proc symp. ISRM on Investigation of Stress in Rock, Sydney*. Supplement 1-8. Sydney: Institution of Engineers, Australia .
- Yazici, S. and Kaiser, P.K. 1992. Bond strength of grouted cable bolts. *Int J. Rock Mech. Min. Sci. & Geomech. Abstr.* **29**(3), 279-292.
- Zheng, Z., Kemeny, J. and Cook, N.G.W. 1989. Analysis of borehole breakouts. *J. Geophys. Res.* **94**(B6), 7171-7182.
- Zoback, M. L. 1992. First- and second-order patterns of stress in the lithosphere: the World Stress Map Project. *J. Geophys. Res.* **97**(B8), 11761-11782.