

NZGC
CASSETTE
C08-003

CURRICULUM VITAE

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NAME: **BARRY JOHN DAVIDSON (FIPENZ)**
Engineering Director, Compusoft Engineering Ltd.
Senior Lecturer, Department of Civil Engineering,
University of Auckland.

EDUCATION: BE (Hons), PhD

FIELDS OF SPECIAL COMPETENCE:

- Earthquake Engineering/Nonlinear time history Analyses
- Soil/Structure, Fluid/Structure Interaction
- Structural Dynamics/Vibration Control
- Finite Element Stress Analysis / Stability Analysis
- Probabilistic Design

EXPERIENCE:

- 1972-1976 University of Auckland
Department of Theoretical and Applied Mechanics,
Research leading to PhD in Structural Stability using Finite Element Techniques.
- 1976-1978 E.D.S. Nuclear Inc., San Francisco:
Soil-Structure Fluid interaction analyses for offshore structures.
Structural analysis and design of Pipework and pressure vessels for Nuclear Power
Facilities.
- 1979-1988
- 1990-2007 University of Auckland:
Senior Lecturer in the graduate courses Structural Dynamics, Earthquake Engineering,
Structural Analysis and Structural Reliability.
- 1980-1984 Founding Director of Matrix Consulting Ltd, Auckland, New Zealand
- 1989 Senior Manager with IMPELL Inc. Fort Worth, Texas.
Seismic Hazard analyses of Existing Nuclear Power Stations.
- 1990-2007 Engineering Director, Compusoft Engineering Ltd.

Earthquake Engineering:

- Maraetai Dam, Waikato River, (N. Z). Advisor to ECNZ: performing static and seismic analysis of 87m high concrete arch dam to assess structural stability.[19]

- 3D Nonlinear analysis of Mangatawai-iti Bridge “The System Identification of a Nonlinearly Responding Base Isolated Bridge”[5,20]
- Consultant to Buller George Engineers for the proposed added damping solution of the existing Princes Wharf Development (Auckland).[29]
- Seismic design of the tank structure for the Underwater World, Pier 39, San Francisco,(California), 1988, requiring soil/structure and fluid/structure analyses.
- Consultant for many high rise structures in New Zealand.
Performing nonlinear dynamic analyses for such buildings as:
 - Auckland Savings Bank (Auckland) 40 floors
 - Bank of New Zealand (Auckland) 31 floors
 - Coopers Lybrand (Auckland) 42 floors
 - The Majestic Centre (Wellington) 29 floors
- Seismic Retrofit. Performing nonlinear analyses for typical under reinforced structures and supporting retrofit schemes.
 - Feltex House (Wellington)
 - Civic Theatre (Auckland)
 - St James Theatre (Auckland)
 - Parnell Library (Auckland)

Structural Dynamics / Vibration Control:

- Design, testing, and analysis of added damping mechanisms for Aotea Centre Staircases (Auckland).[8]
- Measurements and calculation of damping from wind induced vibrations in mast of Auckland Skytower.[31]
- Vibration sensitivity analysis for pedestrians for Ewen Bridge (Wellington)
- Investigation on vibration reduction for the Roller Mill at Portland Cement Works (Whangarei)
- Support for design of pedestals and foundations for turbo machinery at a number of power stations and co generation facilities. Examples are Geothermal Power Stations at Kamojang (Indonesia) and Poihipi (New Zealand) and the Te Rapa (NZ) Dairy Company.
- Floor vibration sensitivity analysis for Tasman Pulp and Paper, to determine Building Foundation Properties.
- Determination of vibration properties of low rise structures resulting from quarry blast loading.
- Design of Liquid Tuned Dampers for “Harbour Residences”, 38 Floor Apartment Building, Auckland.

Stress Analysis:

- Development of software for Design checking of Transmission Towers for Fredderick Sheppard & Partners.
- Stress and Vibration analysis of the 4MW Diffuser Augmented Wind Turbine for Vortec Energy Ltd.
- Stress analysis of Francis turbine for ECNZ
- Stability and Fatigue Analysis of mooring struts for floating nuclear power plant for Public Service Electric and Gas of New Jersey

Probabilistic Design:

- Seismic Hazard Analysis of Arkansas Nuclear I Power Station for Arkansas Power and Light
- Member of Probabilistic Design Committee of New Zealand Standards Association, 1980-1987

Structural Stability:

- Consultant to Fletcher Brownbuilt for the stability analysis of thin-walled purlin sections and the development of safe-load tables for these sections.
- Consultant to Bruce Wallace Partners on stability of drive-in racking systems.

Engineering Software :

SAP2000, ETABS, DRAIN2D, ANSR3, NASTRAN, AUTOPIPE, ANSYS, ADINA

MEMBERSHIPS:

Present:

Member, Dept Building and Housing, "*Structural Advisory Panel*"
 Member, Management Committee, SESOC.
 Member of the Building Research Advisory Council.

Past:

President, the New Zealand Structural Engineering Society (SESOC)
 Member, IPENZ "*Structural Task Force*"
 Convenor for the NZNSEE study group for "*The Seismic Design of Industrial Plant*"
 Member of NZNSEE study group for the "*Seismic Design of Storage Tanks*"
 Member of NZNSEE "Dynamic analysis Advisory Committee"
 Member of SANZ "Probabilistic Design Committee"
 Member of NZNSEE Management Committee
 Member of Auckland Structural Group Management Committee
 Member of NZNSEE "*12th World conference for Earthquake Engineering*"
 Organising Committee. Auckland (NZ) Feb 2000.

SELECTED PAPERS:

Dr. Davidson is author of over 70 technical papers.
 The following are selected to illustrate his range of interests.

1. "A Finite element Approach to Stability Analysis in Frames (including warping effects)" Proc. Of 1974. Int. Conf. On Finite Element Methods in Engineering, Sydney, Australia.
2. "Seismic Design of Storage Tanks", Bull. Of NZ Nat. Soc. For Earthquake Engineering Vol. 19, No.4, Dec. 1986
3. "Moment Redistribution in Seismic Resistant concrete Frames", Pacific conference on Earthquake Engineering, Aug. 1987
4. Research into the Response of a Base-Isolated Bridge", Japan-NZ Workshop on Base Isolation of Bridges, Nov. 1987
5. "Comparative Analyses of a Multi-storey Frame and Wall using the Current and Draft Loadings code", Bull. Of the NZ Nat. Soc. For E.E., Dec. 1989
6. "Dynamic Field Testing of Highway Bridges using Simulated Earthquake Loads", Bridge Design and Research Seminar 1990 ChCh, Vol. 5 of RRU Bull., 1984
7. "Dynamic Absorbers for a Vibrating Staircase", IPENZ Conf. Feb. 1991, Auckland
8. "P-delta Actions in Seismic Resistant Structures", Bull. Of the NZ Nat. Soc. for E.E.
9. "Methods of Analysis for the Design of Multi-storey Structures", Pacific conference on Earthquake Engineering, Nov. 1991
10. "P-delta Effects in Multi-storey Structural Design", 10th World Conference on Earthquake Engineering, Madrid, Spain July 1992
11. "Elongation in Ductile Seismic Resistant Reinforced concrete Frames", Tom Paulay Symposium, San Diego, California Sept, 1993
12. "The Influence of Different Hysteretic Forms on Seismic P-delta Effects", Second Int. Workshop on the Seismic Design of Bridges, Aug. 1994
13. "A Methodology for Calculating the Optimal Bilinear Seismic Isolation System", Technical conference of the New Zealand National society for Earthquake Engineering, April 1995
14. "Factors influencing the slosh-wave height in Broad Liquid Storage Tanks", NZNSEE Technical Conf. Wairakei
15. A., "The influence of slabs on elongation in ductile seismic resistant frame", Proceedings NZNSEE Tech. Conf. April 1995, pp36-43
16. "The Seismic behaviour of concrete arch dams", Technical Conference and AGM, NZNSEE, March, 1995.
17. "System identification of in-situ properties of a base isolated bridge", Proceedings Pacific Conference on Earthquake Engineering, Melbourne, November 1995.
18. "P-delta effects in ductile seismic resistant structures", Proceedings Pacific Conference on Earthquake Engineering, Melbourne, November 1995, Vol.1, pp297-308
19. "Modelling reinforced concrete plastic hinges" Proceedings 11th World Conference on Earthquake Engineering, Acapulco, Mexico, 1996, pp8.
20. "Cyclic performance of nominally reinforced masonry walls", Proceedings NZNSEE Technical Conference, New Plymouth, March 1996.
21. "Response identification of the Pacoima dam in the 1994 Northridge earthquake", Proceedings 11th World Conference on Earthquake Engineering, Acapulco, Mexico, 1996.
22. "In-plane cyclic loading of nominally reinforced masonry walls with openings", NZ Concrete Soc. Conference. Oct. 1996 Wairakei.
23. "Ductility demands for reversing and unidirectional plastic hinges", Proceedings NZNSEE Technical Conference, Mar. 1997, pp 190-197
24. "Factors influencing the slosh wave height in broad storage tanks", Proceedings NZNSEE Technical Conference, Mar. 1997.
25. "A comparison of force and displacement based design", Proceedings NZNSEE Technical Conference, Mar. 1998, pp 67 - 74.
26. "The implementation of seismic isolation in the retrofit of a large wharf", Asia - Pacific workshop on seismic design and retrofit of structures, Taipei, Taiwan, August 1998.
27. "Development of an in-situ concrete composite flooring system using a roll formed beam section", Australasian Structural Conference, Auckland, 30th. Sept. to 2nd. Oct. 1998.
28. "The calculation of modal damping in the mast of the Sky Tower", Australasian Structural Conference, Auckland, 30th. Sept. to 2nd. Oct. 1998.
29. "Seismic evaluation of an unreinforced masonry building", *Proc. NZNSEE Technical Conference and AGM, Wairakei, Taupo, 27-29 March 1998.*

30. 'The re-analysis of the base isolated William Clayton Building to near source earthquakes', *Proc. NZNSEE Technical Conference and AGM, Wairakei, Taupo, 27-29 March 1998*, 197-203.
31. "A comparison of seismic design actions in the Eurocode 8, Uniform Building Code and the New Zealand Loadings Standard", Australasian Structural Conference, Auckland, 30th. Sept. to 2nd. Oct. 1998, Vol.1, pp411-418.
35. "Displacement Focussed Force Based Design", Proceedings Australasian Structural Engineering Conference, April. 2001. pp 223-229
36. "Evaluation of Earthquake Risk Buildings with Masonry Infill Panels", Proceedings NZSEE Technical Conference, Mar. 2001. pp4.02.1-4.02.8
37. "Testing and Codification of Partially Grout-filled Nominally-reinforced Concrete Masonry Subjected to In-plane Cyclic Loads", The Masonry Society Professional Journal. Vol 19 No. 1 Sept 2001.
38. Carden, L. P., Davidson B. J., Larkin T. J., and Buckle, I. G., "Retrofit of Seismically Isolated Structures for Near-field Ground Motion using Additional Viscous Damping", Bull. NZSEE, Vol. 38, No. 2 June 2005 pp 106 – 118.