Jose Pacheco, Ph.D., P.Eng.

SENIOR CONSULTANT + GROUP DIRECTOR

Dr. Pacheco is a Senior Consultant in the Concrete & Cementitious-Materials Group. His consulting practice is focused on providing technical services for contractors, asset owners, and engineering firms. His involvement is typically a blend of fundamental understanding of cement and concrete technology; concrete materials performance, concrete durability and degradation; and construction practices. He normally leads the technical and management aspects of project acquisition, execution, and deliverables. He has been the strategic lead on projects where the long-term performance of concrete structures, concrete degradation mechanisms, and structural and materials forensics are involved. His work encompasses projects where prediction, assessment, and maintenance strategies for new and existing concrete infrastructure play a crucial role.

Dr. Pacheco has provided technical consulting services related to the development of high performance and conventional concrete mixtures for construction, troubleshooting, and assessment of concrete durability issues, and service life of concrete structures. He is an expert in metallic corrosion, corrosion of steel reinforcement in concrete, and concrete degradation mechanisms. His other areas of technical work include characterization of cementitious materials, moisture and ionic transport properties of concrete, and field assessment of concrete structures and repairs. Dr. Pacheco specializes in providing solutions for asset owners and contractors on several issues, selection and evaluation of construction materials, durability performance of existing concrete and steel structures, and the selection of repair and mitigation techniques for extending service life.

Dr. Pacheco serves as the Director of the Concrete & Cement-Based Materials in CTLGroup. He oversees the technical, strategic, and management aspects of the group, including collaboration with other business units in the company. His tasks include the preparation of budgets, overseeing costs and finances, and development of technical staff.

Before joining CTLGroup, he worked as a Junior Scientist at TNO (Netherlands Organization for Applied Research). His worked consisted on providing technical assistance for internal clients on projects focused in cement and concrete production, concrete mixture design and performance evaluation, destructive and non-destructive testing, petrographic and microanalysis (EDS) studies, and electrochemical techniques. Dr. Pacheco has authored and co-authored numerous technical publications in indexed journals and has contributed as an expert reviewer for multiple journals focused on concrete materials and performance, and has provided technical presentations throughout the world.

Academic Credentials

Ph.D. in Civil Engineering
Delft University of Technology,
The Netherlands, 2015

M.S. in Civil Engineering
Delft University of Technology,
The Netherlands, 2015

B.S.E. in Civil Engineering
Universidad Autónoma de Nuevo
León, Mexico, 2008

Licensure/Certification

Professional Engineer (Canada)
BC

Civil Engineer
Mexico

NCEES

Contact Information

5400 Old Orchard Road
Skokie, IL 60077

P (847) 972-3162

C (224) 508-0403

JPacheco@CTLGroup.com

Representative Project Experience

Concrete Durability and Corrosion Protection Plans

- Served as lead consultant on the prediction of atmospheric corrosion predictions for steel pipe elements exposed to the environment in up-state New York for a large tunnel. The elements were barged from the Southwest US through the Atlantic and then trucked up to their final destination. Predictions considered the metallurgy, chloride, and sulfate exposure during transit and storing. Recommendations for long-term storage practices and monitoring programs were provided.
- Served as the lead consultant on the durability of cast-in-place concrete decks for rotary milking platforms. The analysis consisted on a detailed evaluation of the exposure conditions (organic manure and cleaning agents), provided recommendations for material selection, and troubleshooting during construction. The project also included advanced structural analysis to evaluate areas for potential cracking during and after construction.

- Served as lead consultant on the cast-in-place concrete specification development for a multi-purpose building in Astana, Kazakhstan using European Codes and Standards. The elements subject to the specification included parking garages, ramps, and other elements to be exposed to deicer salts.
- Served as the lead consultant on the prediction of atmospheric corrosion predictions for a elevating flooring system in Texas. The system was composed of several metallic components exposed to high concentrations of sulfate in the soil. Predictions were utilized for determining if the system complied with the specified service life for a monumental structure.
- Led analysis on existing documentation of the current condition of a bridge in Virginia and provided recommendations for service life extension. Several elements of the structure suffered from multiple several deterioration mechanisms like delayed ettringite formation (DEF), alkali silica reactivity (ASR), and chloride contamination. Recommendations for monitoring of performance during service were provided.

Service Life Predictions for New and Existing Structures

- Conducted service life predictions for bridge deck elements for the Illinois Tollway considering the transport properties of several concrete mixtures evaluated in the laboratory. The analysis consisted on a comparison of fundamental and finite-element modeling to estimate the design service life for bridge deck elements exposed to the environmental and deicer salt exposure in Illinois.
- Served as the lead consultant on the evaluation of remaining service life of reinforced concrete elements for a shield building exposed to marine breeze overseas. The structure suffered from high concentrations of chlorides that could initiate reinforcement corrosion. Predictions were conducted using commercial, probabilistic, and finite-element modeling tools.
- Served as the lead consultant on the evaluation of remaining service life of reinforced concrete elements for an industrial facility in the Middle East. The structure suffered from high concentrations of chlorides, failures in the cathodic protection system, and potentially on-going corrosion. Predictions were aimed to estimate the time of failure for the cathodic protection systems, provide estimations of the remaining service life, and recommendations for repair and monitoring practices.

Concrete Technology and Concrete Construction

- Led the consulting services related to the fluid penetration resistance of architectural precast panels for construction in Florida. Services included a review of concrete mixture proportions, test data, and other industry standards and specification practices related to concrete permeability.
- Led the consulting and testing services related to the assessment of early-age cracking in various bridge decks in the East Coast. The analysis consisted on review of concrete mixture proportions, ready-mix concrete batch tickets, project specifications and special provisions, cracking surveys, and other available documentations. The deliverable included the likely causes for the observed distress and provided recommendations for laboratory testing methods for confirmation purposes.
- Served as the lead consultant and project manager for the qualification of concrete mixtures for construction for multiple projects in the transportation industry. These projects ranged from bridges, tunnels, parking garages, and marine structures.
- Conducted and assisted Contractors on the development of self-consolidating concrete (SCC) for mass concrete placements for a project in the Energy market. Services rendered included on-call assistance during trial batching, and monitoring of fresh and hardened concrete performance throughout construction.
- Developed the concrete mixture proportions for numerous conventional and high-performance concretes for concrete construction projects. Assisted the contractor or ready-mixed concrete producer on several aspects during development, qualification, and troubleshooting during construction.
- Served as the Principal Investigator for a Department of Transportation on a project

focused on evaluating the performance of internally cured concrete with various curing agents and provided assistance related to the implementation of specifications for construction.

Offshore and Marine Structures

- Served as the lead consultant on the qualification and service life modeling of a retention wall in a USACE the South West. Development of a self-consolidating concrete (SCC) mixture to be used for the fabrication of precast elements. Service life modeling was conducted using finite-element modeling tools.
- Assisted on the investigation of early-age cracking observed in a waterfront structure in VA. The analysis consisted on an evaluation of the concrete mixture proportions, ready-mixed concrete batch tickets, project specifications, and environmental conditions during placement.
- Served as the project manager for the evaluation of the resistance to chloride penetration of a repair concrete mixture for a naval station in HI. The laboratory evaluation consisted on determining the chloride penetrability resistance of various concrete mixtures in accordance with industry accepted test methods.
- Assisted with the development of high-performance and high-performance mass concrete mixtures for a large infrastructure project in Houston, TX. Services were related to the selection and proportioning of concrete materials for achieving fresh and hardened concrete properties including slump retention, low adiabatic temperature rise, early-age and 28-day compressive strength, and chloride ion penetration resistance.

Concrete Repair

- Served as the reinforcement corrosion consultant on the evaluation of a shield building. The evaluation consisted on document review of exploratory borings, evaluation of the condition of the steel reinforcement upon removal of the concrete cover, gravimetric losses, and evaluation of sections for removal and repair.
- Served as the reinforcement corrosion consultant on the durability of reinforced concrete piles for the foundation of a mega-tall building in South East Asia. The analysis consisted of a review of the chemistry of the ground water and the evaluation of the concrete performance of the piles for construction.
- Coordinated the investigation on the evaluation of elastic moduli of cores extracted from high-strength concrete shear walls for a high-rise structure in NY. The work product consisted on a review of the project specifications, review of concrete mixture qualification testing performed by others, and recommendations for repair.

Publications

Isgor, B., Angst, U., Geiker, M., Halmen, C., Hansson, C., Pacheco, J., Tepke, D., Trejo, D. and Vaddey, P. (2019) “Recommended practice for reporting experimental data produced from studies on corrosion of steel in cementitious systems”, RILEM Technical Letters, 4, pp. 22-32. doi: 10.21809/rilemtechlett.2019.90.

Tang, L., Frederiksen, J. M., Angst, U. M., Polder, R., Alonso, M. C., Elsener, B., Hooton, D. & Pacheco, J. (2018). Experiences from RILEM TC 235-CTC in recommending a test method for chloride threshold values in concrete. RILEM Technical Letters, 3, 25-31.

Pacheco, J., Arboleda, C. (2018). Diseño de Mezclas de Concreto de Alto Rendimiento con Vida Util de mas de 100 años. ASOCRETO Septimebre/Octubre No. 150, pp 22-27.

Pacheco, J., & Polder, R. B. (2016). Incorporating cracking of concrete on chloride ingress and service life modeling of concrete structures. Proceedings of Corrosion 2016; Collaborate, Educate, Innovate, Mitigate., Delft, The Netherlands.

Pacheco, J., & Polder, R. B. (2016). Critical chloride concentrations in reinforced concrete specimens with ordinary Portland and blast furnace slag cement. Heron, 61(2), 99-119.

Polder, R. B., Angst, U. M., Pacheco, J., & Peelen, W. H. (2016, September). Propagation of pitting corrosion of steel in concrete: conceptual models for local cross section loss. In Concrete Solutions: Proceedings of Concrete Solutions, 6th International Conference on Concrete Repair, Thessaloniki, Greece, 20-23 June 2016 (p. 417). CRC Press.

Šavija, B., Luković, M., Hosseini, S. A. S., Pacheco, J., & Schlangen, E. (2015). Corrosion induced cover cracking studied by X-ray computed tomography, nanoindentation, and energy dispersive X-ray spectrometry (EDS). Materials and Structures, 48(7), 2043-2062.

Pacheco, J., & Çopuroğlu, O. (2015). Quantitative energy-dispersive X-ray microanalysis of chlorine in cement paste. Journal of Materials in Civil Engineering, 28(1), 04015065.

Mendonça Filho, F. F., Pacheco, J., & Çopuroglu, O. (2015). Semi-and full quantitative EDS microanalysis of chlorine in reinforced mortars subjected to chloride ingress and carbonation. EMABM 2015: Proceedings of the 15th Euroseminar on Microscopy Applied to Building Materials, Delft, The Netherlands, 17-19 June 2015.

Pacheco, J., Šavija, B., Schlangen, E., & Polder, R. B. (2014). Assessment of cracks in reinforced concrete by means of electrical resistance and image analysis. Construction and Building Materials, 65, 417-426.

Pacheco, J., Šavija, B., Schlangen, E., Polder, R.B. (2014). Corrosion of steel in cracked concrete: A microscale study. In: Grantham, M., Basheer, P.M., Magee, B., Soustos, M., Concrete Solutions, Belfast, 2014.

Pacheco, J., Šavija, B., Schlangen, E., Polder, R.B. (2014). Performance assessment of cracks in reinforced concrete. Proceeding of the RILEM International Workshop on Performance-Based Specification and Control of Concrete Durability, 11 -13 June, Zagreb, Croatia, 2014.

Šavija, B., Schlangen, E., Pacheco, J., Millar, S., Eichler, T., & Wilsch, G. (2014). Chloride ingress in cracked concrete: a laser induced breakdown spectroscopy (LIBS) study. Journal of Advanced Concrete Technology, 12(10), 425-442.

Šavija, B., Pacheco, J., & Schlangen, E. (2013). Lattice modeling of chloride diffusion in sound and cracked concrete. Cement and Concrete Composites, 42, 30-40.

Šavija, B., Luković, M., Pacheco, J., & Schlangen, E. (2013). Cracking of the concrete cover due to reinforcement corrosion: a two-dimensional lattice model study. Construction and Building Materials, 44, 626-638.

Šavija, B., Pacheco, J., & Schlangen, H. E. J. G. (2013). Lattice based simulation of chloride ingress in uncracked and cracked concrete: Model validation. In FraMCos-8: Proceedings of the 8th International Conference on Fracture Mechanics of Concrete and Concrete Structures, Toledo, Spain, 10-14 March 2013. International Center for Numerical Methods in Engineering.

Šavija, B., Pacheco, J., Lucović, M., & Schlangen, E. (2013). Modelling of Concrete Cover Cracking due to Reinforcement Corrosion. Construction and Building Materials, 44, 626-638.

Šavija, B., Pacheco, J., & Schlangen, H. E. J. G. (2013). Lattice based simulation of chloride ingress in uncracked and cracked concrete: Model validation. In FraMCos-8: Proceedings of the 8th International Conference on Fracture Mechanics of Concrete and Concrete Structures, Toledo, Spain, 10-14 March 2013. International Center for Numerical Methods in Engineering.

Pacheco, J., Savija, B., Schlangen, E., & Polder, R. (2012). Relationship between cracking and electrical resistance in reinforced and unreinforced concrete. In 2nd Intl. Conf. on Microstructural-related Durability of Cementitious Composites, Amsterdam, Netherlands.

Pacheco, J., Çopuroğlu, O., Šavija, B., Schlangen, E., & Polder, R. B. (2012, January). Assessment of critical chloride content in reinforced concrete by Energy Dispersive Spectrometry (EDS) revisited. In Concrete Repair, Rehabilitation and Retrofitting III: 3rd International Conference on Concrete Repair, Rehabilitation and Retrofitting, ICCRRR-3, 3-5 September 2012, Cape Town, South Africa (p. 185). CRC Press.

Pacheco J., Polder R. (2012) Corrosion initiation and propagation in cracked concrete – a literature review. In: Andrade C., Gulikers J. (eds) Advances in Modeling Concrete Service Life. RILEM Bookseries, vol 3. Springer, Dordrecht.

Pacheco, J., Morales-Nápoles, O., & Polder, R. B. (2012, August). Statistical analysis of electrical resistivity as a tool for estimating cement type of 12-year-old concrete specimens. In Concrete Repair, Rehabilitation and Retrofitting III: 3rd International Conference on Concrete Repair, Rehabilitation and Retrofitting, ICCRRR-3, 3-5 September 2012, Cape Town, South Africa (p. 256). CRC Press.

Šavija, B., Pacheco, J., Schlangen, E., & Polder, R. B. (2012, April). Meso-scale simulation of chloride ingress in cracked concrete. In The Second International Conference on Microstructural-related Durability of Cementitious Composites, Amsterdam, The Netherlands.

Šavija, B., Schlangen, E., Pacheco, J., & Polder, R. B. (2012, January). Modified Wedge Splitting Test (MWST)-a simple tool for durability investigations of reinforcement corrosion in cracked concrete. In Concrete Repair, Rehabilitation and Retrofitting III: 3rd International Conference on Concrete Repair, Rehabilitation and Retrofitting, ICCRRR-3, 3-5 September 2012, Cape Town, South Africa (p. 140). CRC Press.

Šavija, B., Pacheco, J., Schlangen, E., & Polder, R. B. (2012, April). Meso-scale simulation of chloride ingress in cracked concrete. In The Second International Conference on Microstructural-related Durability of Cementitious Composites, Amsterdam, The Netherlands.

Pacheco, J., & Polder, R. B. (2010). Preliminary study of electrochemical lithium migration into cementitious mortar. In 2nd International Symposium on Service Life Design for Infrastructures (pp. 1093-1100). RILEM Publications SARL.

Pacheco, J., Fajardo, G. J., & Valdez, P. L. (2010). Carbonation and chloride corrosion of steel reinforcement in natural pozzolan-based mortars. In 2nd International Symposium on Service Life Design for Infrastructures (pp. 773-680). RILEM Publications SARL.

Fajardo, G., Valdez, P., & Pacheco, J. (2009). Corrosion of steel rebar embedded in natural pozzolan based mortars exposed to chlorides. Construction and Building Materials, 23(2), 768-774.

Pacheco, J., Fajardo, G., & Valdez, P. L. (2008). Accelerated Corrosion due to Chlorides and Carbonation in Natural Pozzolan Based Mortars. In 2008 Concrete Bridge Conference, Federal Highway Administration, National Concrete Bridge Council, Missouri Department of Transportation, American Concrete Institute (ACI).

Pacheco, J., Fajardo, G., Valdez, P., & Badillo, A. (2007). El rol de las puzolanas naturales en el mejoramiento de la durabilidad del concreto reforzado. CIENCIA FIC.

Conferences and Seminars

4th International Conference on Service Life Design for Infrastructures (SLD4), 27-30 August 2018, Delft, The Netherlands, RILEM Publications S.A.R.L.

Concrete Solutions: Proceedings of Concrete Solutions, 6th International Conference on Concrete Repair, Thessaloniki, Greece, 20-23 June 2016.

Concrete Solutions: Proceedings of Concrete Solutions, 5th International Conference on Concrete Repair, Belfast, UK, 1-4 September 2014. CRC Press.

RILEM International Workshop on Performance-Based Specification and Control of Concrete Durability., 11 -13 June, Zagreb, Croatia, 2014.

Concrete Repair, Rehabilitation and Retrofitting III: 3rd International Conference on Concrete Repair, Rehabilitation and Retrofitting, ICCRRR-3, 3-5 September 2012, Cape Town, South Africa (p. 185). CRC Press.

Concrete Solutions: Proceedings of Concrete Solutions, 4th International Conference on Concrete Repair, Dresden, Germany, 26-28 September 2011. CRC Press.

2nd International Symposium on Service Life Design for Infrastructure, 2010, Delft, The Netherlands.

Concrete Bridge Conference, Federal Highway Administration, National Concrete Bridge Council, Missouri Department of Transportation, 2008

Invited Lectures

Pacheco, J., Five Things You Need to Know About Service Life. Big 5 Qatar, Doha, Qatar 2018.

Pacheco, J., ACI Technical Session, “Connecting Materials Science and Durability Prediction”, Detroit, MI, 2017.

Pacheco, J., Durabilidad de Concretos de Alto Desempeño. Conferencias Magistrales UANL, 2017.

Prior Experience

CTLGroup, Skokie, Illinois

Senior Consultant & Group Director, Concrete & Cement-Based Materials, 2018
Associate, Materials & Mechanics, 2015 - 2018

TNO, Delft, The Netherlands

Junior Scientist, Structural Reliability, 2014 - 2015
Intern, Built Environment & Geosciences, 2009 - 2010