

Name:

Dr. Julian Seidel

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Areas of expertise:

Geotechnical assessment and design, Onshore and nearshore deep foundations, Conceptual and detailed design for foundation systems, Retention systems, Bridge foundations, Pile Driveability and Hammer selection, Drilled shafts in rock, Static load testing, Dynamic pile testing, PDA testing and CAPWAP analysis, Non-destructive testing of piles.

Qualifications:

- BE (Hon 1), 1979, Monash University, (Dux)
- PhD 1994, Monash University. "The analysis and design of pile shafts in weak rock".

Professional Memberships & Affiliations:

- Associate of the Department of Civil Engineering, Monash University
- Member of the Institution of Engineers of Australia (MIEAust); Chartered Professional Engineer (CPENG)
- Member of the Australian Geomechanics Society; Member of the International Society for Soil Mechanics and Foundation Engineering
- Member of the American Society of Civil Engineers (MASCE);
- Chairperson, Australian Standards, Piling Code Review Committee AS2159 – Piling (2022)
- Past Member, Australian Standards, Piling Code Committee AS2159 – Piling (1995 and 2009)
- Past Member, International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE) Technical Committee 18 – Deep Foundations
- Past Technical Editor of the US Deep Foundations Institute publication, "Deep Foundations".
- Reviewer for ASCE Jnl of Geotech and Geoenvironmental Engineering; ASCE Jnl of Structural Engineering; Canadian Geotechnical Jnl; Geotechnique, Geotechnical Testing Journal, Intl. Jnl. Rock Mech. And Mining Sciences, Journal Geotechnical and Geological Engineering, Australian Geomechanics

Career Overview:

Dr. Julian Seidel has over 40 years professional engineering experience, with the majority as a geotechnical engineer specialising in deep foundations, with particular expertise in pile dynamics and rock socketed piles. Julian has been employed as a senior engineer with general and specialist geotechnical and foundation engineering consultants, a government road authority, a specialist deep foundation contractor, and at University as senior lecturer and researcher. His broad and extensive experience makes Dr. Seidel uniquely placed to advise on the planning, commissioning, design, installation and verification of structural foundations, with a focus on efficiency and constructability. He has developed a strong reputation in industry for providing practical and state-of-the-art expert advice on projects in Australia and throughout the Asia-Pacific region.

Employment History

Foundation QA, Melbourne, Australia

2001 to current – Owner and consultant. Responsibility for delivery of approximately 900 foundation engineering projects across Australia and overseas including conceptual design, detailed analytical and numerical solutions, constructability and driveability assessments, development, implementation and execution of testing programs, foundation sign-off. Research and development of innovative hardware and software solutions for piled foundations. Development of company technical standards, methods and procedures.

Foundation Specialists Group (expansion of Foundation QA), Melbourne and Brisbane, Australia

2010 to 2020 – Chairman and Technical Director. Overall responsibility for delivery of approximately 700 foundation engineering projects across Australia and overseas including conceptual design, detailed analytical and numerical solutions, constructability and driveability assessments, development, implementation and execution of testing programs, foundation sign-off. Guidance of Research and development of innovative hardware and software solutions for piled foundations. Development of company technical standards, methods and procedures.

Monash University, Melbourne Australia.

1991 to 2000 – PhD student → Lecturer → Senior Lecturer and Research Director. Research into the analysis and design of pile shafts in weak rock. Research supervision of 4 PhD students and 2 Research Masters students in various aspects of drilled shaft and pile dynamics. Lecturing in Soil Mechanics and Foundation Engineering at Levels 2, 3 and 4 of the undergraduate program.

Wagstaff Piling, Brisbane, Australia

1986 to 1990 - Technical Manager and Pile Testing Manager, responsible for design-and-construct tenders, and for foundation testing.

VicRoads, Melbourne, Australia

1983 to 1986 – Geotechnical Engineer. Site investigations and foundation design for bridge and freeway projects around Victoria. Dynamic pile testing for bridge projects in Victoria and interstate. 1 year leave of absence, to work for Pile Dynamics Inc., on project work across North-Eastern USA

Golder Associates, Melbourne, Australia

1981 to 1982 – Geotechnical Engineer. Geotechnical site investigations and reporting for domestic, industrial and commercial projects. Environmental impact assessment for mining project, PNG.

Gutteridge Haskins Davey (now GHD), Melbourne, Australia

1979 to 1981 – Graduate Engineer. Extensive involvement in structural, geotechnical engineering and hydrological studies for projects in Australia and South-east Asia, including design of major dam structures.

Selected Projects:

Dr. Seidel has provided advice for several thousands of foundation projects during his career. The following list of projects has been selected to demonstrate the range of projects in which he has been involved.

Bridge over Padma River, Bangladesh; China Major Bridge Engineering Company (2017 to 2022)

Technical assistance with all aspects of complex driven pile foundation works, and commercial assistance with contractor's cost and time claims. The Padma River bridge foundations comprise 41 river piers, each with six raked 3m diameter 120m long pipe piles. The piles were driven with IHC and Menck offshore hydraulic hammers with ram weights of up to 175 tonne. The construction processes included both base and shaft grouting procedures.

Major Bridges over the Fitzroy River, Yeppen; John Holland Group and Aecom for Transport and Main Roads, Queensland

Review of site investigation reports and development of stratigraphic profiles and engineering models. Development of six alternative costed concept design options. Execution of the PDA testing program and Capwap analyses for the selected precast octagonal driven pile solution. Correlation of the PDA results and Pile Driving Monitor for evaluation of the capacity of all untested piles. Technical and construction advice and recommendations to the client. Sign-off of all piles.

New Parallel Runway Dredge Mooring, Temporary Piling ; Smithbridge for Brisbane Airports Corporation

Prediction of minimum pile installation embedment to satisfy capacity requirements and to maximize the ability to extract the piles with vibratory hammers after execution of the works. Pile testing to confirm and refine the embedments. Prediction of peak velocities on buried sewer line structure from both vibratory installation and pile driving.

Sandy Corner Bridge ; Decmil for Transport and Main Roads, Queensland

Development of geotechnical ground models. Driveability Analysis of non-conforming hammer for evaluation of tension stresses. Development of an installation control strategy to minimize tension stresses to an acceptable level. Review of downdrag design to rationalize and simplify construction detail of pile penetration through the abutments.

Electric Pole Distribution and Sub-Transmission Design Methodology and Workshops for Ausgrid

Purpose-built unique pole embedment design calculator (PEC) based on GIS implementation of stratigraphies and soil and rock strength models derived from soil-landscapes across the Ausgrid network franchise using a library of standard poles, and construction techniques. Delivery of workshops to educate electrical designers on foundation design issues and use of the PEC solution.

NCIG Coal Export Terminal, Kooragang Island, Newcastle

Evaluation of stability, settlement, and lateral movements of embankments on soft clay foundations, including back analysis of surcharged areas, analysis of reinforced soil wall (RSW) abutments, modelling of controlled stiffness columns, assessment of structural adequacy of embedded piles under moments induced by lateral movements. Numerical modelling using Plaxis 2D and Plaxis 3D. Verification of RSW abutments compliance with RMS Specification R57 Design of Reinforced Soil Walls.

Concavo, Victoria Harbour Construction Review; Lend Lease

Assisting the client with expert review of bored pile collapse, including post-collapse site investigation of groundwater chemistry, construction records, use of bentonite and polymer supporting fluids. Evaluation of subcontractor claim.

Sub-transmission Lines, New South Wales and Victoria; Ausgrid and PowerCor

Foundation designs for 50 or more subtransmission line projects in geologies ranging from deep estuarine soft clays, deep and variable mining spoil fills, sand dunes, expansive clays, weathered and hard rock across the Ausgrid and PowerCor franchises. Solutions including mass footings, drilled and placed poles, driven piles with bolted on poles. Site investigations including bores, CPTs and geophysical methods. Challenges of designing near-surface foundations across widely distributed structures with significant geological variations and limited SI information.

INPEX Onshore LNG Processing Facilities, Darwin; John Holland Group and Piling Contractors

Execution of parallel dynamic pile testing for static test piling program and delivery of PDA and Capwap services for contract piling comprising in excess of 1500 open-ended pipe piles. Evaluation of pile plugging and pile setup effects in residual soils and basement deeply weathered siltstones. Correlations of static and dynamic testing. Development of pile acceptance criteria for multiple pile sizes, capacities, and piling hammers.

Construction Jetties and Offloading Wharves for LNG Processing Facilities, Gladstone and Curtis Island; John Holland Group and Golding Contractors for APLNG, GLNG and QCLNG consortia

Execution of PDA testing and Capwap analyses for 10 near-shore structures at Gladstone and Curtis Island including construction marine off-loading facilities (MOFs) and LNG loading platforms, jetties and wharves. Open-ended steel pipe piles of up to 1.5m diameter driven with hammers of up to 25T ram weight. Contribution to design of tension and compression tests using bi-directional load cells. Comparison of dynamic and static load testing. Expert advice in regard to hammer selection and construction issues.

Cape Lambert B Jetty and Wharf; Western Australia; Rio Tinto

Geotechnical and critical pile testing review of Phase 1 piling works. Pile design, pile testing and sign-off for Phase 2 piling. Rationalization of 100% Phase 1 testing program. Development of foundation models for design of Phase 2 piles. Development of innovative procedures and proforma for both tested and untested piles to allow for near-real-time sign-off on compression, tension and lateral load cases.

Cape Lambert Tug Pens; Western Australia; McConnell Dowell for Rio Tinto

The foundations were steel tubes driven to shallow hard rock with tension rock sockets. Development of construction control methods to minimize the possibility of pile toe buckling which would otherwise prevent subsequent drilling of the tension socket. Design of rock sockets using in-house Rocket™ software. Development of down-the-hole-hammer socket logging methods. On site and remote supervision of 24 hour construction cycle for evaluation of socket, real time socket design and pile sign-off.

Wiggins Island Coal Export Terminal; Wharf Dolphin and Jetty; Monadelphous Muhibbah Marine

Development of stratigraphic longitudinal sections and assignment of soil and rock strength profiles for sizing of piling hammer and evaluation of pile toe levels and steel quantities. Remote dynamic pile testing and Capwap analysis of contract piles. Technical and commercial assistance to the client.

5km sheet-pile LNG pipe trench, The Narrows Crossing Gladstone; McConnell Dowell for QCLNG

Redesign of 5000m length of temporary sheet-pile wall for LNG pipeline. Development of strength profiles from combination of widely spaced bores, CPTs and multi-array surface wave analysis. Evaluation of driveability by correlation of PDM (Pile Driving Monitor) measurements of pile frequency, amplitude and penetration rates with GRLWEAP. Wallap and 2D Plaxis analysis of critical wall sections at multiple construction stages.

Ipswich Motorway Upgrade, Dinmore to Goodna; Piling Contractors for Queensland Main Roads (now TMRQ)

Technical support for a claim regarding buckling of steel pipe pile toes in foundations containing cobbles. A unique Monte Carlo statistical analysis was undertaken to compute the risk of local pile overstress based on simulation of pile diameter and wall thickness, cobble size and soil grading.

Quantum Project (now Port Hedland Outer Harbour); McConnell Dowell - Geosea JV for BHP

Tender stage support for bid team development of stratigraphic modelling, assessment of engineering properties and variability, evaluation of pile toe levels for pile length and steel supply evaluation; risk analysis of refusal in upper cemented layers. Critical specification review and recommended amendments. Hammer evaluation and driveability analysis.

Townsville Port Access Road – Ross River Bridge; Aecom and Piling Contractors - for Queensland Main Roads

Specialist advice to Aecom on foundation design, foundation installation and approval. Special issues related to evaluation of setup, internal shaft resistance on pipe piles; tension stresses in prestressed concrete piles, and the acceptability of pile caps with piles of significantly varying toe levels. Strategies were developed to control tension stresses by limitation of pile set and planned replacement of pile cushions. Pile caps with different pile lengths were modelled using Plaxis 3D to establish if there were adverse effects on pile stresses or cap behaviour.

Kempsey Bypass McLeay River Floodplain bridge; Abigroup for NSW Roads and Maritime Services

Twin bridges with 93 piers and 2.45km long. Involvement in initial conceptual foundation design. Subsequent PDA Testing and analysis, and PDM monitoring of every pile for pile sign-off. Challenging and diverse foundation conditions including buried glacial trenches with steep side slopes which resulted in damage to the toes of some piles. Damaged piles were assessed, and the predicted damage correctly verified by pile extraction. Analyses included sizing of vibratory hammer requirements to extract steel tubes of over 40m length.

M80 Upgrade Tilburn Rd to Furlong Rd at Sunshine Tip; Leighton Contractors for VicRoads

Twin bridges with 93 piers and 2.45km long. Involvement in initial conceptual foundation design. Subsequent PDA Testing and analysis, and PDM monitoring of every pile for pile sign-off. Challenging and diverse foundation conditions including buried glacial trenches with steep side slopes which resulted in damage to the toes of some piles. Damaged piles were assessed, and the predicted damage correctly verified by pile extraction. Analyses included sizing of vibratory hammer requirements to extract steel tubes of over 40m length.

Expert Matters – Legal and Insurance

Legal Proceedings in regard to defective drilled foundations for high rise building, Sha Tin, Hong Kong

Expert engaged to provide opinion in regard in respect to my expertise in regard to bored piling in rock, construction, and non-destructive testing. Report and testimony provided.

Arbitration in regard to damaged piles for coal offloading jetty, Lekir, Malaysia.

Expert engaged to act as expert for the consultant in an arbitration with the contractor. Engaged on the basis of my expertise in driven piling, dynamic pile testing, marine piling. Report and attendance at expert conclave.

Arbitration in regard to defective driven steel and concrete piles for wharf, Muara, Brunei

Expert engaged to assess foundations, advise on rectification, and to act as expert for the consultant in an arbitration with the client. Engaged on the basis of my expertise in driven piling, dynamic pile testing, construction control, piling acceptance, and specifications. Report and testimony provided.

Legal proceedings in regard to failure of pier foundation for expressway, Tampa, Florida

Expert engaged to provide opinion in regard to the reasonableness of the remediation requirements imposed by the client, based on my expertise in testing, specifications, codes or practice, limit state design principles and statistical analysis. Informal reports only provided. Matter settled.

Insurance matter in regard to damaged foundations for coal-fired power station, Thailand

Expert engaged by the Insurers to provide opinion in regard to cause. Engaged on the basis of my expertise in driven spun piling, dynamic pile testing, construction control. Reports and attendance at expert conclave.

Assessment of claim in regard to delays caused by deep excavation wall movement, Melbourne

Expert engaged by the contractor in regard to significant movements of a 25m high retaining wall. Opinions regarding key questions relating to issues of failure, categorization, cause and responsibility. Engaged on the basis of my expertise in foundations, excavations, site investigation, foundation specifications and contracts. Two reports provided.

Insurance matter in regard to 14 claims for foundations for coal-fired power station, Malaysia

Expert engaged by the Reinsurers to provide opinion in regard to cause. Engaged on the basis of my expertise in piling, temporary earth retention systems, site investigation and interpretation and ground engineering. Reports and attendance at expert conclave.

Insurance matter in regard to foundation settlement for high-rise building, Indonesia

Expert engaged by the Loss Adjustor to provide opinion in regard to cause. Engaged on the basis of my expertise in piling, site investigation and interpretation and ground engineering.

Insurance matter in regard to foundation settlement for petrochemical plant, Asia (ongoing)

Expert engaged by the Loss Adjustor to provide opinion in regard to cause. Engaged on the basis of my expertise in piling, site investigation and interpretation and ground engineering.

Adjudication matter in regard to water ingress into basement, infrastructure project NZ (ongoing)

Expert engaged by the Contractor to review findings. Engaged on the basis of my expertise in piling and ground engineering.

Arbitration matter in regard to bridge project HK (ongoing)

Expert engaged by the Contractor to assist with management and preparation of the defence.

Bridge Project, Bangladesh (2017-2022)

Commercial assistance with contractor's cost and time claims; management of and liaison with delay and disruption expert and legal advisors.

Selected Technical papers (over 80 publications with 58 listed in Google Scholar and over 1100 citations)

- 1) Seidel, J.P., Cho, C.W. and Haberfield, C.M. (2002). Prediction of the axial capacity of pile sockets. Invited paper to Korean Geotechnical Journal.
- 2) Seidel, J.P. (2002). Reliability concepts in LRFD Design, or what is a reasonable factor of safety? Accepted U.S. Deep Foundations Institute, Fulcrum.
- 3) Seidel, J.P. and Haberfield, C.M. (2002). Laboratory testing of concrete-rock joints in constant normal stiffness direct shear. Accepted Geotechnical Testing Journal, ASTM
- 4) Seidel, J.P. and Haberfield, C.M. (2002). Theoretical models for rock joints subjected to constant normal stiffness direct shear. Accepted Int. J. of Rock Mechanics and Mining Sciences.
- 5) Seidel, J.P. (2001). PDA Testing and effective quality assurance. Keynote lecture, 5th International Conference on Deep Foundation Practice. Singapore. 5-6 April 2001.
- 6) Seidel, J.P. (2001) PDA testing – opening the black box : issues of effective quality assurance. Concrete Piling for the New Millennium. Invited lecture, Concrete institute of Australia. Sydney, February 21, 2001.
- 7) Seidel, J.P. and Collingwood, B (2001). An improved socket roughness factor for prediction of rock socket shaft resistance. Canadian Geotechnical Journal, February, 2001 : 138-153
- 8) Haberfield, C. and Seidel, J.P. (2000). The role of theoretical models in the analysis and design of rock socketed piles. Invited paper. John Booker Memorial Symposium. Balkema DW Smith & JP Carter (eds) : 465-488.
- 9) Seidel, J.P. and Kodikara, J.K (2000). Current issues in Academia and Geoengineering Education. GeoEng2000. Melbourne, November, 2000. Dr. Seidel was invited chair for the workshop on Geoengineering Education.
- 10) Seidel, J.P. (2000). The need for quality assurance in the dynamic pile testing industry. 6th Intl. Conf. on Application of Stress-wave Theory to Piles. Sao Paulo, Brazil, Sept., 2000. Dr. Seidel was invited chair for the workshop on quality assurance.
- 11) Schmidt, H.H., Seidel, J.P. and Haberfield, C.M. (1999) Tragfähigkeit von Bohrpfählen in festen Böden und Fels. (Load capacity of bored piles in hard soils and rock). Bautechnik Journal, 9 September, 1999 : 795 – 800.

Invited Papers and Presentations

Dr. Seidel provides invited and keynote presentations to learned societies and conferences in regard to various topics related to foundation engineering.