



# Unified Engineering Inc.

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## **Mark A. Lawrence, Ph.D., P.E.** Engineering Mechanics & Reliability

### **Employment**

- 1995-present Principal, Unified Engineering, Inc.
- 1992-1995 Director of Engineering Mechanics, Packer Engineering, Inc.
- 1990-1992 Manager of Engineering Mechanics, Packer Engineering, Inc.
- 1986-1989 Assistant Professor, Department of Mechanical Engineering, Northwestern University
- 1985-1986 Visiting Assistant Professor, Department of Mechanical and Nuclear Engineering, Northwestern University

### **Special courses taught**

- 1991 Prestressed Concrete, Illinois Institute of Technology
- 1988 Mechanics of Structures, Zenith Electric Corporation through arrangement with Northwestern University

### **Education**

- 1986 Ph.D. in Civil Engineering; University of Illinois at Urbana-Champaign (Thesis: *A Basis Random Variable Approach to Stochastic Structural Mechanics*)
- 1982 M.S. in Civil Engineering; University of Illinois at Urbana-Champaign
- 1981 B.S. in Civil Engineering; University of Illinois at Urbana-Champaign

### **Continuing education**

- 1999 Fractography; ASM International
- 1998 Fracture & Fatigue Control in Structures; University of Kansas
- 1996 Wind Loads for Buildings and Other Structures; ASCE
- 1996 OSHA 10-Hour Course; Chicagoland Construction Safety Council
- 1994 Introduction to ANSYS; Swanson Service Corporation
- 1991 Application of Engineering Fracture Mechanics; Texas A & M University
- 1990 Cords, Strands, Cables, and Wire Rope: Recent Developments and Applications; University of Illinois

### **Professional societies**

- American Society of Civil Engineers
- American Society of Mechanical Engineers
- American Institute of Steel Construction
- American Welding Society
- ASM International
- American Statistical Association

### **Professional licenses and registrations**

- Professional Engineer, State of Illinois license number 062-048382

**Awards**

- 1988-1989 National Science Foundation Research Initiation Award
- 1987 Finalist, Apple Computer's Aerospace Software Competition
- 1982-1985 Exxon Fellowship in Civil Engineering
- 1981-1982 University of Illinois Fellowship
- 1981 University of Illinois Bronze Tablet, University Honors

**Selected publications**

- "A Finite Element Solution Technique for Plates of Random Thickness," Chapter 9 in *Finite Element Methods for Plate and Shell Structures* (T.J.R. Hughes and E. Hinton, eds.), Pineridge Press, Ltd., Swansea, UK, 1986.
- "Basis Random Variables In Finite Element Analysis," *International Journal of Numerical Methods in Engineering*, vol. 24, no. 10, October 1987, John Wiley & Sons
- "Probability-Based Tools for Interactive Computer-Aided Design," *Computational Probabilistic Methods* (W.K. Liu, T. Belytschko, M.A. Lawrence, and T. Cruse, eds), ASME Publication AMD-Vol. 93, 1988, pp. 37-48
- "An Introduction to Reliability Methods," Chapter 1 of *Computational Mechanics of Probabilistic and Reliability Analysis* (W.K. Liu and T. Belytschko, eds), Elmepress International, Lausanne, Switzerland, 1989, pp. 10-45
- "Brittle Fracture Reliability by Probabilistic Finite Elements," (with G.H. Besterfield, W.K. Liu, and T.B. Belytschko) Chapter 15 of *Computational Mechanics of Probabilistic and Reliability Analysis* (W.K. Liu and T. Belytschko, eds), Elmepress International, Lausanne, Switzerland, 1989, pp. 326-342
- "Fatigue Crack Growth Reliability by Probabilistic Finite Elements," (with G.H. Besterfield, W.K. Liu, and T.B. Belytschko) Chapter 16 of *Computational Mechanics of Probabilistic and Reliability Analysis* (W.K. Liu and T. Belytschko, eds), Elmepress International, Lausanne, Switzerland, 1989, pp. 344-369
- "Brittle Fracture Reliability by Probabilistic Finite Elements," (with G.H. Besterfield, W.K. Liu, and T. Belytschko), *Journal of Engineering Mechanics*, vol. 116, no. 3, March 1990, ASCE, pp 642-659
- "Fatigue Crack Growth Reliability," (with W.K. Liu, G.H. Besterfield, and T. Belytschko), *Journal of Engineering Mechanics*, vol. 116, no. 3, March 1990, ASCE, pp 698-708
- "Fatigue Crack Growth Reliability by Probabilistic Finite Elements," (with G.H. Besterfield, W.K. Liu, and T. Belytschko), *Computer Methods in Applied Mechanics and Engineering*, 1991, pp 297-320
- "Use and Abuse of Probabilistic Methods," presented at SAE International Off-Highway & Powerplant Congress & Exposition, 1992