

Hazim M. Dwairi

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EDUCATION

North Carolina State University (NCSU), Raleigh, NC, USA

Ph.D. in Civil Engineering/Structures and Mechanics **2005**

Dissertation: "Equivalent Damping in Support of Direct Displacement-based Design with Applications to Multi-span Bridges."

The dissertation was focused on the advancement of Direct Displacement-based Design method (DDBD) for multi-span bridge structures in seismic regions. The DBD method was first proposed in 1993 and it started making its way into current codes such as FEMA and ATC standards. A Visual-Basic macro was developed to analyze and design multi-span bridges accordingly.

Jordan University of Science and Technology (JUST), Irbid, Jordan

M.Sc. in Structural Engineering **1999**

Thesis: "On the Dynamic Response of Sandwich Plates Subjected to Impact Loading"

Jordan University of Science and Technology (JUST), Irbid, Jordan

B.Sc. in Civil Engineering **1997**

Area of Concentration: Structural Engineering. Graduation project involves the design of a residential building, underground water tank and design of a frame structure with curved plates.

AWARDS

- Southeastern Transportation Center Fellowship, NCSU University **2004 – 2005**
 - The Hashemite University Fellowship to graduate school at NCSU University **2001 – 2004**
 - Ministry of Higher Education Fellowship to JUST University **1992 – 1997**
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TEACHING EXPERIENCE

The Hashemite University, Zarqa, Jordan

Associate Professor – Department of Civil Engineering **2010 to present**

Assistant Professor – Department of Civil Engineering **2005 to 2010**

Entitled of research development, and teaching basic and senior courses in structural engineering

North Carolina State University, Raleigh, NC, USA

Visiting Professor – Department of Civil Engineering **Summer 2006**

Teaching "Engineering Mechanics – Statics." Developed syllabus and overall course structure, and administered all grades.

Lecturer – Department of Civil Engineering **2004 - 2005**

Teaching "Reinforced Concrete Design." Developed syllabus and overall course structure, and administered all grades.

Teaching Assistant – to Professor James Nau **2003 - 2004**

In "Reinforced Concrete Design," and "Engineering Mechanics – Statics." Collaborated on curriculum and exam development, met with students upon request, and graded all written work, including final exam papers.

Jordan University of Science and Technology, Irbid, Jordan

Teaching Assistant – Department of Civil Engineering **1997 - 1999**

Collaborated on curriculum and exam development, met with students upon request, and graded all written work, for various courses in Structural Engineering.

RESEARCH EXPERIENCE

North Carolina State University, Raleigh, NC, USA

Postdoctorate – Department of Civil Engineering

2004 - 2005

Conduct testing of deep beams reinforced with conventional and high-strength steel in order to mimic the use of such members in mat foundation, compile a report and write papers.

Research Assistant – to Professors Paul Zia and Mervyn Kowalsky

2001 - 2004

Compile reports and write papers, and conduct structural testing in the field and in the laboratory including but not limited to:

- Live load testing and health monitoring of highway bridges namely: US 401 Highway Bridge over the Nause River in Wake County, North Carolina, USA.
- Laboratory testing of historic post-tensioned Prestressed concrete block bridge girders.
- Field and laboratory testing of pretensioned self-compacted concrete (SSC) bridge girders (ASSHTO type III and IV)

INDUSTRY EXPERIENCE

Consolidated Consultants, Inc. (CC), Amman, Jordan

Design Engineer

1999 - 2001

Entitled of designing reinforced concrete structures, including but not limited to office buildings, elevated and underground water reservoirs, and bridge crossings. Projects involved in are:

- Waste Water Collection, Treatment and Effluent Reuse for North Jordan Valley Communities (in association with Metcalf & Eddy and Stanley Consultants of USA): Involves the design of waste water treatment plant and bridge crossings of main sewer trunk over the Jordan Valley. Project value is \$29 million.
- Zara-Maein (in association with Harza Consultants of USA): Involves the design of a desalination plant, water pump stations, and bridge crossings of water main between Zara-Maein and Amman. Project Value is \$70 million.
- Development of the Baptism Site (in association with Studio Sonzogni of Italy): Involves the design of visitors' center and underground water tank. Project value is \$7.1 million.
- Alhusban-Kafrien Site Development: Involves the structural design of underground pump station. Project value is \$5 million.

National Company for Engineering and Contracting (NCEC), Aqaba, Jordan

Site Engineer

1997 - 1998

Entitled of reviewing design drawings and supervising the construction of various site planning and landscaping projects.

COURSES TAUGHT

- Introduction to Earthquake Engineering
- Prestressed Concrete Design
- Reinforced Concrete Design I, II
- Engineering Mechanics – Statics
- Mechanics of Solids
- Technical Writing for Engineers
- Engineering Drawing using AutoCAD
- Manual Engineering Drawing

RESEARCH INTERESTS

- Earthquake Engineering, analysis and design.
 - Performance-based seismic engineering.
 - Behavior and design of reinforced and prestressed concrete structures.
 - Sound waves propagation and noise isolation.
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RESEARCH ACTIVITIES

- Development of approximate solutions for nonlinear systems response.
 - Advancement of direct displacement-based design method for multi-span bridge structures.
 - Health monitoring of high performance prestressed concrete bridge in Raleigh, NC.
 - Flexure and shear testing of historic prestressed concrete block bridge.
 - Material testing and health monitoring of prestressed SCC girders.
 - Flexure and shear testing of deep beams reinforced with conventional and high strength steel.
 - Development of visual basic application for displacement-based design of multi-span bridges.
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TECHNICAL SKILLS

- Excellent knowledge in the IBC-2006, UBC-1997, BS8110, PCI Handbook, AASHTO LFD & LRFD and ACI-318 design provisions.
 - Excellent knowledge in the SEAOC and FEMA guidelines for Performance-Based Seismic Engineering.
 - Professional in the following software packages: RUAUMOKO3D, SIMQKE, SPECTRA, RESPONSE-2000, SAP2000, SAFE, ETAB, Staad *Pro*, LEAP Software Package (ConBox, ConSpan, RCPier), KingMC, ANDRIANA, Matlab, MathCAD, and AutoCAD.
 - Professional in the following programming languages: VISUAL BASIC, FORTRAN and HTML.
 - Familiar with the following programming languages: ANSI-C and JAVA.
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PUBLICATIONS AND PAPERS

Journal Papers

- **H. M. Dwairi**, M. C. Wagner, M. J. Kowalsky, and Paul Zia (2010). "Behavior of Instrumented Prestressed High Performance Concrete Bridge Girders." *Journal of Construction and Building Materials*, 24(11), pp. 2294-2311.
 - Husam Al-Qablan, **Hazim Dwairi**, Nasim Shatarat, Taleb Rosan and Tamara Al-Qablan (2010). "Stability Analysis of Composite Panels with Stiffeners and Circular Cutouts." *Jordan Journal of Civil Engineering*, 4(2), pp. 119-131.
 - **H. M. Dwairi** and H. M. Duwairi (2010). "On The Vertical Velocity Component Effects on Sound Waves Propagation of a Stationary or Flowing Fluid in a Cylindrical Tube Filled With a Porous Media." *Journal of Porous Media*, 13(3), pp. 249-259
 - Hasan N. Katkhuda, **Hazim M. Dwairi** and Nasim Shatarat (2010). "System Identification of Steel Framed Structures with Semi-rigid Connections." *Structural Engineering and Mechanics*, 34(3), pp. 351-366.
 - Husam Al Qablan, Hasan Katkhuda, and **Hazim Dwairi** (2009). "Assessment of the Buckling Behavior of Square Composite Plates with Circular Cutout Subjected to In-Plane Shear." *Jordan Journal of Civil Engineering*, 3(2), pp. 184-195.
 - Hamzeh M. Duwairi and **Hazim M. Dwairi** (2009). "Propagation of Sound Waves in a Cylindrical Tube Filled with a Porous Media." *Journal of Porous Media*, 12(6), pp. 537-548.
 - Tarek K. Hassan, Hatem M. Seliem, **Hazim Dwairi**, Sami H. Rizkalla and Paul Zia (2008). "Shear Behavior of Large Concrete Beams Reinforced with High-Strength Steel." *ACI Structural Journal*, 105(2), pp. 173-179.
 - **Hazim M. Dwairi** (2008). "Analysis of Nonlinear Isentropic Sound Wave-Propagation in a Cylindrical Tube Filled with Fluid-Saturated Porous Media." *WSEAS Transaction on Fluid Mechanics*.
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3(1), pp. 68–75.

- **Dwairi, H. M.**, Kowalsky, M. J. and Nau, J. M. (2007). "Equivalent Damping in Support of Direct Displacement-based Design." *Journal of Earthquake Engineering* 11, pp. 1–19.
- **Dwairi, H. M.** and Kowalsky, K. J. (2006). "Implementation of Inelastic Displacement Patterns in Direct Displacement-Based Design of Continuous Bridge Structures." *Earthquake Spectra*. 22(3), pp. 631–662.

Conference Proceedings

- **H. M. Dwairi**, (2008). "On the Isentropic Forchheimer's Sound Waves Propagation in a Cylindrical Tube Filled with a Porous Media." *Proceedings of the 1st WSEAS International Conference on Computational Chemistry*, Cairo, Egypt, pages 98-103.
- **H. Dwairi**, M. Dawood, S. Rizkalla, and S. Faza. (2005). "Shear and Flexural Behavior of Concrete Members Reinforced with MMFX Steel." *7th International Conference on Multi-purpose High-rise Towers and Tall Buildings*. Dubai, December 10–11, 9 pages.
- P. Zia, R. A. Nunez, L. A. Mata and **H. M. Dwairi**. (2005). "Implementation of self-consolidating Concrete for Prestressed Concrete Girders," *Seventh International Symposium on the Utilization of High-Strength/High-Performance Concrete*, SP-228(22). Washington DC, June 21 – June 23, pp. 297–316.
- Wight G., **Dwairi H.**, Kowalsky M. and Paul Z. (2004). "Performance of a Historic Prestressed Concrete Block Bridge," *2004 Concrete Bridge Conference*, October 17-20, Atlanta, GA.
- **Dwairi, H. M.** and Kowalsky, M. J. (2004). "Inelastic Displacement Patterns in Support of Displacement-Based Design for Multi-Span Bridges," *13th World Conference on Earthquake Engineering (13WCEE)*, Vancouver, August 1-6. Paper # 231, 14 pages.
- **Dwairi, H. M.**, and Kowalsky, M. J. (2004). "Investigation of Jacobsen's Equivalent Viscous Damping Approach as applied to Displacement-Based Seismic Design", *13th World Conference on Earthquake Engineering (13WCEE)*, Aug. 1-6, Vancouver, Canada Paper # 228, 14 pages.
- **Hazim Dwairi** and Mervyn Kowalsky. (2004). "Investigation of the Equivalent Viscous Damping Approach," *Proceedings of International Workshop: Performance-Based Seismic Design Concepts and Implementation*. Bled, Slovenia. June 28 – July 1. 12 pages.
- Kowalsky, M. J. and **Dwairi, H. M.** (2004). "Review of Parameters Influencing the Seismic Design of Lightweight Concrete Structures," *High-Performance Structural Lightweight Concrete*, ACI International, SP-218(3). pp. 29–50.

Technical Reports

- Seliem, H., Hosny, A., **Dwairi, H.**, and Rizkalla, S., "Shear Behavior of Concrete Beams Reinforced with MMFX Steel without Web Reinforcement." *Technical Report: IS-06-08*, submitted to MMFX Technologies Corporation, North Carolina State University (NCSU), Constructed Facilities Lab (CFL), Raleigh, North Carolina, April 2006.
- **Dwairi, H.**, Rizkalla, S. and Kowalsky, M., "Shear Behavior of Concrete Beams Reinforced with MMFX Steel without Web Reinforcement." *Technical Report: IS-05-04*, submitted to MMFX Technologies Corporation, North Carolina State University (NCSU), Constructed Facilities Lab (CFL), Raleigh, North Carolina, August 2005.
- Kowalsky, M. J., Zia, P., **Dwairi, H. M.**, and Wilson, R. "The Behavior of Prestressed High Performance Concrete Bridge Girders for US Highway 401 over the Neuse River in Wake County, NC." *Technical Report: FHWA/NC/2002-03*, submitted to North Carolina Department of Transportation (NCDOT), Raleigh, NC, August 2003.

PROFESSIONAL AFFILIATION

- Jordan Engineers Association (JEA)
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