Curriculum Vitae

DESMOND KENNETH BULL

BORN

Wellington, New Zealand, 1958

QUALIFICATIONS

Master of Engineering (Civil), University of Canterbury, 1984

Bachelor of Engineering (Civil), University of Canterbury, 1981

SPECIALISATION

Structural design of reinforced concrete structures (buildings, bridges and wharves), with a strong background in earthquake engineering, investigation and research. Sub-groups of activities in this area of specialisation include:

- Conceptual analysis & design of all types of building structures
- Seismic assessment and retrofit
- Precast concrete design & detailing
- Evaluation of the performance of concrete in a wide range of applications and environments
- Developing practical mitigation of the unique problems facing concrete structures in service
- Education and research development in applied engineering science, emphasising application of engineering theory in practice.

CURRENT OCCUPATION

Holcim Adjunct Professor in Concrete Design, Department of Civil Engineering, University of Canterbury, Christchurch.

Technical Director and Shareholder - Holmes Consulting Group, Civil and Structural Engineers, Christchurch.

Director and Shareholder - Holmes Solutions Ltd, Christchurch

PROFESSIONAL STATUS

Fellow of the Institution of Professional Engineers New Zealand

- Civil and Structural Practice Colleges

Chartered Professional Engineer, New Zealand

Past President - New Zealand Concrete Society

Member - Structural Engineering Society New Zealand

Member - New Zealand National Society for Earthquake Engineering

Member - New Zealand Concrete Society

PROFESSIONAL AWARDS

New Zealand Society for Earthquake Engineering Inc.
2004 Otto Glogau Award.

Institution of Professional Engineers New Zealand
Professional Commitment Award, 2004.

New Zealand Concrete Society
Sandy Cormack Award, 2002, most innovative and original paper, NZ Concrete Society Annual Conference.

Institution of Professional Engineers New Zealand
Freyssinet Award, 1997, for the Best Paper published on Reinforced Concrete Research in IPENZ publications in the preceding year.

American Prestressed Concrete Institute
"Martin P. Korn" Award, 1986, for contributing research for the advancement of prestressed concrete.

TEACHING ACTIVITIES at the UNIVERSITY OF CANTERBURY

- Co-lecturer of the final year (3rd Pro) "Reinforced Concrete" course (1993 – 2005) and "Academic-in-charge" of the course (1994-1999, 2003-present).
- Masters of Engineering "Structural Concrete" course: co-lecturer (1993-1998) and "Academic-in-charge" (1997-1999).
- Co-lecturer for the Masters of Engineering "Bridge Design" course (1993-1997)
- Co-lecturer for the 3rd Pro "Structural Concepts/Systems" course (1994-2008).
- Lecturer of the 2nd Pro "Engineering Materials: concrete section" (1993-1996).

RESEARCH ACTIVITIES at the UNIVERSITY OF CANTERBURY

- Postgraduate research programmes as primary supervisor include:
  - Evaluation of concrete floors acting as diaphragms (1994- continuing).
  - Instability of thin wall panels subjected to gravity and in-plane seismic forces (1996-1999, continuing).
  - Performance of partially filled concrete masonry walls subjected to out-of-plane face loading (1997, 1998).
  - Ductility evaluation of light weight aggregate concrete (1997-2001).
  - "Gravity" or "secondary" frames subjected to seismic loading (1995-1996).

- Postgraduate research programmes as secondary supervisor include:
  - Retrofit of Existing Structures, Post 1975, Subjected to Seismic Attack (2004, continuing).
  - Performance of partially filled concrete masonry walls subjected to out-of-plane face loading (1997, 1998).
  - Interaction of foundations and buildings and associated design methodologies (1998-2000).
  - Reinforced concrete beams elongation during earthquakes (2007- 2010).
  - Ponding together of structures during earthquakes (2007 – present).

- Supervision of Postgraduate Students
  - 17 Masters of Engineering graduates (including six who received "ME with Distinction") as primary supervisor.
  - 2 PhD graduates as primary supervisor
  - 3 ME and 2 PhD students for 2009/2010/2011 as primary supervisor

- 4 PhD students as Co- or Associate supervisor
- Supporting role for four postgraduate students and thesis examiner at the Department of Civil and Resource Engineering, University of Auckland

- Research Funding (the last ten years)
  - Co-objective Leader for $1.5 million FRST Existing Building programme (2004-2010) with Dr Pampanin (UoC) and Dr Ingham (UoA)
  - Co-objective Leader for $3.0 million FRST Future Building programme (2004-2010) with Dr Pampanin (UoC)
  - Directly negotiated with various groups in the construction industry
    - $85,000 in grants that go to the students
    - $240,000 of funds towards the costs of materials for the laboratory research programmes.
  - In association with other academics at the Department funds have been secured from:
    - Departmental grants
    - Earthquake Commission
    - Foundation for Research, Science and Technology
    - Graduate Research and Industry Fund
      - The aggregate sum for these aspects is in the order of $250,000.

- Personal Research
  - Development of a new form of building construction based on avoiding all structural damage during a major earthquake.
  - Development of refined design methods for transferring seismic forces through buildings (diaphragm design).
  - Development of new design guidelines for the use of 500 MPa reinforcing steel in New Zealand construction.

- Collaborative Research and Development with
  - Professor R Park University of Canterbury
  - Professor T Paulay University of Canterbury
  - Professor N Cooke University of Canterbury
  - Dr S Pampanin University of Canterbury
  - Dr K McManus University of Canterbury
  - Dr A Carr University of Canterbury
  - Dr Bruce Deam University of Canterbury
  - Dr Rajesh Dhakal University of Canterbury
  - Professor J Mander University of Canterbury
  - Professor R Fenwick University of Auckland/Canterbury
  - Dr Jason Ingham University of Auckland
  - Dr J Restrepo University of Canterbury
  - Dr B Davidson University of Auckland
  - Professor J Stanton University of Washington, Seattle, USA
  - L McSaveney Golden Bay Cement Company Ltd
  - A Wilton Wilton Joubert Ltd
  - D Chisholm Building Research Association of NZ
  - A King Building Research Association of NZ
  - D Barnard Cement & Concrete Association of NZ
  - R Kotzé Cement & Concrete Association of NZ
  - Dene Cook Cement & Concrete Association of NZ

OTHER PROFESSIONAL ACTIVITIES

- Reviewer/consultant of Draft Standard for Concrete Structures Design Standard DZ 3101:2006.
- Member of the Standards Association NZ Committee for AS/NZS 1170.5: Earthquakes (2000-2006).
- Past Chair of the Standards Association NZ Review Committee for NZS 3101: Design of Concrete Structures.
- Deputy chair of the Standards Association NZ Review Committee for NZS 3101: Design of Concrete Structures. This Code was published in 1995. In this role, produced a new section for the Code on the "Design of structures of Limited Ductility", as well a making contributions to six other sections of the Code. Facilitator and a contributor to Amendment No.1 (1998) of NZS 3101:1995.
- Consultant on two Joint Standards between Australia and New Zealand.
    - Production of Reinforcing and Prestressing Steel
    - Loadings Standard: seismic loads
- Member of the Research Panel for the Earthquake Commission (EQC) – 2003, 2005 & 2007.
- Senior Trainer for Rescue Engineering for Urban Search and Rescue Task Forces, Ministry of Civil Defence and Emergency Management and the NZ Fire Service (1997 – present)
- Senior Structural Engineer for NZUSAR Task Force 2, NZ Fire Service (Christchurch 2003 - present).
- Editor and contributing author for the Second Edition of the "Guidelines for the Use of Structural Precast Concrete in Buildings", published by the Centre for Advanced Engineering, Christchurch, (1999).
- Co-author and co-editor for the "Examples of Concrete Structural Design to NZS 3101:1995", published by the Cement & Concrete Association of NZ, in association with the NZ Concrete Society, (1998).
- Co-editor of the "New Zealand Reinforced Concrete Design Handbook"(1992). Design aids and guidelines for the design of concrete beams and columns, published by the Cement & Concrete Association of NZ.
- Co-editor of the "New Zealand Concrete Masonry Manual"(1990). Design aids, guidelines and specifications for the design and construction of concrete masonry buildings, published by the New Zealand Concrete Masonry Association.
- Past-Editor of the Journal of the Structural Engineering Society New Zealand.
- Member of the Reconnaissance Team of the NZ National Society for Earthquake Engineering to go to Los Angeles after the Northridge Earthquake of January 17, 1994. His contribution to the reconnaissance and subsequent report was in the fields of commercial buildings and highway bridge structures.
- Co-ordinator of the South Island-based Reconnaissance Teams for the NZ National Society for Earthquake Engineering.
- Secretary of WG3/Seismic Design of Prefabricated Concrete Buildings, of the International Federation for Structural Concrete (fib), Commission 7 on Seismic Design, and invited member of WG4/P: Seismic Design of Prestressed Concrete Buildings, Commission 7, fib.

- US -Japan-New Zealand-Australia Seminars on "Structural Performance of High Strength Concrete in Seismic Regions". Invited member and presenter of the working group - Kyoto, 1993 and Hawaii, 1994. A Special Publication for the American Institute of Concrete was produced in 1998 as a result of the working group activities: "SP-176: High-Strength Concrete in Seismic Regions". Contribution of two papers to this publication.

- Invited member of the Second International Workshop on "Seismic Design of Retrofitting of Reinforced Concrete Bridges", Queenstown, New Zealand, 1994.

- Concept input and peer review of Digest No.17: "Seismic Detailing for Reinforced Concrete in Australia", produced by the Steel Reinforcement Institute of Australia.

- School of Architecture, Victoria University: invited "structural engineering practitioner" to the Structural Aspects course, final year, Bachelor of Architecture course, for four years, while resident in Wellington.

- Department of Civil and Resource Engineering, University of Auckland: presented a course in design of commercial and domestic masonry structures for the final year B.E. course in 1994.

- Reviewer for FoRST applications in the area of the design of concrete structures.

- Major Seminars and Conferences within New Zealand and Australia: **Invited Presenter/Author**

  - "Red Book" Seminars (2008): "Examples of Concrete Structural Design to NZS 3101:2006" NZ Concrete Society.
    - D. Bull, R. Fenwick and D. Cook
    - Wellington, Christchurch and Auckland

  - *Australian Society For Earthquake Engineering* Conference, Albury, Australia, 2005,
    - Paper in *Proceedings*, "Earthquake Engineering in Regions of Low-Moderate Seismicity".

  - *1855 Wairarapa Earthquake Symposium*, Wellington, New Zealand, 2005
    - Paper in *Proceedings*, "Issues Associated with the Design & Construction of New Buildings".

  - *IPENZ Convention 2005, Auckland*, New Zealand, 2005
    - Paper in *Proceedings, Special Structural Session,* "Seismic Issues for Suspended Floors".

  - "New Zealand Fire Service: Urban Rescue Technician Programme" (1995, 2001-2009)
    - Senior Instructor for Engineering in Urban Search and Rescue: invited lecturer to the pilot programme held at Linton Military Camp, Palmerston North. Input on the likely damage scenarios and hazards of typical NZ structures following a major earthquake. This presentation was done in support of Los Angeles City Fire Department urban rescue instructors who were brought to New Zealand to facilitate the course. This course has been run 4 times now.

  - "Urban Search and Rescue. Level 1 and Level 2 Engineering" (2003-2010)
    - In conjunction with D R Brunsdon, developed and presented the Level 1 course in 2003, 2004, 2005(2) and 2007. Level 2 was developed and presented in October 2004, Adelaide in February 2005 and Melbourne in July 2007. Combined Level 1 and 2 course Christchurch March 2009. These courses are aimed structural engineers to support rescue efforts across a range of emergency situations.

- "Precast Concrete Design Seminar", May 2005
  Cement & Concrete Association of NZ & Precast NZ
  - D. Bull, D. Cook, K. Norgate, A. Smith and C. Giddens
  - Wellington, Christchurch and Auckland

- "Symposium to Celebrate the Lifetime Contributions of Tom Paulay and Bob Park": July 2003 Christchurch.
  - 11 presenters including Des Bull, "Understanding the Complexities of designing Diaphragms in Buildings for Earthquakes", p25.

- Australian Consulting Structural Engineers of New South Wales, Annual Seminar, August 2003, "Will the Earth move for You under the New Earthquake Code?", Sydney.
  - Des Bull, Richard Weller, Simon Matthews and Rod Johnston.

- "Concrete for Engineers" Seminars (1999)
  Allied Concrete Ltd./ NZ Concrete Society/ Cement & Concrete Assoc. of NZ.
  - D. Bull, D. Barnard, L. Gaerty, J. Shaw and A. Dallas
  - Wellington, Christchurch and Auckland

- "Red Book" Seminars (1998): "Examples of Concrete Structural Design to NZS 3101:1995"
  NZ Concrete Society/ Cement & Concrete Association of NZ.
  - D. Bull, D. Brunsdon and R. Kotzé
  - Wellington, Christchurch and Auckland

- "Seismic Design of Reinforced Concrete Structures" – Seminar on the principles of design:
  NZ Concrete Society.
  - Prof. R. Park , Prof. T. Paulay and D. Bull
  - Wellington, 1997

- "Lessons from the Northridge, Los Angeles Earthquake, 1994"- seminar series by members of the NZ Reconnaissance Team, NZ National Society for Earthquake Engineering.
  - D. Bull, A. King, G. McVerry, J. Norton and T. Larkin.
  - Wellington, Christchurch, Dunedin, Palmerston North and Auckland

- "Revisions to the New Zealand Standard for the Design of Concrete Structures, NZS 3101" Seminars (1994)
  - Prof. R. Park , Prof. T. Paulay , D. Bull and L. McSaveney
  - Wellington, Christchurch and Auckland

- "Designing to the non-specific Masonry Design Standard: NZS 4229:1986" – course presented for training of polytechnic tutors.
  - D. Bull and D. Barnard
  - Wellington, Hamilton and Auckland

- Member of four regional conference organising committees (NZ Concrete Society) and for two international conferences (NZ Concrete Society /C&CA NZ and ACI/CANMET).

WORK EXPERIENCE

November 1996 - present

Technical Director and Shareholder, Holmes Consulting Group Ltd
Civil and Structural Engineers, Christchurch

Mr Bull's work with the Holmes Consulting Group involves matters relating to structural design with an emphasis on concrete structures (commercial buildings, bridges and wharves) and the performance of concrete materials in a variety of environments and in-service conditions. Parts of his duties involve marketing and development of structural engineering services for the company.

As part of these activities, he reviews of a number of alternative building products and innovations in design and construction applications. These reviews were to determine whether these methods and materials were "fit for purpose" in terms of strength, life safety, durability and achieving of the performance promised by the suppliers/manufacturers. Such products included imported reinforcing bars, new grades of reinforcement, ductile cold-drawn wire meshes, fibre reinforced concrete, prestressed slabs-on-grade, cement-based grouting systems, reinforcing bar connectors and new precast concrete members (buildings and bridges).

Holmes Consulting Group projects that have required his specialist input on structural engineering or concrete materials technology, either at concept stage, under peer review or during construction include:

- Aotea Civic Car Park Building, Auckland
- Hyatt Regency, Auckland
- Christchurch Art Gallery, Christchurch
- Christchurch Women's Hospital, Christchurch
- PJK Bridges, Tauranga
- Britomart project, Auckland
- Metropolis, Auckland
- Hobson Bay Sewer, Auckland
- Scenic Circle Hotels, Napier and Queenstown
- Hanmer Pools
- Pioneer Pool & Leisure Centre, Christchurch
- QE II Pool, Christchurch
- Centra Hotel, Auckland
- Woolworths Distribution Centre, Christchurch
- Shakespeare Bay Wharf, Picton
- NZ Post Distribution Centre, Hamilton
- CHH Packaging, Christchurch
- Ngawha Geothermal Power Station, Kaikohe
- ALX Blocks, Christchurch Polytechnic
- 1 Rapahoe Bridge

March 1993 - to the present

Holcim Adjunct Professor in Concrete Design (2003 & to the present)
Adjunct Senior Fellow (2000 - 2003)
Cement & Concrete Association Fellow (1993-1999)
Department of Civil & Natural Resources Engineering, University of Canterbury

As part of the duties at the Department of Civil and Natural Resources Engineering , Mr Bull firstly held the position of the Cement & Concrete Association Fellow and subsequently, Adjunct Senior Fellow and then Holcim Adjunct Professor, at the Department of Civil Engineering, University of Canterbury. The

duties of this position include lecturing to undergraduates and postgraduates in the fields of concrete design (buildings and bridges) and concrete material technology.

Mr Bull is responsible for initiating and supervising certain research programmes in structural concrete at the Department. This research includes: evaluation of concrete floors acting as diaphragms, "gravity" or "secondary" frames subjected to seismic loading, the instability of thin wall panels subjected to gravity and in-plane seismic forces, performance of partially filled concrete masonry walls subjected to out-of-plane face loading and the ductility evaluation of light weight aggregate concrete.

August 2001 - present

Director - Shareholder, Holmes Solutions Ltd
Prototype Design and Manufacture, Christchurch

The main objective of Holmes Solutions is to capture and focus the intellectual and creative capacity within Holmes Group and for external clients, leading to the development and commercialisation of innovative products for the engineering industry in New Zealand and overseas.

Holmes Solutions undertakes research, feasibility studies and prototype design for some 55 clients from such diverse fields as the School of Medicine, Christchurch, Allied Concrete, Fletcher Challenge Steel and Wire, University of Mexico and Saatchi and Saatchi. Areas of industry that Holmes Solutions activities encompass include research providers, heavy industrial product manufacturers, medicine, horticulture, transportation engineering, structural engineering, concrete product manufacture, to name a few.

March 1989 - February 1993

National Structural Engineer, Cement & Concrete Association of New Zealand
Wellington

As the National Structural Engineer for the C & CA, the duties of this position included:

- Technical advice on concrete/masonry building design including representation as required upon SANZ or other Committees. As a member of the Review Committee of NZS 3101, Mr Bull was responsible for producing the section on limited ductility structures and assisting in other areas.
- Production of technical information and literature for the design sector of the building industry. Mr Bull was co-compiler of the current "NZ Reinforced Concrete Design Handbook" and he was responsible for C&CA computer software updating and promotion/sales. Mr Bull was involved in updating certain sections of the "Concrete Masonry Manual". Mr Bull produced an economic/structural evaluation on various structural types of a typical 10-storey building and papers on the applications of High Strength Concrete.
- Presentation of technical papers at Seminars and Training Courses. Mr Bull has produced and presented papers at NZ Concrete Society Conferences and for IPENZ.
- Mr Bull had assisted at the School of Architecture for four years, offering a practising Structural Engineer's perspective to a final year course. He was involved in giving courses on masonry design in conjunction with the Building Research Association of NZ (BRANZ), at a number of polytechnics.
- Responsibility for research and development programmes on Structural Engineering matters for the Cement & Concrete Association or for other outside agencies.
- Maintain liaison with Government and consulting/design organisations as appropriate for the cement and concrete industry activities.
- Maintain and develop an understanding of structural development in materials such as structural steel and timber.

March 1986 - February 1989

Project Engineer, Smith Leuchars Ltd
Civil and Structural Engineers, Wellington.

Mr Bull in the position of Project Engineer had specialised in the design and construction of multi-storey structures. Other areas of experience include the design of commercial and light industrial structures as well as the strengthening for seismic considerations or modified use of existing buildings. He had headed design teams for the TAB Head Office, Petone (5 storeys) and 212 Willis Street, Wellington (14 storeys).

Mr Bull was responsible for the structural design of 35 Johnston Street (14 storeys), the seismic shear wall of the CPO redevelopment ((The Park Royal, 22 storeys). He has acted as technical adviser/designer for the Wakesfield Centre, Mid City, and UDC Tower, all of Wellington. Mr Bull was Supervising Engineer on the sites of Norwich Stage II, UDC Tower and TAB Head Office.

March 1984 - February 1986

Design Engineer, Beca Carter Hollings and Ferner Ltd
Civil and Structural Engineers, Wellington.

Duties included the design of the raft foundation of the No. 5 Recovery Boiler at Kinleith. A major portion of his experience was on the design of the superstructures of two railway viaducts of the Ohakune - Horopito Deviation. Through Mr Bull's previous bridging experience he developed the design methodology for the segmentally cast, post-tensioned concrete spans of the Hapuawhenua and Taonui Bridges (the Hapuawhenua Bridge was the recipient of the 1988 Prestressed Concrete Award of the New Zealand Concrete Society). Mr Bull then became the supervising engineer for the bridge construction project, liasing directly with local and Head Office staff of the New Zealand Railways Corporation (the Client).

March 1983 - February 1984

Post Graduate Studies, Department of Civil Engineering, University of Canterbury

As part of a Master of Engineering degree Mr Bull selected an area of research that he believed could contribute to the construction industry. After developing a research programme Mr Bull designed, constructed and tested three full-size concrete beam-column joint assemblies. The emphasis of the research was the investigation of the seismic resistance of reinforced concrete frames incorporating precast prestressed concrete beam shells.

In 1987, Mr Bull was joint recipient, with Professor R Park, of the Martin P Korn Award of the American Prestressed Concrete Institute for a paper on the results of the above research. The paper was specially commended for its merit as a contribution to the advancement of precast and prestressed concrete.

February 1981 - February 1983

Design Engineer, New Zealand Railways Corporation
Wellington

Mr Bull was responsible for the strengthening and refurbishment of numerous railway bridges and he undertook new designs of ballast deck prestressed rail bridges.

PUBLICATIONS

Refereed Journals

Cole, G. L., Dhakal, R. P., Carr, A. J. and Bull, D. K. (2010). "Interbuilding pounding damage observed in the 2010 Darfield earthquake." *Bulletin of the New Zealand Society for Earthquake Engineering* **43**(4): 382 - 386.

Fenwick, R.C., and Bull, D.K., "Potential Failure Modes Associated with Hollow-Core Floors and Seismic Actions", *Journal of the Structural Engineering Society of NZ,* Vol.23 No.1, April 2010, 12pp.

Hare, H.J., Fenwick, R.C., Bull, D.K. and Built, R., "Precast Double Tees Support Systems", *Journal of the Structural Engineering Society of NZ,* Vol.22 No.1, April 2009, 36pp.

Marriott, D.J., Pampanin, S., Bull, D. & Palermo, A., "Dynamic Testing of Precast, Post-Tensioned Rocking Wall Systems with Alternative Dissipating Solutions", *Journal of the Structural Engineering Society of NZ,* Vol.41 No. 2, June 2008, 14 pp.

MacPherson, C.J., Mander, J.B. & Bull, D. K., "Reinforced Concrete Seating Details of Hollowcore Floor Systems", *Journal of the Structural Engineering Society of NZ,* Vol.18 No.1, September 2005, 9 pp.

Bull, D.K., "Understanding the Complexities of designing Diaphragms in Buildings for Earthquakes", *Bulletin of NZ Society for Earthquake Engineering*, Vol. 37, No. 2, June 2004.

Fenwick, R., Deam, B. & Bull, D. K., "Failure Modes for Hollowcore Flooring Units", *Journal of the Structural Engineering Society of NZ,* Vol.17 No.1, April 2004, 19 pp.

Bull, D. K. & Allington, C. J., "L, N and E Grade 500 Reinforcing Steel", *Journal of the Structural Engineering Society of NZ,* Vol.15 No.1, September 2002, 5 pp.

Fenwick, R., Hunt, R. & Bull, D. K., "Stiffness of Structural Walls for Seismic Design", *Journal of the Structural Engineering Society of NZ,* Vol.14 No.2, September 2001, 13 pp.

Zhang, X., Singh, S.S., Cooke, N. & Bull, D.K. "The Effects of Openings on the Out-of-plane Performance of Partially Grouted Concrete Masonry Walls", *Journal of Structural* Engineering, v127no1, 2001: 51-7.

Fenwick, R. & Bull, D. K., "What is the Stiffness of Reinforced Concrete Walls?", *Journal of the Structural Engineering Society of NZ,* Vol.13 No.2, September 2000, 10 pp.

Singh, S.S., Cooke, N. & Bull, D.K. "Out-of-plane performance of a partially filled reinforced concrete masonry wall with Ribraft floor", *Bulletin of the New Zealand National Society for Earthquake Engineering*, v32no2, June 1999: 90–101.

Bull, D. K., "Slenderness of Concrete Walls: NZS 3101:1995: Requirements", *Journal of the Structural Engineering Society of NZ,* Vol.11 No.1, April 1998, 2 pp.

Bull, D. K., "Reinforcing Steel: Compliance with NZS 3402:1989", *Journal of the New Zealand Structural Engineering Society,* Vol.10 No.1, June 1997, pp. 54-57.

Bull, D. K., "Design Concepts and Applications of High Strength Concrete in New Zealand", *Special Publication of the American Institute of Concrete,* 1997, SP176.

Bull, D. K., "Bond and Anchorage of Reinforcement in Concrete- New Zealand Code Provisions", *Special Publication of the American Institute of Concrete,* 1997, SP176.

Bull, D. K., et al., "Northridge Earthquake Reconnaissance Report", *Bulletin of the New Zealand National Society for Earthquake Engineering,* Vol.27 No. 4, Dec. 1994, pp.235-344.

Bull, D. K., "Seismic Provisions for the Design of Structural Elements of Limited Ductility", *Journal of the New Zealand Structural Engineering Society,* Vol.7 No.1, June 1994, pp. 30-43.

Bull, D. K., "Concrete: GRC Permanent Formwork", *Journal of the New Zealand Structural Engineering Society,* Vol.5 No.1, June 1992, 5 pp.

Bull, D. K. and Park R., "Seismic Resistance of Frames Incorporating Precast Prestressed Concrete Beam Shells", *Journal of the Prestressed Concrete Institute,* Vol.31 No. 4, 1986, pp.54-93.

Bull, D. K. and Park R., "Behaviour of Cast In Situ Reinforced Concrete Frames Incorporating Precast Prestressed Concrete Beam Shells Subjected to Seismic Loading", *Bulletin of the New Zealand National Society for Earthquake Engineering,* Vol.17 No. 4, Dec. 1984, pp.223-250.

Other Refereed Publications

Fenwick, R.C., Bull, D.K. and Gardiner, D., 2010, "Assessment of hollow-core floors Seismic performance", Research Report 2010-02, Department of Civil and Natural Resources Engineering, University of Canterbury.

Bull, D. K. and Brook, R. (editors), "Examples of Concrete Structural Design to New Zealand Standard NZS 3101:2006", *Cement & Concrete Association of NZ,* Wellington, New Zealand, 2008, 170 pp.

Bull, D. K., "Suspended Floors and Diaphragm Action", in *Proceedings, "Precast Concrete Design Seminar",* Cement & Concrete Association of NZ & Precast NZ, Wellington, May 2005

Bull, D. K., "Shell Beams", in *Proceedings, "Precast Concrete Design Seminar",* Cement & Concrete Association of NZ & Precast NZ, Wellington, May 2005.

Bull, D. K. and Brunsdon, D. R., "Level 2 USAR Engineer: *Operating within the perimeter of the site*", Student Manual, *New Zealand Urban Search and Rescue,* Wellington, New Zealand, 2004, 100 pp.

Brunsdon, D. R. and Bull, D. K., "Level 1 USAR Engineer: *Operating on the perimeter of the site*", Student Manual, *New Zealand Urban Search and Rescue,* Wellington, New Zealand, 2003-2004, 64 pp.

Contributing author, Bulletin 27, "Seismic Design of Precast Concrete Building Structures", *State-of-art Report, Task Group 7.3, International Federation for Structural Concrete (fib),* Lausanne, Switzerland, Oct 2003, 254 pp.

Bull, D.K., "Understanding the Complexities of designing Diaphragms in Buildings for Earthquakes", *Symposium to Celebrate the Lifetime Contributions of Tom Paulay and Bob Park*: July 2003 Christchurch: p25.

Bull, D.K. and Matthews, J.G, 2003, "Proof of Concept Tests for Hollow-core Floor Unit Connections", Report for Precast NZ Inc, *Research Report 2003-01, Department of Civil Engineering, University of Canterbury*, Christchurch, New Zealand.

Simmons, P. W. and Bull, D.K., "The Safety of Single Storey Straight Stairflights with Mid-height Landings under Simulated Seismic Displacements", *Research Report 2000-09, Department of Civil Engineering, University of Canterbury,* Christchurch, New Zealand, 2000, 293 pp.

Bull, D.K. (ed. & co-author), Guidelines for the use of structural precast concrete in buildings. *NZ Concrete Soc. & NZ Nat. Soc. for Earthquake Engineering*, Centre for Advanced Engineering, 2d ed., 1999: 174p.

Contributing author, SP-176, "High-Strength Concrete in Seismic Regions", Special Publication, American Institute of Concrete, 1998, 471 pp.

Allington, C., Bull, D. K. and Park, R., "Ductile Response of High Strength Lightweight Aggregate Concrete Columns under Uniaxial Compression", *Research Report 98/1, Department of Civil Engineering, University of Canterbury, Christchurch, New Zealand,* 1998, 298 pp.

Bull, D. K. and Brunsdon, D. R. (editors), "Examples of Concrete Structural Design to New Zealand Standard NZS 3101:1995", *Cement & Concrete Association of NZ and NZ Concrete Society,* Wellington, New Zealand, 1998, 425 pp.

Park, R., Paulay, T. and Bull, D. K., "Seismic Design of Reinforced Concrete Structures", *Technical Report No. 20, New Zealand Concrete Society*, Oct. 1997, 135 pp.

Park, A.R.C. and Bull D.K, "Precast reinforced concrete frames with beams supported on column corbels subjected to simulated seismic displacements", *Research Report 96/16*, *Department of Civil Engineering, University of Canterbury,* Christchurch, New Zealand, 1996.

Elliott, D.A. and Bull D.K, "The performance of a precast reinforced concrete beam-column sub-assembly under simulated seismic displacements", *Research Report 95/09*, *Department of Civil Engineering, University of Canterbury,* Christchurch, New Zealand, 1995.

Park, R., Paulay, T., Bull, D. K. and L. McSaveney, "Seismic Design of Reinforced Concrete Structures", *Technical Report No. 15, New Zealand Concrete Society*, May. 1994, 155 pp.

Herlihy M.D, Park R. and Bull D.K, 1995, "Precast Concrete Floor Unit Support and Continuity", *Research Report 93/103*, *Department of Civil Engineering, University of Canterbury,* Christchurch, New Zealand.

Bull, D.K. and Barnard, D.P. (editors/compilers), "New Zealand Reinforced Concrete Design Handbook: Ultimate Strength Standard NZS 3101:1982 and Amendments 1989", *Cement & Concrete Association of NZ,* Wellington, and *Pacific Steel Ltd,* Auckland, New Zealand, 1991, 445 pp.

Bull, D. K. (co-author), "Guidelines for the Use of Structural Precast Concrete in Buildings", *Centre for Advanced Engineering*, Christchurch, New Zealand, 1991, 174 pp.

Bull, D. K. and Barnard, D. P. (editors/compilers), "New Zealand Concrete Masonry Manual*", New Zealand Concrete Masonry Association,* Auckland *and Cement & Concrete Association of NZ,* Wellington, and, New Zealand, 1990, Volumes 1 and 2.

Bull, D. K. and Park, R., "Behaviour of Structural Concrete Frames with Precast Concrete Beam Shells Subjected to Seismic Loading", *Research Report 84/1, Department of Civil Engineering, University of Canterbury,* Christchurch, New Zealand, 1984, 132 pp.

Refereed Conferences

Bull, D.K., keynote, "The Performance of Concrete Structures in the Canterbury Earthquakes: Lessons to be learned and the Future of Concrete Buildings", *NZ Concrete Industries Conference*, Rotorua, August 2011.

Cole, G. L., Dhakal, R. P., Carr, A. J. and Bull, D. K. "Building pounding state of the art: Identifying structures vulnerable to pounding damage". *New Zealand Society for Earthquake Engineering Annual Conference (NZSEE 2010).* J. Ingham. Wellington, New Zealand**:** paper P11. 2011

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Bull, D. K., "Issue of Non-compliance with the Steel Reinforcing Materials Standard", *Journal of the Structural Engineering Society of NZ,* Vol.16 No.1, April 2003, 5 pp.

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Number of refereed publications:	**98**	
Number of patents:	**1**	
Number of significant publications not included in the above:	**26**	
Number of post-graduate theses supervised to completion:	PHD:	2
	Masters:	17
Number of post-graduate theses examined:	PhD:	2
	Masters:	2