Dissertations and Theses Completed under Prof. Bažant's Advisorship, and Collaborators

September 6, 2012

1 Ph.D. Dissertations

1. Martin K. Christensen, *Field Solutions for Large Regular Frameworks under Initial Stress,* June 1973.

2. Leonard J. Najjar, *Environmental Factors and Prediction of Structural Effects in Creep of Concrete,* June 1973.

3. Spencer T. Wu, *Rate-Type Creep Law of Aging Concrete in Variable Environment,* August 1973.

4. Vicente Cuellar, *Rearrangement Measure Theory Applied to Dynamic Behavior of Sand,* August 1974 (co-advised with R.J. Krizek).

5. Mahjoub M. El Nimeiri, *Stability and Large Deflections of Curved Thin-Walled Girders,* June 1974.

6. Ibrahim Kutay Ozaydin, *A Micro-Mechanistic Analysis of Creep Response of Kaolin Clay,* June 1974 (co-advised with R.J. Krizek).

7. Ali A. Asghari, *Experimental and Numerical Investigation of the Effects of Variable Humidity, Aging and Stress Nonlinearity on Creep of Concrete,* August 1975.

8. Parameshwara D. Bhat, *Endochronic Theory of Inelasticity and Failure of Concrete with Application to Seismic-Type Cyclic Loading,* June 1976.

9. Elmamoun Abdalla Osman, *Prediction of Creep and Shrinkage of Concrete and Its Modeling as a Stochastic Process,* June 1976.

10. Atilla M. Ansal, *An Endochronic Constitutive Law for Normally Consolidated Cohesive Soils,* June 1977 (co-advised with R.J. Krizek).

11. John Louis Glazik, *Numerical Analysis of Elastodynamic Near-Tip Stress Fields for Stationary and Propagating Cracks,* June 1977 (co-advised with J.D. Achenbach).

12. Werapol Thonguthai, *Creep and High Temperature Effects on Pore Pressure and Drying of Concrete,* August 1977.

13. Rafael Blázquez, *Endochronic Model for Liquefaction of Sand Deposits as Inelastic Two-Phase Media,* June 1978 (co-advised with R.J. Krizek).

14. Ali A. El Zaroughi, *Application of Endochronic Constitutive Law to One-Dimensional Liquefaction of Sand,* June 1978 (co-advised with R.J. Krizek).

15. Sang-Sik Kim, *Theoretical and Experimental Investigation of Nonlinear Behavior and Creep of Concrete,* August 1978.

16. Liisa Panula, *Practical Prediction of Time-Dependent Deformations and Failure of Concrete,* August 1978.

17. Luis F. Estenssoro, *The Surface Singularity of Cracks,* August 1979.

18. Celal Sener, *An Endochronic Nonlinear Inelastic Constitutive Law for Cohesionless Soils Subjected to Dynamic Loads,* August 1979 (co-advised with R.J. Krizek).

19. Tatsuya Tsubaki, *Nonlinear Response of Plain Concrete and Cracked Reinforced Concrete,* August 1979.

20. Byung-Hwan Oh, *Mathematical Models for Inelastic Behavior and Cracking of Concrete Structures,* July 1982.

21. Jenn-Chuan Chern, *Creep Law of Concrete, Its Uncertainty and Effects of Drying and Cracking,* 1984.

22. Ta-Peng Chang, *Finite Element Modeling of Strain-Softening and Failure in Concrete,* 1985.

23. Jin-Keun Kim, *Fracture and Inelastic Constitutive Relations for Concrete and Geomaterials,*

1985.

24. Phillip A. Pfeiffer, *Size Effect in Blunt Fracture,* 1986.

25. Feng-Bao Lin, *Plasticity with Nonlocal Strain-Softening and Material Instabilities,* 1987.

26. Gilles Pijaudier Cabot, *Nonlocal Strain Softening Material Instabilities,* 1987.

27. Pere C. Prat, *Micromechanics Modeling and Fracture of Concrete and Geomaterials,* 1987.

28. Santosh Prasannan, *Nonlinear and Thermal Effects in Concrete Creep — Experiment and Theory,* 1989.

29. Mazen R. Tabbara, *Fracture and Stability of Strain-Softening Materials and Structures,* 1990.

30. Joong-Koo Kim, *Prediction of Time-Dependent Deformations of Concrete and Bridge Deflection Probability,* 1990.

31. Mohammed T. Kazemi, *Fracture Characteristics of Quasi-brittle Materials from the Size Effect Method and Implications in Design,* 1990.

32. Yunping Xi, *Analysis of Concrete Creep, Shrinkage and Fracture by Deterministic and Probabilistic Methods,* 1991.

33. Ravindra Gettu, *Concrete and Rock Fracture and the Influence of Loading Rate,* 1992.

34. Milan Jirásek, *Modeling of Fracture and Damage in Quasibrittle Materials,* 1993.

36. Zhengzhi Li, *Fracture Size Effect and Damage Properties of Quasibrittle Materials,* 1995.

37. Yuyin Xiang, *Modeling of Fracture and Scaling in Quasi-Brittle Materials*, 1996.

38. Sandeep Baweja, *Long-Term Deformations of Concrete, Practical Prediction, Effect of Composition and Mechanisms*, 1996.

39. Sanjeev Tandon, *Fracture Behavior of Quasi-Brittle Material*, 1997 (co-advised with K.T. Faber).

40. Jang-Jay Ho Kim, *Failure Mechanisms and Size Effect of Quasi-Brittle Materials: Ice, Steel Reinforced Concrete and Fiber Composite*, 1998.

41. Michele Brocca, *Material Modeling and Structural Analysis with the Microplane Constitutive Model*, 1999.

42. Ferhun C. Caner, *Computational Modeling of Damage and Fracture in Concrete*, 2000.

43. Emilie Becq-Giraudon, *Size Effect on Fracture and Ductility of Concrete and Fiber Composites*, 2000.

44. Goangseup Zi, *Size Effect of Quasibrittle Materials and Simulation of Concrete Decontamination Using Microwave Heating*, 2002.

45. Zaoyang Guo, *Size Effect Analysis of Materials and Structures from Micro Scale to Macro Scale*, 2004.

46. Yong Zhou, *Size Effect on Strength of Fiber Composites and Rigid Foams*, 2005.

47. Alessandro Beghini, *Stability and Quasibrittle Failure of Fibrous and Particulate Composites*, 2005.

48. Sze-Dai Pang, *Probabilistic Size Effect in Fracture of Quasibrittle Materials*, 2005.

49. Martin G. Andrews, *The Static and Dynamic Interaction of Multiple Delaminations in Plates Subject to Cylindrical Bending* (co-advised with Prof. Roberta Massabó, Univ. of Genova), 2005.

50. Qiang Yu, *Size Effect and Design Safety in Concrete Structures under Shear*, 2007.

51. Jialiang Le, *Probabilistic and Energetic Scaling of Fracture of Quasibrittle Materials*, 2010.

52. Mahendra Gattu, *Structural Strength at Large Strains and under Softening Compression Damage*, Aug. 2012.

53. Christian G. Hoover, *Fracture and size effect in quasibrittle composites: Experiment and theory*, Aug. 2012.

54. Kyung-Tae Kim, *Scaling of Failure and Time Dependent Behavior of Brittle Heterogeneous Materials: Composite, Concrete and Bone*, Sept. 2012.

2 M.S. Theses

1. Leonard J. Najjar, *The Drying of Concrete as a Nonlinear Diffusion Problem,* June 1971.

2. Werner Astl, *Torsion of Stiffening Systems of Thin-Walled Beams in High-rise Structures,* June 1976.

3. Michael C. Burrow, *Nonlinear Three-dimensional Finite Element Analysis of Reinforced Concrete Beams in Flexure,* August 1977.

4. Chuan Lin, *Frictional Limit Design of Reinforcement in Plates,* August 1981.

5. Steven Zebich, *Statistical Analysis of Creep and Shrinkage Data,* December 1981.

6. James S. Ong, *Creep in Continuous Beam Built Span by Span,* February 1982.

7. Warren J. Raftshol, *Finite Element Model for Creep and Shrinkage in Concrete Cylinders,* August 1982.

8. Kwang-Liang Liu, *Uncertainty Analysis and Shrinkage in Concrete Structures,* 1984.

9. Manuel Aguinaga-Zapata, *Effect of Creep on Overloads of Slab Buildings During Construction,* 1985.

10. Sohail Aslam, *Bayesian Probabilistic Prediction of Creep Deflections of Bridges,* 1985.

11. Hsu-Huei Sun, *Size Effect in Diagonal Shear Failure and Pullout Strength of Concrete,* 1986.

12. Hung-Wen Chen, *The Effect of Drying Creep in Concrete Box Girder Beams,* 1986.

13. Stephen Beissel, *Numerical Analysis of Nonlinear and Time-Dependent Fracture by Means of the Smeared-Tip Superposition Method,* 1990.

14. William F. Schell, *Fatigue Fracture of High Strength Concrete Under High Frequency Loading,* 1991.

15. Gustavo Gioia, *Is No-Tension Dam Design Always Safe?—A Comparison with Fracture Mechanics Analysis,* 1994.

16. Louis Paul Goncalves Da Costa, *Numerical Simulation of a Concrete Slab Impacted by a Projectile Using Microplane Theory and Finite Elements,* 1995.

17. Michele Cyr, *Fracturing Truss Model: Size Effect of Reinforced Concrete Beams in Torsion*, 1998.

18. Guang-Hua Li, em Unbiased Statistical Evaluation of Creep and Shrinkage Models from a Comprehensive Database, 2009.

Appendix I: Doctoral Theses Prepared Fully or Partly under Bažants Advisorship or Co-Advisorship at Northwestern, but Defended at Other Universities

1. Abu-Bakr Wahab *Stability of parallel crack system* (visiting, from U. of Khartoum).

2. Anping Hong, *Theory of Crack Initiation from Smooth Surfaces and Its Applications,* (co-advised with H. Binienda), 1994—Ph.D. awarded by University of Akron with Bažant as examining committee member.

3. Rodrigue Desmorat, *Size effect in fiber of bar pullout with interface softening slip*, Ph.D. Thesis, L.M.T., E.N.S. (Ecole National Supérieur) de Cachan, Paris-Cachan, France, 1992-93 (princ. advisor Jean Lemaitre); Visiting Research Assistant at Northwestern University.

4. Laurent Granger, *Effect of Composition on Basic Creep of Concrete and Cement Paste*, Ph.D. Thesis, E.C.P.C. (Ecole Nationale des Ponts et Chausée), Paris, France, 1993 (princ. advisor Paul Acker); Visiting Research Assistant at Northwestern University.

5. Anders Boe Hauggaard, *Microprestress-Solidification Theory for Concrete Creep*, Ph.D. Thesis 1996, Technical University of Denmark, Lyngby, 1995 (prepared mainly at NU, supported by 6 month Danish Fellowship).

6. Jiří Nemeček, *Microplane modeling of concrete*, part of Ph.D. dissertation at CTU Prague (principal advisor Z. Bittnar).

7. Alexander Steffens, *Mathematical Model for Aggregate-Silica Reaction in Concrete.* Part of Ph.D. Thesis, T.U. Braunschweig, Germany 1999 (6 months at NU during 1998).

8. Gianluca Cusatis, *Microstructure Based Lattice Model for Concrete*, PhD. Thesis 2002, Politecnico di Milano, Italy (1 year at NU, 1999–2000, supported by Italian fellowship).

9. Giovani de Luzio, *Nonlocal Microplane Model for Concrete* PhD. Thesis 2003, Politecnico di Milano, Italy (1 year at NU, 2000-2001, supported by Italian Fellowship).

10. Martin Wierer, *Computational Modeling of Composites* Predoctoral Fellow (doctoral student at CTU Prague, principal advisor J. Šejnoha), 4 months in 2003.

11. Miroslav Vořechovský, *Stochastic fracture mechanics and size effect* (doctoral student at VUT Brno), Fulbright Fellow, 8 months in 2003-04 (with supplement from Bažant's NSF grant).

Appendix II: Other Theses Prepared Fully or to a Major Extent under Bažant's Advisorship at Northwestern but Defended at Other Universities

1. M. Elisabeth (Betsy) Karr (M.S. Student on NU Summer Institute Fellowhip), *Size effect in high strength con-*

crete, 1989.

2. Jerôme Pelan, *Inelastic buckling study of concrete columns*, Graduation Thesis at Ecole polytéchnique, Paris–Palaiseau, France, Visiting Fellow at Northwestern University, spring 1992.

3. Marc Heitz, *A study of quasibrittle fracture*, Graduation Thesis at Ecole polytéchnique, Paris–Palaiseau, France, Visiting Fellow at Northwestern university, spring 1992.

4. Phillipe Hein, *Finite element whose distribution function has an excess number of parameters determined by optimum fitting.* Graduation Thesis at Ecole polytéchnique, Paris–Palaiseau, France, Visiting Fellow at Northwestern University, spring 1993.

5. Michael Thoma, *Size effect in pullout failure of fibers or reinforcing bars*, Diploma Thesis (Diplomarbeit, Lehrstuhl A für Mechanik), Technische Universität München, Germany; Visiting Research Assistant at Northwestern University, Dec. 1992–June 1993.

6. Olivier Barrère, *Fatigue fracture and size effect in fibre-reinforced concrete*, Thesis, E.N.S. de Cachan, France, 1996.

7. Louis da Costa, *Numerical simulation of impact on concrete walls.* Visiting Fellow (3 months at NU), from Ecole centrale, France, 1996.

8. Fredéric Beltoise. *Modeling of rapid heating of concrete wall*, princ. advisor for Ph.D. G. Pijaudier-Cabot, E.N.S. de Cachan, France, Visiting Fellow at NU, summer 1997.

9. Andreas Kalkbrenner, Predoctoral Fellow, graduate student on leave from Stuttgart University (Prof. H. Reinhardt), Visiting Fellow, Oct. 2001 - Jan. 2002.

10. Olivier Gouirand, Graduation Thesis at Ecole polytéchnique, Paris–Palaiseau, France, Visiting Fellow, April–July 2004, Study of microplane model for fiber-reinforced concrete (support from France, plus supplement from Bažant's project).

11. Olivier Abellan, Graduation Thesis at Ecole polytéchnique, Paris–Palaiseau, Frace, Visiting Fellow, Approximations of aging coefficient for concrete creep, April–July 2005.

12. Pierre Madelpech, Graduation Thesis at Ecole polytéchnique, Paris–Palaiseau, Frace, Visiting Fellow, Computer modeling of skin wrinkling in sandwich plates, April–July 2005.

13. Mathieu Verdure, Graduation Thesis at Ecole polytéchnique, Paris–Palaiseau, France, Visiting Fellow, One-dimensional model for progressive collapse of tall buildings, April–July 2006.

14. Marc de Maréschal, Graduation Thesis at Ecole polytéchnique, Paris–Palaiseau, France, Visiting Fellow, Size effect in punching shear of reinforced concrete slabs, April–July 2007.

Appendix III: Theses at Other Universities Advised or Co-Advised by Bažant's During His Visits to These Universities

1. M. A. Mukaddam, *Creep analysis of concrete structures at elevated temperatures*, Ph.D. Dissertation, University of California, Berkeley, Ph.D., 1968 (princ. advisor Boris Bresler).

2. B. M. Jensen, *The effect of temperature on the thermal dilatation of concrete conditioned to a given humidity*, M.S. Thesis, 1968, University of California, Berkeley, 1968 (princ. advisor Boris Bresler).

3. Jan Byfors, *Concrete creep at early ages*, CBI, Royal Institute of Technology, Stockholm, Sweden, 1977 (co-advisor).

4. L. Resende, *Progressive damage continuum model for rock*, Ph.D. Dissertation, University of Cape Town, South Africa, 1984 (princ. advisor John B. Martin).

5. Jan Erik Jonasson, *Concrete Durability*, Ph.D., Lulea University, Sweden 1994 (also, principal examiner).

Appendix IV. Visiting Scholars and Postdoctoral Associates Supported Fully of Partly from Bažant's Projects

1. Geir Horrigmoe, Trondheim U.
2. Hideomi Ohtsubo (co-advisor: S. Nemat-Nasser)
3. Abu Bakr Wahab, Univ. of Khartoum, Sudan
4. R.P. Khetan (with Prof. Achenbach), India
5. Atilla Ansal, Bosphorus University, Instanbul
6. Luigi Cedolin, Politecnico di Milano
7. Pietro Gambarova, Politecnico di Milano
8. Zekai Celep, TU Istanbul
9. Henrik O. Madsen, Danish Eng. Acad., Lyngby
10. Tong-Sheng Wang, Anhui, China
11. David Darwin, U. of Kansas
12. Andrej Pitoňák, ÚSTARCH, Slov.Ac.Sci. Bratislava
13. Alexander Zubelewicz, IPPT, Warsaw
14. Michael P. Wnuk, South Dakota State U.
15. Soo-Gon Lee, Korea
16. Jacky Mazars, ENS de Cachan, Paris
17. Yves Berthaud, ENS de Cachan, Paris
18. Joško Ožbolt, Stuttgart U. and Zagreb U.
19. Jianying Pan, China Acad. of Railway Sci., Beijing
20. Jose More Ramos, Lab. Nat. Engeh. Civil, Lisbon
21. Mehmet Basar Çivelek, IIT Chicago
22. Sıddık Sener, Gazi U., Ankara
23. Kang-Ming Xu, Wuhan Inst. Hydr.Elec.Engrg.
24. Zhiping Cao, Yellow River Cons.Com., Zheng-Zhou
25. Y.W. Kwon, Korea
26. Toshiaki Hasegawa, Shimizu Co., Tokyo
27. M. Elisabeth (Betsy) Karr
28. Ignacio Carol, UPC, Barcelona
29. Jaime Planas, UP Madrid
30. Vladimír Křístek, CTU Prague
31. Rodrigue Desmorat, ENS de Cachan, Paris
32. Anders Boe Hauggaard, U. of Denmark, Lyngby

33. Jaroslav Navrátil, TU Brno, Czech Rep.
34. Richard Kohoutek, Univ. of Wollongong, Australia
35. Jiří Nemeček, TU Prague
36. Jerôme Pelan, EP, Paris-Palaiseau
37. Marc Heitz, EP, Paris-Palaiseau
38. Jan L. Vítek, TU Prague
39. Stuart G. Reid, U. of Sydney
40. Larissa Molina, CBI, Stockholm
41. B. Pohl, EP, Paris-Palaiseau
42. Phillipe Hein, EP, Paris-Palaiseau
43. Michael Thoma, TU Munich, Germany
44. Olivier Barrère, EP, Paris-Palaiseau
45. Louis da Costa, EP, Paris-Palaiseau
46. Fredéric Beltoise, EP, Paris-Palaiseau
47. M. Verdure, EP, Paris-Palaiseau
48. Shang-Ping Bai, Inst. of Sci. & Technol., Shanxi
49. Min Chen, Water Conservancy Hydroel.Power Res.
50. Imre Bojtár, TU Budapest Zhishen Wu, Tokyo
51. Laurent P. Granger, EDF, France
52. Xiao-Xin Cui, Beijing Polytechnic Inst.
53. Peter J. Simeovov, Bulgarian Acad. Sci., Sophia
54. E. A. El Traify, Univ. of Khartoum, Sudan
55. Wei Yi Gan, Northw. Invest./Design Inst., Xi'an
56. Christian Huet, Ecole des Ponts et Chaussees, Paris
57. Milan Holický, Klokner Inst., CTU (ÇVUT), Prague
58. Yuan-Neng Li, China
59. An-Ping Hong, China
60. Wei-Hwa Gu (co-advisor K. Faber)
61. Bořek Patzák, CTU, Prague
62. Franz-Josef Ulm, LCPC, Paris
63. Alexander Steffens, Stuttgart University
64. Gianluca Cusatis, Politecnico di Milano
65. Giovani de Luzio, Politecnico di Milano
66. Jan Červenka, Červenka Co., Prague
67. Petr Kabele, CTU, Prague
68. Drahomír Novák, TU Brno, Czech Rep.
69. Daniel Ferretti, U. of Parma, Italy
70. Jan Sládek, Slovak Academy of Sciences, Bratislava
71. Reza Vaziri, UBC, Vancouver
72. Libor Jendele, Červenka Co., Prague
73. Martin Wierer, CTU Prague
74. Miroslav Vořechovský, TU Brno, Czech Rep.
75. Arash Yavari, Caltech (as external collaborator)
76. Petr Pařík, Czech Acad. Sci. Prague
77. Ferhun Caner, UPC, Barcelona
78. Peter Grassl, Chalmers U., Göteborg, Sweden
79. Vít Šmilauer, CTU Prague
80. Goangseup Zi, Korea University, Seoul
81. Yun Lee, KAIST, Korea
82. Jian-Ying Wu, Zhejiang Univ., Hangzhou, China
83. Jan Eliáš, TU Brno, Czech Rep.
84. Vanja Travaś, U. of Zagreb, Croatia
85. Roman Wendner, BOKU, Vienna
86. Jan Vorel, CTU, Prague
87. Weihui Duan, Monash University, Melbourne
88. Xin Chen, Univ. of Mining & Technology, Beijing

Visiting Professor: Jaime Planas
Eschbach Visiting Professor: Milan Jirásek

Technicians (paid from grants, since 1969):
John Schmidt, Samuel Meiri, Marvin Hagen, Steve Albertson, John Chirayil, John Bayldon.