

Brady Heywood.



CURRICULUM VITAE: DR SEAN BRADY

Sean is a forensic structural engineer specialising in identifying the cause of engineering failures, defects, and unsatisfactory performance in steel and concrete structures.

SUMMARY

Sean has investigated the cause of structural engineering failures in significant multi-party construction and engineering disputes, and resolved structural issues for a wide range of international and national clients, including Australian law firms and government departments.

He is a Chartered Professional Engineer, a board member of the Society of Construction Law Australia, a member of the Editorial Board of the ASCE *Journal of Performance of Constructed Facilities*, and a member of the Editorial Panel of the ICE *Forensic Engineering Journal*.

EXPERTISE

Sean's technical expertise is in forensic engineering, failure investigation, structural analysis, structural assessment, finite element modelling, in-service structural testing, research, and dynamic and fatigue investigations.

EDUCATION

PhD	2004	Structural Engineering University College Dublin, Ireland
BAI	1998	Bachelor in Engineering (Civil, Structural, and Environmental Engineering) Trinity College Dublin, Ireland
BA	1998	Bachelor in Arts (Mathematics) Trinity College Dublin, Ireland

AFFILIATIONS

Chartered Professional Engineer (CPEng)
Fellow of the Institution of Engineers, Australia (FIEAust)
National Professional Engineers Register (NPER)
Registered Professional Engineer in Queensland (RPEQ)
Board member of Society of Construction Law Australia
Editorial Review Board Member: ASCE Journal of Performance of Constructed Facilities
Editorial Panel member: Institution of Civil Engineering (ICE) Forensic Engineering Journal
Regularly contributes articles to The Structural Engineer (IStructE publication)
Regular peer reviewer for the ASCE Journal of Performance of Constructed Facilities
Member of the Structural Branch of the Queensland Division of Engineers Australia

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EMPLOYMENT

- 2010 to date Managing Director, Brady Heywood Pty Ltd, 320 Adelaide St, Brisbane, Queensland
- 2011 to date Visiting Lecturer, Queensland University of Technology, Gardens Point Campus, Brisbane, Queensland
- 2005 – 2010 Business Manager: Consulting, Texcel Pty Ltd, 24 Bank St, West End, Queensland
- 2004 – 2005 Project Manager, Texcel Pty Ltd, 24 Bank St, West End, Queensland
- 2001 – 2003 Lecturer, University College Dublin, Ireland & Trinity College Dublin, Ireland

EXPERIENCE

2010 TO DATE

BRADY HEYWOOD PTY LTD BRISBANE, QLD

Managing Director

Key projects include:

- Investigation into the structural failure of a stadium roof;
- Investigation into the failure of a large ferris wheel during rectification;
- Investigation into the cause of a product failure;
- Investigation into the cause of failure of a large conveyor gantry at a coal mine;
- Investigation into the failure of the roof structure of a 40m diameter steel storage tank for an international petroleum company;
- Investigation into the in-service movements of a commercial shipping wharf due to diurnal temperature loading;
- In-service investigation into the behaviour and failure mechanism of a bespoke bridge lifting device for the Queensland Department of Transport and Main Roads, Australia.

2011 TO DATE

QUEENSLAND UNIVERSITY OF TECHNOLOGY, BRISBANE, QLD

Visiting Lecturer

- Deliver module for Executive Master of Business (Complex Project Management) for Graduate School of Business;
- Lecturing Module 'Anatomy of Failure'.

2005 – 2010

TEXCEL PTY LTD BRISBANE, QLD

Business Manager: Texcel Expert Services Division

Key projects include:

- Expert witness support for a Supreme Court of Queensland case. The case involved the investigation of structural behaviour in a large apartment complex, and comprised of in-service monitoring, structural analysis, critical review of expert reports, and preparation of expert reports for mediation;
- Development of a method to assess the strength and fatigue performance of fillet welded joints of complex geometry in large diameter, high pressure water pipes subject to axial tension forces. This design method overcame the absence of sound analytical methods in the literature (Heywood et. al., 2009);
- Investigation and measurement of the cause of structural vibration of a key wharf facility for Rio Tinto. The project included collection and interpretation of in-service vibration and strain data to identify the cause of the vibration and quantify its affects;
- The development of a suitable fatigue design criteria for the upgrade design of conveyors at Port Waratah Coal Services for Bechtel Australia. The project involved the utilisation of mechanical engineering data to estimate the fatigue loading for the upgraded conveyors;
- An investigation into the cause of widespread structural cracking in suspended concrete floors in an aluminium smelter for Rio Tinto. The investigation involved an inspection of the floors, a detailed load rating, a determination of the cause of distress, and development of management strategies;

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- Development and installation of appropriate in-service monitoring system for the Vulture St Busway Tunnel in Brisbane. Project included scoping the risks associated with keeping the tunnel in service during significant nearby construction works, selection of the in-service monitoring system to manage these risks, and providing assistance to develop appropriate strategies to respond to any concerning structural behaviour;
- A theoretical investigation into temperature effects on the structural behaviour of slurry heaters;
- An investigation into the dynamic, in-service behaviour of large scale precipitator tanks in the Gove refinery for Alcan (now Rio Tinto). Particular attention was given to understanding the consequences of hydraulic, thermal, and solar radiation loading;
- A theoretical investigation into the cause and consequences of distortions in a fill tank in alumina refinery in Queensland;
- The investigation and in-service measurement of the behaviour of the Riverside Expressway for the Queensland Department of Main Roads due to thermal loading over a period of months following its temporary closure in late 2006;
- An evaluation of quarry blast vibrations on the integrity of buried pipelines for the Southern Regional Water Pipeline. The project included an extensive review of the research literature and the selection and implementation of an appropriate design methodology;
- The development of strengthening concepts for the Captain Bishop Bridge and the Lucinda Drive Overpass for the Port of Brisbane Corporation;
- Theoretical evaluation of the residual strength of a prestressed concrete bridge that had been subject to fire damage for Emerald Shire Council;
- Dynamic structural monitoring of a magnetic resonance imaging facility at the PA Hospital (Brisbane) due to construction vibrations;
- Technical review and assessment of the National Transport Commission draft document titled 'Performance Based Standards - Bridge Assessment Guidelines'.

Management responsibilities include:

- Financial, technical, and operational management of the Texcel Expert Services division and management of all projects;
- Successfully navigating the division through the GFC, and identifying the potential for the application of the division's existing forensic skills to a wider market.

2004 – 2005

TEXCEL PTY LTD BRISBANE, QLD

Project Manager

Key projects include:

- Investigation into the cause of noise generated by a bridge in a residential area for the Roads and Traffic Authority, NSW. The project involved the dynamic modelling and structural analysis of the bridge, in conjunction with an acoustic investigation undertaken by an acoustic consultant;
- The structural assessment of numerous bridges.

2001 – 2003

UNIVERSITY COLLEGE DUBLIN, IRELAND & TRINITY COLLEGE DUBLIN, IRELAND

Lecturer

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1998 – 2004

UNIVERSITY COLLEGE DUBLIN, IRELAND

PhD Candidate on the topic of 'The Influence of Vehicle Velocity on Dynamic Amplification in Highway Bridges'.

- The project resulted in the development of an understanding of the contribution of vehicle velocity to bridge/vehicle interaction.
- Attended and presented papers at four conferences:
 - 7th International Symposium Heavy Vehicle Weights and Dimensions, Delft, The Netherlands, 2002.
 - First Symposium on Bridge Engineering Research in Ireland, Dublin Ireland, 2002.
 - 6th Vehicle Infrastructure Interaction Conference, Poland, 1999.
 - WAVE (Weigh-in-Motion of Axles and Vehicles for Europe) Final Symposium Paris, France, 1999.
- Carried out research mission to Aalborg University, Denmark, 1998.
- Supervised large scale scientific experiments in:
 - Lulea, Northern Sweden, 1998,
 - Verjai, Slovenia, 1999.

1994 – 1998

TRINITY COLLEGE DUBLIN, IRELAND

BAI Civil, Structural, and Environmental Engineering Degree and BA Arts (Mathematics) Degree

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RECENT PRESENTATIONS

Brady, S., "Role of Technical and Expert Evidence in Legal Proceedings", *Construction Law for Engineers*, Griffith University, South Bank, Brisbane, November 2013

Brady, S., "The Role of Finite Element Analysis in Construction Disputes", *Third Society of Construction Law National Conference*, Sydney, August 2013

Brady, S., "Learning from Structural Failure", *Fifth International Conference on Forensic Engineering*, London, April 2013

Brady, S., "Total Investigation Management: Incident and Accident", *Marcus Evans*, Brisbane, February 2013

Brady, S., "Structural Engineering Failure – The Role of 'Human' Factors", *IStructE*, London, April 2013

Brady, S., "Structural Engineering Failure – The Role of 'Human' Factors", *Engineers Australia and the IStructE*, Brisbane, Bendigo, Melbourne, Sydney, Perth, November 2012 - August 2013

Brady, S., "Managing Catastrophic Failure", Joint presentation with *Minter Ellison*, Brisbane, September 2012

Brady, S., "The Structural Engineer as Expert Witness – Forensic Design",

- *Society of Construction Law New Zealand*, Auckland & Wellington, August 2013;
- *Society of Construction Law Singapore*, Singapore, April 2013;
- *Royal Institute of Chartered Surveyors*, Brisbane, March 2012;
- *Society of Construction Law UK*, Oxford, February 2012;
- *Society of Construction Law Hong Kong*, Hong Kong, January 2012;
- *Society of Construction Law Australia*, National Conference, Brisbane, August 2011

Brady, S., "Forensic Engineering Workshop", *Engineers Australia and Institute of Structural Engineers*, Brisbane, March/April 2012

Brady, S., "Recent Lessons Learned from Structural Failure", *Concrete Institute of Australia*, Brisbane, June 2011

Brady, S. & Heywood, R., "Learning Workshop: Forensic Engineering", *Engineers Australia and Institution of Structural Engineers*, Brisbane, 6th and 20th Oct 2010.

Bielert, B., Brady, S., & Murphy, P. "Practical tips on Risk Management and Response to Structural and Equipment Failures", Joint presentation with law firm *Baker & McKenzie*, Melbourne, 16th March 2010; Joint presentation with *Baker & McKenzie* and the *German-Australian Chamber of Industry & Commerce*, Sydney, 9th March 2010.

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PUBLICATIONS

JOURNAL PAPERS

Brady, S. P., (2013), "Learning from Structural Failure: The Challenges and Opportunities", *ICE Forensic Engineering*, Accepted for publication October 2013, (Manuscript No. FENG-D-13-00018R1)

Brady, S. P., (2013) "Effectively Responding to Structural Engineering. Failure: Expertise and Cognitive Entrenchment", *Journal of Performance of Constructed Facilities*, Accepted March 11, 2013 posted ahead of print March 13, 2013. Doi:10.1061/(ASCE)CF.1943-5509.0000458

Brady, S., (2012), "The Structural Engineer as Expert Witness – Forensics & Design", *Society of Construction Law UK*, Paper number D132, published online (<http://www.scl.org.uk/structural-engineer-expert-witness-forensics-and-design>), March 2012

Brady, S. P., O'Brien, E.J., & Žnidarič, A., (2005), "The Effect of Vehicle Velocity on the Dynamic Amplification of a Vehicle crossing a Simply Supported Bridge." *Journal of Bridge Engineering*, ASCE (Manuscript No. 022948).

Brady, S. P., & O'Brien, E. J., (2005), "The Effect of Vehicle Velocity on the Dynamic Amplification of Two Vehicles crossing a Simply Supported Bridge." *Journal of Bridge Engineering*, ASCE, (Manuscript No. 022947).

Heywood, R., Bartleet, S. & Brady, S., (2009), "Performance of Fillet Welded Joints in Water Pipelines," *Journal of Australian Water Association*, August, pp. 56- 58.

JOURNAL FORUMS

Brady, S., (2012), "Role of the Forensic Process in Investigating Structural Failure", *American Society of Civil Engineers*, *J. Perform. Const. Facil.*, Volume 26 Issue 1, February 2012, pp 2-6

AS EDITOR

Brady, S., (2013), Editorial, *ICE Forensic Engineering*, Volume 166 Issue FE3, pp. 105-106, <http://dx.doi.org/10.1680/feng.2013.166.3.105>, August 2013

Brady, S., (2010), "Special Issue on Forensic Structural Engineering," *The Australian Journal of Structural Engineering*, Vol 11, No1.

McNally, C., & Brady, S., (2002), "Proceedings of the First Symposium on Bridge Engineering Research in Ireland", Dublin, Ireland.

ARTICLES

Brady, S., (2013), "I-35W Highway Bridge Collapse – Lessons Learned", *The Structural Engineer*, October 2013, pp 36-37

Brady, S., (2013), "Near-misses and failures (Part 2)", *The Structural Engineer*, September 2013, pp 22-23

Brady, S., (2013), "Near-misses and failures (Part 1)", *The Structural Engineer*, August 2013, pp 34-35

Brady, S., (2013), "Lessons from the Malahide Viaduct Collapse", *The Structural Engineer*, July 2013, pp 34-35

Brady, S., (2013), "Previous Failures: Utilising the Lessons", *The Structural Engineer*, June 2013, pp 20-21

Brady, S., (2013), "The 30 year Failure Cycle", *The Structural Engineer*, May 2013, pp 14-15

Brady, S., (2013), "Interstate 90 Connector Tunnel Ceiling Collapse", *The Structural Engineer*, April 2013, pp 32-33

Brady, S., (2012), "De Grolsch Veste Stadium Failure", *Civil Engineers Australia & The Structural Engineer*, September/November 2012, pp 58-59

Brady, S., (2012), "Human Factors and Bridge Failure", *Civil Engineers Australia & The Structural Engineer*, August/December 2012, pp 32-36

Brady, S., (2011), "Learning from Failures – An Overview", *Civil Engineers Australia*, July 2011, pp 40-42

Brady, S., (2011), "Causation, The Structural Engineer, and The expert witness", *Construction Law International*, International Bar Association, Volume 6 Issue 2, June 2011, pp 4-8

Heywood, R. & Brady, S., (2010), "Forensic Engineers in High Demand," *Civil Engineers Australia*, January, pp. 26-27.

Brady, S. & Heywood, R., (2009), "Accurately Assessing Existing Structures," *Civil Engineers Australia*, July, p 31.

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PUBLICATIONS

CONFERENCE PAPERS

Brady, S., (2012), "The Structural Engineer as Expert Witness – Forensics & Design", Second *Society of Construction Law* Brisbane, Paper number D132, published online (<http://www.scl.org.uk/structural-engineer-expert-witness-forensics-and-design>), August 2011

Brady, S.P., Gonzalez, A., Žnidarič, A., O'Brien, E.,J., (2002), "Impact Factors on Medium Span Bridges Due to Multiple Vehicle Presence", 7th International Symposium, Heavy Vehicle weights and Dimensions, Delft, The Netherlands, pages 1 – 10

Brady, S.P., Gonzalez, A., O'Brien, E.J. Dempsey, A.T., "Theoretical Study of the Use of Infrastructure Response in the Development of a Free of Axle Detector Weigh-in-Motion System", Vehicle-Infrastructure Interaction VI, Zakopane, Poland, Sept/Oct 1999

Gonzalez, A., Brady, S. P., O'Brien, E.J., (1999), 'A Dynamic Multi-Sensor Bridge Weigh-In-Motion Algorithm', WAVE Final Symposium Paris, France, pages 209 – 216

Rattigan, P.H., Gonzalez, A., O'Brien, E.J., Brady, S.P., "Transverse Variation of Dynamic Effects on Beam-and-Slab Medium Span Bridges", Eurodyn 2005, Paris, eds. C. Soize & G.I. Schuëller, 2005, pp. 1643-1688

Brady, S., Gonzalez, A., Žnidarič, A. & O'Brien, E.J. (2002), "Dynamic Impact Factors on Medium Span Bridges due to Multiple Vehicle Presence", in Proceedings of First Symposium on Bridge Engineering Research Activity in Ireland, Eds. C. McNally & S. Brady, UCD, Dublin, Ireland, August 31, pp. 11-21

O'Brien, E.J., Li, Y.Y., Gonzalez, A., Brady, S.P., 'The Influence of Speed on the Dynamic Amplification of Two Loads Crossing a Simply Supported Bridge', Bridge Management 5, Proceedings of the 5th International Conference on Bridge Management, Eds. G.A.R. Parke & P. Disney, Thomas Telford, London, 2005, pp. 452-458

CONFERENCE PAPERS

Brady, S., (2004), 'The Influence of Vehicle Velocity on Dynamic Amplification in Highway Bridges', University College Dublin, Ireland.

EDUCATION MATERIAL

Brady, S., (2011), 'Study Guide Module 4: Anatomy of Failure', Queensland University of Technology, QLD, Australia. (8,700 word study guide)

Brady, S., (2012), 'Forensic Engineering Workshop', Engineers Australia & IStructE, QLD, Australia. (Workshop presentation slides and notes.)