

Thomas Mitchell Tharp
Associate Professor of Geology

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Purdue University
West Lafayette, IN 47907

Education

B.S. - 1971	Mining Engineering - University of Wisconsin - Madison
M.S. - 1973	Mining Engineering - University of Wisconsin - Madison
Ph.D. - 1978	Geology - University of Wisconsin - Madison

Professional Experience

1976 - 1977	Physical Research Scientist, U.S. Bureau of Mines, Denver Mining Research Center
1977 - 1980	Geotechnical Engineering, U.S. Bureau of Reclamation, Denver
1980 - 1981	Assistant Professor of Geology, Wright State University
1982 - 1988	Assistant Professor of Geology, Purdue University
1988 - Pres.	Associate Professor of Geology, Purdue University

Professional Societies

American Geophysical Union
Geological Society of America
International Society for Rock Mechanics
Indiana Academy of Science
National Speleological Society

Professional Registration

Professional Engineer, State of Colorado #15703

Courses Taught

General Geology

Physical Geology, Oceanography, Field Camp, Geology for Engineers, Mathematical Modeling Geology, Introduction to Geography

Engineering Geology

Engineering Geology I, II, Rock Mechanics, Mining Systems, Fracture Mechanics in Geology, Stream Hydrology and Sediment Transport, Engineering Seismology, Blasting

Engineering

Finite Element Method, Petroleum Engineering

Structural Geology

Plate Tectonics, Tectonophysics, High-Temperature Rock Deformation, Structural and Engineering Geology of Argillaceous Sediments, Transport Phenomena in Geology, Structural Geology

Publications

Theses

Numerical model study of subduction and the deformation of oceanic lithosphere. Ph.D. Thesis, University of Wisconsin – Madison.

Behavior of three calcite rocks under tensile cyclic loading. M.S. Thesis, University of Wisconsin – Madison.

Technical Reports

Tharp, T.M., 1978. Finite element study of potential sympathetic fault movement in the vicinity of the proposed Auburn Dam foundation. Report prepared for the U.S. Bureau of Reclamation.

Tharp, T.M., 1978. Finite element well simulation in problems of fluid flow through porous media. Report prepared for the U.S. Bureau of Reclamation.

Tharp, T.M. and Scott, G.A., 1978. Foundation stability and deformation analyses for Auburn Dam CB-2. Report prepared for the U.S. Bureau of Reclamation.

Tharp, T.M., 1979. Idealization of fault geometry and movement for Auburn Dam CG-2 surface displacement study. Report prepared for the U.S. Bureau of Reclamation.

Tharp, T.M., 1980. Self-healing filter to restrict flow velocity through a foundation opening. Report prepared for the U.S. Bureau of Reclamation.

Tharp, T.M., 1985. Technical review of “Geotechnical borehole testing report Holtzclaw no. 1 Well (PD-10)”. Report prepared for Battelle Memorial Institute.

Tharp, T.M., 1985. Technical review of “Laboratory simulation of hydraulic fracturing stress measurement in salt”. Report prepared for Battelle Memorial Institute.

Papers

- Haimson, B.C. and Tharp, T.M., 1974. Stresses around boreholes in bilinear elastic rock. *Society of Petroleum Engineers J.*, **14**: 145-151.
- Tharp, T.M., Scott, G.A. and Von Thun, J.L., 1978. Rock mechanics considerations in the design and analysis of embankment dams. Preprint 3340, ASCE Annual Convention, 21 p.
- Tharp, T.M., 1980. Material models applied to Pacific trench flexure. *Tectonophysics*, **69**: 123-145.
- Tharp, T.M., 1981. Stability characterization of a jointed rock mass in the Auburn Dam Foundation. In: H.H. Einstein (ed.) *Rock Mechanics from Research to Application*, Proc. 22nd U.S. Symp. On Rock Mechanics, 461-466.
- Tharp, T.M., 1982. An enriched finite element for simulation of groundwater flow to a well or drain. *J. of Hydrology*, **55**: 237-245.
- Tharp, T.M., 1983. A field investigation of fluvial sediment transport under flood conditions. *J. Geol. Education*, **31**: 375-378.
- Tharp, T.M., 1983. Analogies between the high-temperature deformation of polyphase rocks and the mechanical behavior of porous powder metal. *Tectonophysics*, **96**: T1-T11.
- Tharp, T.M., 1983. Mechanics of failure for rock masses subjected to long-term tensile loading – analysis of large naturally occurring cantilevers. In: C.C. Mathewson (ed.), *Rock Mechanics, Theory, Experiment, Practice*, Proc. 24th Symp. On Rock Mechanics, 309-318.
- Tharp, T.M., 1983. Possible ‘ductility’ in a material with planar discontinuities. In: *Recent Advances in Engineering Mechanics and Their Impact on Civil Engineering Practice*, Proc. 4th Engr. Mech. Div. Spec. Conf., vol. II, W.F. Chen and A.D.M. Lewis (eds.), ASCE, N.Y., 968-971.
- Tharp, T.M., 1984. Sediment characteristics and stream competence in ephemeral and intermittent streams, Fairborn, Ohio. *Catena, Supplement 5*: 121-136.
- Tharp, T.M., 1984. Stability of slopes in discontinuously jointed rock. In: C.J. Dowding and M.M. Singh (eds.), *Rock Mechanics in Productivity and Protection*, Proc. 25th U.S. Symp. On Rock Mechanics, 891-898.
- Tharp, T.M., 1985. A program to evaluate the ductility of minerals. *Computers and Geosciences*, **11**: 85-89.
- Tharp, T.M. and Coffin, D.T., 1985. Field application of fracture mechanics analysis to small rock slopes. In: E. Ashworth (ed.), *Research and Engineering Applications in Rock Masses*, Proc. 26th U.S. Symp. On Rock Mechanics, 667-674.

- Tharp, T.M., 1985. Numerical models of subduction and forearc deformation. *Geophys. J. R. Astron. Soc.*, **80**: 419-437.
- Tharp, T.M., 1985. Stability analysis of three-plane wedges. *Computers and Geosciences*, **11**: 417-428.
- Travers, M.A. and Tharp, T.M., 1986. A simple precracking procedure for fracture toughness testing in rock – application to roof rock above No. V coal (Indiana). In: H.L. Hartman (ed.) *Rock Mechanics: Key to Energy Production*, Proc. 27th U.S. Symp. On Rock Mechanics, 24-31.
- Tharp, T.M., 1987. A finite element for edge-cracked beam columns. *Int. J. Num. Meth. Engr.*, **24**: 1941-1950.
- Tharp, T.M., 1987. Conditions for crack propagation by frost wedging. *Geol. Soc. Am. Bull.*, **99**: 94-102.
- Curtin, T.J. and Tharp, T.M., 1989. Stability investigation of Mt. Carmel Tunnel by physical and finite element models. In: *Construction to Minimize Environmental Impact*, Proc. 39th Highway Geology Symp., 150-165.
- Tharp, T.M., 1989. Crystal rotation by mechanical interaction between plastically anisotropic crystals. *J. Struct. Geol.*, **11**: 613-623.
- Tharp, T.M., 1994. Analysis of mine roof failure with a cracked beam column finite element. In: H.J. Siriwardane and M.M. Zaman (eds.), *Computer Methods and Advances in Geomechanics*, Eighth Int. Conf. Of the Int. Assoc. for Computer Methods and Advances in Geomechanics, 1907-1912.
- Tharp, T.M. and Holdrege, T.J., 1994. Fracture mechanics analysis of limestone cantilevers subjected to very long-term tensile stress in natural caves. In: P.P. Nelson and S.E. Laubach (eds.), *Rock Mechanics Models and Measurements Challenges from Industry*, Proc. First North American Rock Mechanics Symp., 817-824.
- Tharp, T.M. and Scarbrough, M.G., 1994. Application of hyperbolic stress-strain models for sandstone and shale to fold wavelengths in the Mexican Ridges Foldbelt. *J. Struct. Geol.*, **16**: 1603-1618.
- Tharp, T.M., 1995. Design against collapse of karst caverns. In: B.F. Beck (ed.), *Proc. Fifth Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst*, 397-406.
- Tharp, T.M. and Holdrege, T.J., 1995. Very long-term loading of roof beams in limestone caves. In: J. Daemon and R. Schultz (eds.) *Proc. 35th U.S. Symp. On Rock Mechanics*, 789-794.

- Tharp, T.M., 1996. A fracture mechanics analysis of stand-up time for mine roof beams. In: M. Aubertin, F. Hassani and H. Mitri (eds.) Proc. 2nd North American Rock Mechanics Symp., 1177-1184.
- Tharp, T.M., 1997. Mechanics of formation of cover-collapse sinkholes. In: B.F. Beck and J.B. Stephensen (eds.), Proc. Sixth Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst, 29-36.
- Tharp, T.M., 1997. Time-dependent compressive failure around an opening. *Int. J. Rock Mech. Mining Sci.*, **34**: No. 3-4, Paper No. 310 (CD), 1-14.
- Tharp, T.M., Loucks, R.R. and Sack, R.O., 1998. Modeling compaction of olivine cumulates in the Muskox Intrusion. *Am. J. Sci.*, **298**: 758-790.
- Tharp, T.M., 1999. Mechanics of upward propagation of cover-collapse sinkholes. *Engr. Geol.*, **52**: 23-33.
- Tharp, T.M. and Holdrege, T.J., 1999. Analysis of roof failure in Salamander Cave, Indiana. Proc. 37th U.S. Rock Mech. Symp., 1213-1220.
- Tharp, T.M. and Foster, J.N., 2000. Progressive roof failure in Breakdown Mountain Room, Salamander Cave. In: J. Girard, M. Liebman, C. Breeds and T. Doe (eds.) Proc. 4th North American Rock Mech. Symp., 415-422.
- Tharp, T.M., 2001. Cover-collapse sinkhole formation and piezometric surface drawdown. In: B.F. Beck and J.G. Herring (eds.) Geotechnical and Environmental Applications of Karst Geology and Hydrology, 53-58.
- Salvati, R., Tharp, T.M. and Capelli, G., 2001. Conceptual model for geotechnical evaluation of sinkhole risk in the Latium Region. In: B.F. Beck and J.G. Herring (eds.) Geotechnical and Environmental Applications of Karst Geology and Hydrology, 163-167.
- Tharp, T.M., 2002. Medical Geography. Chap. 12 in Introduction to Geography – Custom Edition for Purdue University, Pearson Custom Publishing, 311-328.
- Tharp, T.M., 2002. Economic and Military Geography. Chap. 14 in Introduction to Geography – Custom Edition for Purdue University, Pearson Custom Publishing, 363-380.
- Tharp, T.M., 2002. Poroelastic analysis of cover-collapse sinkhole formation by piezometric surface drawdown. *Environmental Geology*, 447-456.
- Tharp, T.M., 2003. Cover-collapse sinkhole formation and soil plasticity. In: B.F. Beck (ed). Sinkholes and the Engineering and Environmental Impacts of Karst, Geotechnical Special Pub. No. 122, ASCE. 110-123.

Tharp, T.M., 2004. Mineral Resources. Chap. 10 in Introduction to Geography, 2nd Ed. - Custom Edition for Purdue University, Pearson Custom Publishing, 241-276.

Tharp, T.M., 2004. Agriculture. Chap. 14 in Introduction to Geography, 2nd Ed. - Custom Edition for Purdue University, Pearson Custom Publishing, 367-393.

Comments and Replies

Tharp, T.M., 1983. An enriched finite element for simulation of groundwater flow to a well or drain – reply. *J. of Hydrology*, **60**: 383.

Tharp, T.M., 1984. Differential stress magnitudes during regional deformation and metamorphism: upper bound imposed by tensile Fracturing, by M.A. Etheridge – Comment. *Geology*, **12**: 56.

Sponsored Research

Project Title: Fracture mechanics properties of Indiana coal mine roof rocks
Agency: Indiana Mining and Minerals Resources Research Institute
Duration: July 1983 – June 1985
Amount: \$20,245

Project Title: Stability analysis of slopes in discontinuously jointed rock
Agency: Indiana Mining and Minerals Resources Research Institute
Duration: July 1983 – June 1985
Amount: \$18,390

Project Title: A finite element for edge-cracked beam columns
Agency: Indiana Mining and Minerals Resources Research Institute
Duration: September 1985 – January 1987
Amount: \$11,869

Project Title: Behavior of cracked roof beams in underground mines
Agency: Indiana Mining and Minerals Resources Research Institute
Duration: June 1986 – December 1988
Amount: \$14,878

Project Title: Long-term deformation and strength loss in limestone subject to acid mine Water
Agency: Indiana Mining and Minerals Resources Research Institute
Duration: January 1993 – December 1993
Amount: \$13,566

Research Grants Supporting Agencies:

U.S. Bureau of Mines (Indiana Mining and Minerals Resources Research Institute) – USBM

USBM – “Fracture Mechanics Properties of Indiana Coal Mine Roof Rocks”, Principal Investigator, 7/83-6/85, \$20,240.

USBM – “Stability Analysis of Slopes in Discontinuously Jointed Rock”, Principal Investigator, 7/83-6/85, \$18,390.

David Ross Grant (Purdue University) – “The Formation and Geologic Implications of Ductile Fracture in Rock”, 5/85-6/86, \$6,600.

Summer XL Grant (Purdue University) – “Fracture Mechanics Criteria for Stability of Slopes in Discontinuously Jointed Rock”, Principal Investigator, 6/85-7/85, \$3,750.

USBM – “A Finite Element for Edge-Cracked Beam Columns”, 9/85-1/87, Principal Investigator, \$11,870.

USBM – “Behavior of Cracked Room Beams in Underground Mines”, 6/86-12/88, Principal Investigator, \$14,880.

USBM – “Long-Term Deformation and Strength Loss in Limestone Subject to Acid Mine Water”, 1/93-12/93, Principal Investigator, \$13,566.