John Reilly Consulting, International
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John Reilly PE, CPEng (Ret), BE, MS

Education

M.S. Structural, University of California, Berkeley 1964.

B.E. Hons. Civil, Sydney University 1963.

Registrations

Massachusetts (PE), Australia (CPEng. Ret.), BC Canada (PEng Ret.)

Professional

President, American Underground Construction Association 1999- 2001,

Lifetime Achievement Award 2020

Chair, ITA Working Group 13, "Direct and Indirect Advantages of Underground Facilities"

Chair, ITA Working Group 20, "Urban Problems, Underground Solutions".

Chair, North American Tunneling Conference, Boston, June 2000

Chair, "Management, Policy and Contracting for underground construction" UCA/ITA Conference. April 1996, Washington DC

Chair, "Policy and Finance" for Underground construction, North American Tunneling Conferences Denver 1994/Boston 1992

Life Member, American Society of Civil Engineers

Member, International Tunneling Association

Member, Australasian Tunnelling Association

Member, British Tunnelling Society (BTS)

Life Member, *IE Aust.*

Life Member, Underground Construction Assoc. USA

Professional Experience

John Reilly has 60 years' experience in management, strategy, organization, risk management, risk-based cost &schedule (CEVP®) analysis, team alignment, partnering, management oversight, expert and strategic advisory panels and advanced contacting and delivery methods for large, complex infrastructure projects including metros and light rail systems, underground structures, tunnels, highways, bridges and airports.

Major/Mega Projects (partial list)

Washington DC Metro: project engineer for Sections A4, D1, D2 & D4 including rock and earth tunnels, cut and cover tunnels and stations, Dupont Circle mined station, Secretary, Board of Experts 1969-72.

Boston—MBTA, Southwest Corridor Transit program: Program Director for program management, final design, and construction management assistance to MBTA for Boston's $1 billion (1987) Southwest Corridor Project – transit, rail &urban design, delivered under budget. President's Design Award and ASCE Outstanding Civil Engineering Achievement of 1987.

Los Angeles Metro—Heavy and Light Rail projects: Recommendations for contracting and delivery methods, LACMTA Westside Extension Program, 2012.
Project management oversight and technical assistance for tunnels, underground stations, at-grade sections, and bridges as part of PMO oversight for cost-to-complete, design reviews, technical reports, agency and consultant costs, team alignment, risk workshops. 1991–1997.

Washington State DOT (WSDOT): Assistance to the WSDOT Executive and Project Directors re agency policies and procedures including risk management and risk-based cost estimating for multiple mega-projects in the Seattle area, including the Alaskan Way Viaduct Replacement Tunnel (57'dia.) and the SR520 Floating Bridge (longest in the world). 2001- 2013.

London Underground: Partnering and team-alignment for the signal replacement program and manufacture of new transit vehicles—design-build structure within an alliance contract. 2003.

Toronto—Rapid Transit Expansion Program: Management, organization, contracting & delivery, and implementation of full team alignment for the integrated TTC/consultant team on the CN$3 billion Rapid Transit Expansion. 1994–1996.

Lima Peru. New Airport Terminal + Runway: Risk management and CEVP® cost-risk implementation services for a new terminal and runway. Advanced risk identification, response, mitigation, and implementation. Owner/Design Team Alignment, recommendations for partnering, contracting, procurement and delivery. 2017 –2019.

High-level Expert Panels / Strategic Advisory Teams:

John worked on the initiation of, input to, participation in, and management of Expert Review Panels and Strategic/Technical Advisory Teams, advising owners on management, strategies and technical areas associated with the delivery of complex infrastructure programs, including: Washington State DOT: Executive report to the Secretary of Transportation regarding decisions which led to problems on the SR520 Floating Bridge Program, 2013; Chair, SR520 Expert Review Panel, recommendations re causes and repairs for pontoon construction, 2012-2013; Chair, Strategic Technical Advisory Team SR99 Alaskan Way Project 2010-2013; SR520 Chair, Expert Review Panel, Tunnel alternatives, Westside/Montlake Cut, 2008.

Risk, Risk Management & Management of Cost to Budget

WSDOT Cost Estimate Validation Process (CEVP)

The WSDOT risk-based Cost Estimate Validation Process (CEVP) was developed and implemented in 2002 by a team led by John with Mike McBride and Dave Dye of WSDOT. The process, or a simpler version called Cost-Risk Assessment (CRA), is now a standard application for WSDOT Projects. The process is innovative and noteworthy results have been obtained, leading to better understanding of cost and risk to establish more reliable budgets, implementation of risk mitigation and improved project management to meet budget and schedule goals.

The process, or an equivalent, is required by the U.S. Federal Highway and Federal Transit Administration and the process has been applied by other agencies in the U.S., Canada, Europe, and South America.

These processes are a direct outcome of a critical need to ensure that we carefully and responsibly define, understand, and manage risk and associated cost outcomes for complex, urban, infrastructure transportation projects. This need was clearly articulated by Doug MacDonald, Secretary of the Washington State Department of Transportation 2001-2007, in addressing State funding priorities and the urgent need for substantial transportation improvements.

Papers and presentations by John Reilly given from 1998 to the present in the United States and 12 other countries to date have addressed better use of risk mitigation and improved risk management practices, addressing over-budget concerns, need to control costs, and to understand "cost-drivers". For details of the process, articles and presentations on CEVP® see www.JohnReilly.us or go to WSDOT's website at https://wsdot.wa.gov/engineering-standards/project-management-training/project-management/cost-risk-assessment

RISK, RISK MANAGEMENT - RISK WORKSHOPS

John continues researching, developing, writing, presenting, and practicing techniques to identify, analyze, control, and mitigate risk in complex infrastructure and underground projects. He has run risk identification and mitigation workshops for multiple large infrastructure and underground construction programs.

Risk workshops allow a project team to quickly identify, quantify, and evaluate potential threats, develop mitigation, or risk reduction strategies, determine cost/benefits for these strategies and to decide a prudent course of action. The work structure includes:

- Identify potential threats to the project.
- Examine related linkages and causal drivers.
- Quantify the impact of threats if they occur.
- Evaluate the probability of the threats occurring.
- Determine risk (impact x probability)
- Rank and prioritize risks for action.
- Determine action plans for top-ranked risks.
- Determine cost and cost/benefit for each action plan.
- Decide which plans to implement.

RISK AND RISK MANAGEMENT, CONSULTING

Risk Management– Lake Mead Tunnel, NV

Risk management definition, define and facilitate risk workshops and advanced risk identification processes, construction risk management plan, oversight of risk management procedures, risk compliance reports for the Owner (Southern Nevada Water Authority) and contractor (Vegas Tunnel Contractors) for this extreme TBM tunnel application (design for 17 bar pressure). 2008-2015.

Risk Management, Risk Process implementation, CEVP® + RIAAT[1] Lima Peru

John provided risk management and risk process implementation services for Lima Airport Partners new terminal and runway in Lima Peru, including advanced risk identification, response, mitigation and implementation processes, development of Risk Management Policy, Risk Management Plan, and associated risk implementation process as well as implementation of Team Alignment, Partnering and definition of alternatives re contracting, procurement and delivery. 2017-2019

Risk Evaluation, Delaware Aqueduct Tunnel, Hudson River

Development of a risk analysis process to assess the exceptionally low probability of collapse, after dewatering, of this 1940's tunnel under the Hudson River which supplies half of NY City's water. The tunnel was leaking 15 million gallons/day which needed to be addressed by construction of a bypass tunnel and then dewatering of the existing rock tunnel. Development, with colleagues RiskConsult in Austria (www.riskcon.at) of a fault-tree risk evaluation process using the proprietary software RIAAT.

Risk Workshops, Risk Management, Risk Management Oversight

Application of risk identification, mitigation and response for multiple projects and programs in association with work in development of CEVP® WSDOT's probabilistic cost-risk validation process. These include.

- Alaska Railroad extension, risk workshop followed by CEVP cost-risk workshop 2005.
- Alaska Railroad Fairbanks re-alignment, risk workshop 2005.
- Alaskan Way Viaduct replacement program – annual workshops from 2001-2009, including use of cost, risk, value engineering and scope changes to manage to the Legislature's defined budget. See also our paper: "Use of Probabilistic Cost Estimating CEVP® in the management of Complex Projects to Defined Budgets," Reilly, J.J., Laird, L., Sangrey, D. & Gabel, M. International Tunnelling Association Conference, Helsinki, May 2011.
- Brightwater program, King County WA - Risk process and workshops to facilitate decisions to narrow the alternatives for the Brightwater tunnels. 2003.
- Dallas Airport, people mover operational readiness risk workshop. 2004.
- Los Angeles Metro Green Line - risk workshop, readiness for operations. 1994.
- Omaha CSO program – risk workshops. 2006-2008.
- Pennsylvania Maglev program, cost-risk workshop. 2003.
- Pittsburgh PA, Light Rail extension program, cost-risk / CEVP workshop demonstration for FTA. 2003.
- Sir Adam Beck Niagara hydro tunnel, risk workshop. 1998.
- SR520 Floating Bridge replacement, Seattle. CEVP / risk workshops, 2002-2010, Risk Management Plan 2012, Risk specification RFP for construction 2011, Risk Review 2013.
- Utah Dept. of Transportation, risk demonstration / CEVP workshop, Salt Lake City, 2006.
- Waterfront Toronto – implementation of CEVP cost-risk process for this complicated set of urban infrastructure projects with critical funding, schedule, and stakeholder requirements. 2006-2007,

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[1] RIAAT: Risk identification and administration, developed by colleagues at RiskConsult in Austria. www.RiskCon.at

Risk Management Guidelines

1. Review, input and commentary, International Tunneling Association, ITA 2004 “Guidelines for Tunnelling Risk Management”, International Tunnelling Association, Working Group 2, Eskensen, S, TUST Vol. 19, No. 3, pp 217-237. Now the ITA Code of Practice for Risk Management in Tunneling Works, 2023.
2. Review and implementation, ITIG Code of Practice for Risk Management, Lake Mead Tunnel, 2008-2010

Risk Publications Book Chapters:

3. Author of “Chapter 4, Risk Management” in “Recommended Contract Practices for Underground Construction”, Society for Mining, Metallurgy, and Exploration, Inc. Denver 2008
4. Reilly, J.J. 2013b Author of the Foreword, co-author of the Chapters on Risk, Cost and Schedule management in "Managing Gigaprojects", ASCE press 2013, Edited by Galloway, Nielsen and Dignum.
5. Reilly, J.J., 2010c, Chapter 5, "Cost and Schedule Control", "Megaprojects: Challenges and Recommended Practices" ACEC Press, Spring.

Risk Publications, Conference Proceedings:

6. Reilly JJ, Spiegl M & Sander P, 2023 “30 years of Advances in Risk Management for Underground Projects” RETC Conference Proc. Boston June.
7. Spiegl M, Sander P, Burns T & Reilly J.J 2021 “Integrated Cost-Schedule Risk Analysis: Application of Project Risk Twin Process for Major Infrastructure Projects using RIAAT” AACE Conference Boston June
8. Reilly, J.J. 2021 “Megaprojects, Risk, Contracting and CEVP – What have we Learned?” presentation to the US Cost-Risk-Engineering-Management group (CREM – WSDOT) December
9. Reilly, J., 2018 “Megaprojects and Risk”, BSCE Lawler Lecture, Boston, May
10. Reilly, J.J. 2017, “A Short History of Risk Management”, Risk Management Conference, Alexandria VA, and Los Angeles (2019).
11. Sander, P., Entacher, M., Reilly, J., & Brady, J., 2017 “Risk-based Integrated Cost and Schedule Analysis for Infrastructure Projects”, TBM Business Magazine April.
12. Reilly, J.J., Moergli, A, & Sander, P. 2015 “Risk-Based, Probabilistic Cost Estimating Methods” International Tunneling Association, World Tunnel Congress, Dubrovnik May
13. Reilly, J.J 2004b w. Brown, J “Management and Control of Cost and Risk for Tunneling and Infrastructure Projects” Proceedings, World Tunneling Conference, International Tunneling Association, Singapore, May
14. Reilly, J J 1999a “Policy, Innovation, Management and Risk Mitigation for Complex, Urban Underground Infrastructure Projects” ASCE New York, Metropolitan Section, spring geotechnical Seminar, May.

UNDERGROUND CONSTRUCTION / TUNNEL PROGRAMS

Perhaps more than any other field, underground projects involve an unusual mixture of art and the science of engineering. John's consulting involves management, strategic planning, contracting, partnering, value engineering and risk mitigation for complex infrastructure, systems, and underground programs.

John was US representative and Animateur for the International Tunneling Association (ITA) Working Group (WG) 13 which examines the direct and indirect benefits of underground projects. Subsequently he integrated the goals of WG 4 (Planning) and WG 15 (Environmental) to form Working Group, No. 20 “Urban Problems, Underground Solutions”.

In 2000, John sponsored a worldwide review of underground projects, to better understand what makes one project successful while another can have major problems. This has led to management and strategic recommendations which have benefited key clients and are documented in papers and presentations (see “Publications”).

Types of underground projects include large complex infrastructure and transportation programs.

- Tunnel Boring Machines (TBMs) include open digger shields, slurry shields, earth-pressure balanced machines, convertible machines (mix-shields), hard rock machines.
- Cut-and-cover line and station structures for transit systems.
- Soft earth tunnels using steel, cast-iron and concrete liners.
- Single and double track rock tunnels using NATM or ribs and concrete.
- Mined rock station construction using rock-bolts, shotcrete, and steel sets.
- Large scale jacked-pipe, medium diameter, tunnel systems.
- Underpinning construction includes slurry wall earth retaining and underpinning systems.

Tunnel Boring Machines (TBMs)

John Reilly has actively worked on the question "How much should an owner be responsible for the definition of Tunnel Boring Machines (TBMs) including the degree to which their configuration and operating characteristics are specified".

This question, and the related issue of the balance between, or choice of, prescriptive or performance specifications has been debated in several of John's projects, including:

- Washington DC Metro, tunnel sections D1, D4 and A4, including Dupont Circle mined station.
- LA Metro, Segments 2, 3 and the East Side Extension
- LA Metro, contracting and delivery alternatives, Westside Extension Project
- Toronto Rapid Transit Expansion Program, Sheppard tunnels
- Sir Adam Beck Hydro project, Niagara Falls initial TBM approach, risk management.
- Seattle Alaskan Way Replacement Tunnel definition & implementation.

This has also been the focus of discussions with International Associations in Mexico, Austria, Switzerland, Holland, UK, Germany, Australia, China, Sweden, and Korea.

Tunnel Boring Machines – Key International Papers

- In 1997 John presented a seminal paper on TBM selection and considerations titled ‘Owner responsibilities in the selection of tunnel boring machines with reference to contractual requirements and construction conditions’ (Tunnels for People, Vienna April 1997 Proc pp 749-756 AA Balkema).
- In 2000 John presented a Keynote Address at the Tunnels & Tunneling Symposium in Beijing titled ‘Management of Complex Underground Projects’. The lecture covered management, strategic planning and cost and risk procedures to improve the performance of major, complex tunneling and underground construction projects. The article was printed in Tunnels & Tunneling, International, Chinese Edition 2000, pp 3-9 (in Chinese).
- In 2001 John, with colleagues from Geodata Torino, authored a paper “High Level Report, TBM Development for China, Joint Cooperation – Technology Development, Chinese Tunnel & Hydro Projects” which covered implementation of TBM technologies for application to the long water and transportation tunnels planned for China in the upcoming decade.
- In September 2001 John, with Professor Fu of ISRM, convened a special workshop of key Chinese professionals and International TBM experts to discuss TBM development / joint-manufacture in China, held in Beijing. Reported in China Construction Journal, No. 5, June 2002 (in Chinese). That implementation is now routine.

Specific Underground Assignments

- Engineering coordination and technical management of underground cut-and-cover and NATM rock stations; cut-and-cover, earth and NATM rock tunnel line sections; underpinning of buildings by jacked-piles and permanent slurry walls. Planning for machine bored line tunnels in rock. Washington DC Metro System 1969 - 1972
- Secretary, Board of Engineering Consultants, Washington DC Metro System 1969 - 1972
- Advisory services, Federal US buildings, Washington DC. Impact, cost reduction and mitigation of effects caused by earth tunnels adjacent to historic buildings. General Services Administration 1974 - 1978
- Project and design management for a permanent slurry wall system acting as underpinning and final tunnel wall. MBTA, Southwest Corridor Project, Boston 1982 - 1985
- Evaluation of advanced European underground engineering and construction technologies for the US market. Focus on technologies, value and cost competition, new capabilities, and acceptance. Systems included earth pressure-balanced shields in soft ground with extruded concrete lining, soft ground NATM construction, diaphragm, and cut-off walls. Hochtief AG with Dames and Moore, 1987 - 1988
- Engineering alternatives include the cost and technical merit of large underground interaction chambers, 54 miles of precast jacked tunnels and ventilation shafts. US Superconducting Supercollider, State of Florida proposal 1987
- Engineering and construction alternatives, impact analysis - proposal to tunnel Route 1 under historic Old Town, Alexandria Virginia, 1987
- Construction management, underpinning historic buildings, Back Bay, Boston, 1987-1989, 1999.
- Los Angeles Mined Transit Stations task force. Management of a technically focused team to evaluate options and technical implications of using alternative construction methods - including full underground mining - for the heavy rail transit stations of the Red Line, Segment 2. Los Angeles Metro, Rail Construction Corporation, 1991
- Opinion, technical merit, and value, related to elimination of reinforcement for the final tunnel liner, Los Angeles Metro System. Scope included soil-structure interaction, concrete integrity, durability, dynamic analysis, and earthquake forces. 1992
- See other examples at www.JohnReilly.us

OTHER PUBLICATIONS related to risk:

Risk and management of cost, related papers, extracted from over 100 papers since 1992.

1. Reilly, J.J., Moergli, A, & Sander, P. 2015a “Construction – Risk Based Cost Estimating” RETC June
2. Reilly, J.J., Moergli, A, & Sander, P. 2015b “Risk-Based, Probabilistic Cost Estimating Methods” International Tunneling Association, World Tunnel Congress, Dubrovnik May
3. Reilly, J.J., Moergli, A, & Sander, P. 2015c “Quantitative Risk Analysis – Fallacy of the Single Number” International Tunneling Association, World Tunnel Congress, Dubrovnik May
4. Reilly, J.J. 2014 “Megaprojects Management and Delivery”, Paper and presentation to the Italian Tunneling Society conference, Bologna, October.
5. Reilly, J.J. 2013c "Alternative Contracting and Procurement for Megaprojects", UCA/Tunneling Journal Cutting Edge Megaprojects Conference, Seattle, November.
6. Reilly, J.J. 2013b Author of the Foreword, co-author of the Chapters on Risk, Cost and Schedule management in "Managing Gigaprojects", ASCE press 2013, Edited by Galloway, Nielsen and Dignum.
7. Reilly, J.J. 2013a, "Megaprojects, Successes Learned" keynote presentation for the UCA Fox Conference, New York, January.
8. Reilly, J.J., Sangrey, D., Gabel, M., Prill, W. & Shilbayah, S. 2011b "Emerging Methodologies to Improve Cost and Schedule Estimates, Using Risk-based Evaluation – The Success of CEVP®", Rapid Excavation Tunnelling Conference, San Francisco, June.
9. Reilly, J.J., 2010c, "Cost and Schedule Control", Chapter 5 "Megaprojects: Challenges and Recommended Practices" Spring.
10. Reilly, J.J., Sangrey, D. & Warhoe, S. 2010a "Management of Cost & Risk to meet Budget & Schedule", International Tunneling Association, World Tunneling Conference, Vancouver, May.
11. Reilly, J.J 2009a ‘Probable Cost Estimating and Risk Management Part 2’ Proc. International Tunneling Association, World Tunnel Conference, Budapest May
12. Reilly, J.J 2008b "Probable Cost Estimating and Risk Management" Proc. North American Tunneling Conference 08, San Francisco, June
13. Reilly, J.J 2008a, "Chapter 4, Risk Management" in "Recommended Contract Practices for Underground Construction", Society for Mining, Metallurgy, and Exploration, Inc. Denver.
14. Reilly, J.J 2006b, Cost Estimating, Probable Cost, Risk Identification and Risk Management for Infrastructure/Rail Projects" Proc. APTA Rail Conference, NY, June.
15. Reilly, J.J 2006a, "Risk Identification, Risk Mitigation and Cost Estimation", Tunnelling & Trenchless Construction, April.
16. Reilly, J.J 2005c "Cost Estimating and Risk Management for Underground Projects", Trenchless Engineering, Magazine, Krakow, Vol, No. 2-2005 (in Polish)
17. Reilly, J.J 2004c w. McBride, M, Sangrey, D, MacDonald, D & Brown, J. "The development OF CEVP® - WSDOT’s Cost-Risk Estimating Process" Proceedings, Boston Society of Civil Engineers, Fall/Winter 2004
18. Reilly, J.J 2004b w. Brown, J "Management and Control of Cost and Risk for Tunneling and Infrastructure Projects" Proceedings, World Tunneling Conference, International Tunneling Association, Singapore, May
19. Reilly, J.J 2004a "Management and Control of Cost and Risk for Tunneling and Complex Infrastructure Projects”, Proceedings, North American Tunneling Conference, American Underground Construction Association, Atlanta, April.
20. Reilly, J.J 2003c "The Relationship of Risk Mitigation to Management and Probable Cost", Proc International Tunneling Association, World Tunnelling Congress, Geldermalsen, Netherlands, April
21. Reilly, J J. 2002a w. McBride, M, Dye, D & Mansfield, C - Guideline Procedure. ‘Cost Estimate Validation Process (CEVP)’ Washington State Department of Transportation, January
22. Reilly John; Arrigoni Gianni; Xu Shulin; Grasso Piergiorgio; Qian Qihu; Li Xingbi "TBM and its application to China", Modern Tunnelling Technology, 2002, Issues 1-4.