

Referências Bibliográficas

ABRAMSON, L. W.; Lee, T. S; SHARMA, S; BOYCE, G. M., **Slope Stability and Stabilization Methods**. New York: Jhon Wiley & Sons, 2002.

Autodesk AutoCAD. AutoCAD Civil 3D, 2013. Disponível em <http://www.autodesk.es/autocad>.

BANDIS, S. C.; LUMSDEN, A. C.; BARTON, N. R., **Fundamentals of rock joint deformation**. International Journal of Rock Mechanics and Mining Sciences & Geomechanics, Salt lake, v. 20, n. 6, p. Abstr 249-268, 1983.

BARTON, N. **Estimating the shear strength of rock joints**. Proc. of 3rd Congr. Int. Soc. Rock Mech. Advances in rock mechanics, Denver, v. II A, p. 219-220, 1974.

BARTON, N.R. **Review of a new shear strength criterion for rock joints**. **Engng Geol.** 7, 287-332. 1973.

BARTON, N. **The shear strength of rock and rock joints**. Int. J. Mech. Min. Sci. & Geomech. Abstr. 13 (10), 1-24. 1976.

BARTON, N. & BANDIS, S.C. **Review of predictive capabilities of JRC-JCS model in engineering practice**. International Symposium on Rock Joints. Loen 1990. Proceedings, pp. 603-610, 1990.

BEER, G., **An Isoparametric Joint/Interface Element for Finite Element Analysis**, Int. Journal for Numerical Methods in Engineering, Vol. 21, pp. 585-600, 1985.

BEER, G.; WATSON, J. O. **Introduction to Finite and Boundary Element Methods for Engineers**. Chichister: Jhon Wiley & Sons Ltd, 1992.

BHAWANI, S. and GOEL, R. K. **Engineering Rock Mass Classification: Tunneling, Found and Landslides**. Oxford: Butterworth-Heinemann, 2011.

BRADY, B. H. G and BROWN, E. T. **Rock Mechanics for underground mining**, 3ª. Ed, Springer Netherlands. 2006.

BUENAVENTURA INGENIEROS S.A, BISA, **Estudio de Estabilidad de Taludes de los Tajos Mina 2 y Mina 4**. LIMA. 2011.

BUENAVENTURA INGENIEROS S.A, BISA. **“Proyecto Pampa de Pongo –Informe Geológico de la Campaña de Perforación 2012”**. LIMA: Jinzhao Mining Peru S.A., 2012.

CHOWDHURY, R. **Geotechnical Slope Analysis**. London: Taylor & Francis Group, 2010.

DAY, R. A.; POTTS, D. M. **Zero thickness interface elements- numerical stability and application**. International Journal for Numerical and Analytical Methods in Geomechanics, v. 18, p. 689 - 708, 1994.

Drucker, D.C. & Prager, W. Soil mechanics and plastic analysis or limit design. Quarterly of Applied Mathematics 10, 157-165. 1952. DUNCAN, J. M. **Limit Equilibrium and Finite-Element Analysis of Slopes**. ASCE, Journal of Geotech Engineering, v. 122, n. 7, p. 577-596, 1996.

EBERHARDT, E. D. **Rock slope stability analysis - utilization of advanced numerical techniques**. Vancouver, Canada: University of British Columbia, 2003.

EINSTEIN, H. H., VENEZIANO, D., BAECHER, G. B., O'REILLY K. **The effect of discontinuity persistence on rock slope stability**. International Journal of Rock Mechanics and Mining Science and Geomechanics Abstracts 20(5), p. 227 - 236, 1983.

GHABOUSI J, WILSON. E. L. **Finite element for rock joints and interfaces**. Journal of the Soil Mechanics and Foundations Div. ASCE SM3, 1973.

GOODMAN, R. E. **Deformability of joints, determination of the in situ modulus of deformation of rock**. In Symposium in Denver, ASTM, Special Technical Publication 477, Colorado, p. 174 - 196, 1970.

GOODMAN, R. E. **Methods of Geological Engineering in Discontinuous Rocks**. New York: West Publishing, 1976.

GOODMAN, R. E. **Introduction to Rock Mechanics**. New York: John Wiley & Sons, 1989.

GOODMAN, R. E.; SUNDARAM, P. N. **Fault and System Stiffness and Stick-Slip Phenomena**. Basel. 1978.

GOODMAN, R. E.; TAYLOR, R. L.; BREKKE, T. L. **A model for the mechanics of jointed rock**. Journal of the Soil Mechanics and Foundations Division ASCE 94; SM3, 1968.

HAQUE, A. **Shear Behavior of Soft Rock Joints Under Constant Normal Stiffness**, Doctoral Thesis. University of Wollongong. Wollongong, New South Wales, Australia. 1999.

HEIDBACH, O; TINGAY, M; BARTH, A; REINECKER, J; KURFE, D; MÜLLER, B. **The World Stress Map based on the database release 2008, equatorial scale 1:46,000,000, Commission for the Geological Map of the World, Paris, doi:10.1594/GFZ.WSM.Map2009**. Paris. 2008. (2 edition).

HERGET, G. **Stresses in rock**. Balkema: Rotterdam, A. A, 1988.

HOEK, E. **Strength of rock and rock masses**. ISRM News Journal, p. 4-16, 1994.

Hoek, E.; Read, J.; Karzulovic, A.; and Chen, Z. Y. **Rock slopes in Civil and Mining Engineering**. International Conference on Geotechnical and Geological Engineering, GeoEng2000, 19-24 November, Melbourne. 2000.

HOEK, E.; & BROWN, E. T. **Empirical Strength Criterion for Rock Masses**. *Journal of Geotechnical Engineering* (ASCE) 106(GT9), 1980.

HOEK, E.; BRAY, J. **Rock Slope Engineering**. UK: E and FN Spon, 2-6 Boundary Row, London SE1 8HN, 1996.

HOEK, E.; BRAY, J. W. **Rock Slope Engineering**. London: Instn Min. Metall, 1974.

HOEK, E.; CARRANZA TORRES; C.; CORKUM, B. **Hoek & Brown Failure Criterion - 2002 edition**, Toronto, p. 267 - 273, 2002.

HOEK, E.; KAISER, P.; BANDEN, W. **Support of Underground Excavations in Hard Rock**. Directorate and Universities Research Incentive Fund, 1995.

HUDSON, A., HARRISON, J. **Engineering Rock Mechanics: an Introduction to the Principles and Applications**. UK: Elsevier Science, Imperial College of Science, Technology and Medicine, 1997.

ISRM: **Suggested methods for geophysical logging of boreholes**. Int. J. Rock Mech. Min. Sci. & Geomech. Abstr. 18, p. 67 - 84, 1981.

JENNINGS, J. E. **A mathematical theory for the calculation A mathematical theory for the calculation**. Planning Open Pit Mines. Proceedings of International Symposium (ed. PWJ Van Rensburg), Johannesburg, Balkema, Cape Town, p. 87 - 102, 1970.

KULHAWY, F. H. **Stress-Deformation Properties of Rock and Rock Discontinuities**. Elsevier Scientific Publishing Company, Research Papers, New York, Eng. Geol., 9, p. 327 - 350, 1975.

KULHAWY, F. H; DUNCAN J. M and SEED H.B. Finite element analysis of stress and movements in embankments during construction. Geotechnical Engineering Report TE-69-4. University of California, 1969.

LOPES, M. C. **Comportamento Geotécnico e Mecanismos de Ruptura em Rochas Brandas** – Minas Córrego do Sítio. Dissertação de mestrado, Ouro Preto. 2006.

LORING, L.; VARONA, P. **Practical Slope-Stability Analysis Using Finite - Difference Codes**. Slope Stability in Surface Mining, p. 115 - 124, W. A. Hustrulid et al., Eds. Littleton, Colorado: SME.

MEJIA, L. C. **Modelagem do Mecanismo de Ruptura Tipo Step-Path em Taludes Rochosos Fraturados Através do Método dos Elementos Discretos**. PUC- RIO, Dissertação de mestrado. Rio de Janeiro, 2010.

MOREIRA DA SILVA, J. P. **Os Métodos de Equilíbrio Limite e Dos Elementos Finitos na Análise de Estabilidade de Taludes**. Universidade do Porto, dissertação de mestrado. Porto. 2011.

NBR, ABDNTA. **Estabilidade de Encostas (11682)**. Associação Brasileira de Normas Técnicas. Rio de Janeiro. 2009.

NAYLOR, D. J. PANDE, B. SIMPSON and TABB R. **Finite elements in geotechnical engineering**. Swansea, UK: Pineridge Press, 1981.

OLIVEIRA, V. S. **Análise de Estabilidade Bi e Tridimensional de Talude Estabilizado em Solo Grampeado**. Dissertação de mestrado, Florianópolis. 2006.

PANDE, G. N.; BEER, G.; WILLIAMS, J. R. **Numerical Methods in Rock Mechanics**. Chichester, England: John Wiley and Sons Ltd, 1990.

PATTON, F. D. **Multiple Modes of Shear Failure in Rock**. Proc.1st Congr. Int. Soc. Rock Mech., Lisbon 1. 509-513. 1966.

PLAXIS 2D. **User's Manual**. Netherlands: Delft University of Technology & PLAXIS, 2015a.

PLAXIS 3D. **User's Manual**. Netherlands: Delft University of Technology & PLAXIS, 2015b.

PRICE, N. J. **Fault and Joint Development in Brittle and Semi-Brittle Rock: The Commonwealth and International**. 1^a. ed. Oxford: Pergamon Press Ltd, 1966.

PRIEST, S. D. **Discontinuity Analysis for Rock Engineering**. Londres: Chapman & Hall, University of South Australia, 1993.

READ, J.; STACEY, P. **Guidelines for Open Pit Sole Design**. Australia: CSIRO PUBLISHING, 2009.

ROCSCIENCE. **RockLab**, Program for determining rock mass strength parameters, based on the latest version of the generalized Hoek-Brown failure criterion, Rocscience Inc., Toronto, 2015a.

ROCSCIENCE. **Slide** - Program for determining slope stability with the limit equilibrium method, Rocscience Inc., Toronto, 2015b.

ROCSCIENCE. **Phase² - 2D elasto-plastic finite element** 2D elasto-plastic finite element excavations in rock or soil, Phase2 v 8.0 Rocscience Inc., Toronto, 2015c.

ROCSCIENCE. **A New Era in Slope Stability Analysis: Shear Strength Reduction Finite Element Technique**, 2004.

ROMANEL, C. **Métodos Numéricos e Mecânica de Solos em Engenharia Civil**, Notas de aula, Curso de Mestrado em Engenharia Civil: Geotecnia, Departamento de Engenharia Civil. PUC-Rio. 2011-2012.

ROSS-BROWN, D. M. **Design Considerations for Excavated Mine Slopes in Hard Rock**. Research Report No. 21, Departments of Civil Engineering, Geology and Mining and Mineral, Imperial College of Science and Technology, London, 1972.

ROSSO, R. S. **A comparison of joint stiffness measurements in direct shear, triaxial compression and in-situ**. International Journal of Rock Mechanics and Mining Sciences, Utah, v. 13, p. 167 - 172, 1976.

SHEORY, P. R. **A theory for in situ stresses in isotropic and transversely isotropic rock**. Int. J. Rock Mech. Min. Sci. & Geomech. Abstr., 31(1), pp. 23–34. 1994.

SJÖBERG, J. **Analysis of Large Scale Rock Slopes**. Doctoral Thesis, Division of Rock Mechanics. Luleå University of Technology, Sweden. 1999.

STACEY, T. R. **Stability of Rock Slopes in Open Pit Mines**. National Mechanical Engineering Research Institute. Council for Scientific and Industrial Research, CSIR Report MEG 737, Pretoria, South Africa. 1968.

STACEY, T. R. **The Stresses Surrounding Open-Pit Mine Slopes**. In Planning Open Pit Mines, Proc. Symposium on the Theoretical Background to the Planning of Open Pit Mines with Special Reference to Slope Stability (Johannesburg, August 29 - September 4, 1970), Cape Town: A. A. Balkema, 1970.

STACEY, T. R. **Three-Dimensional Finite Element Stress Analysis Applied to Two Problems in Rock Mechanics**. International Journal of Rock Mechanics and Mining Sciences & Geomechanics, Gran Britain, 1972.

STACEY, T. R. **Stability of Rock Slopes in Mining and Civil Engineering Situations**. National Mechanical Engineering Research Institute. Council for Scientific and Industrial Research, CSIR Report ME 1202, Pretoria, South Africa, 217 p. 1973.

TERZAGHI, K.; and PECK, R. **Soil Mechanics in Engineering Practice**. New York: John Wiley and Sons, 1967.

TRISTÁ, C. E. **Aplicação de Métodos de Análise de Estabilidade de Taludes de Grande Altura em Mineração**. PUC RIO, Dissertação de mestrado. Rio de Janeiro, 2009.

WYLLIE, D. C and MAH, C. **Rock Slope Engineering: Civil and mining**. 4^a. ed. New York: Spon Press, 2005.

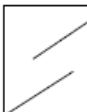
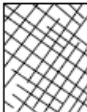
WITTKE, W. **Rock mechanics- theory and applications**. Berlin: Springer, 1990.

WITTKE, W. **Rock Mechanics Based on an Anisotropic Jointed Rock Model (AJRM)**. Berlin: Wilhelm Ernst & Sohn, 2014.

ZIENKIEWICZ, O. C.; BEST, B.; DULLAGE, C.; STAGG, K. **Analysis of nonlinear problems in rock mechanics with particular reference to jointed rock systems**. Proceedings of the Second International Cong. on Rock Mechanics, Belgrade, 1970.

ZOBACK, M.D; BARTON C.A; BRUDY, M; CASTILLO, D.A, FINKBEINER, T.; GROLLIMUND, B.R; MOOS, D.B; PESKA, P; WARD, C.D; WIPRUT, D.J. **Determination of stress orientation and magnitude in deep wells**. International Journal of Rock Mechanics and Mining Sciences & Geomechanics, California, v. 40, p. 1049 - 1076, 2003.

Anexo A: Geological strength index (GSI)

GEOLOGICAL STRENGTH INDEX (GSI) PARA ROCHAS FRATURADAS (Hoek & Marinos, 2000)		CONDIÇÃO DA SUPERFÍCIE DA DESCONTINUIDADE				
ESTRUTURA		DECRÉSCIMO DA QUALIDADE DA SUPERFÍCIE →				
	ROCHA ÍNCTA OU MASSIVA - sem descontinuidades ou poucas descontinuidades com grandes espaçamentos.	90				
		80				
			70			
			60			
				50		
				40		
	ROCHA INTENSAMENTE FRATURADA/DISTÚRBADA - dobrado com blocos angulosos formados pela incorporação de muitos sistemas de fraturas. Persistência de planos de acamamento ou xistocidade.				30	
					20	
						10
		N/A	N/A			