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Megaprojects, Management Over 50 Years – What Have We Learned?

John Reilly, president of John Reilly Associates International, talking about his professional work, managing megaprojects and risk management.



John Reilly graduated from the University of Sydney (BE Civil 1963) and the University of California (MS Structures 1965). He is a registered Professional Engineer in Australia and the United States.

In 1966 he designed the first prestressed concrete building in Vancouver, BC, Canada and part of an elevated freeway in Sydney, Australia. He moved to the US in 1967 as project engineer for 13 core projects of the Washington DC Metro system and was Secretary to the Board of Consultants. From 1973 to 1978, he analyzed historic structures in Washington before moving to Boston to manage design of a complex rail, transit and urban development project as well as planning for Logan Airport's expansion.

In 1987 he established his consulting firm, focusing on management and technical advice for complex Metro design and construction, including organization, partnering, design, contracting and risk management for projects in Los Angeles, Toronto, San Francisco, Boston, Atlanta, Philadelphia, Seattle, Pittsburgh and London, UK.

From 2001 to 2013 he advised the Washington State Department of Transportation (WSDOT) on management, team-alignment, partnering, organization, contracting and technical issues as well as the development and implementation of WSDOT's probabilistic cost estimate validation process (CEVP®) linked with advanced risk identification and management. He led high-level expert panels for several WSDOT projects.

He is the author of book chapters on risk, contracting, cost and schedule and has authored over 80 papers.

Sander: *Your professional work affected many complex projects since the 1970s. What is your personal key experience (do's and don'ts) in managing megaprojects?*

Reilly: My paper for the 2016 WTC conference in San Francisco includes recommendations about megaproject management, from lessons-learned over 50 years. It notes that keys to successful delivery include a focus on key goals and objectives, proactive communication with, and outreach to, politicians and the public, selection of management personnel who are technically and managerially competent and who can demonstrate leadership in difficult circumstances. Management and technical processes must be appropriate and applicable for the project – and specific processes may need to be developed for these projects, as we have done for the Washington State megaprojects. Specific processes, for example, include team-alignment, contracting methods, risk management and CEVP® probabilistic cost estimating.

S: *John, you are a well-recognized expert in risk management around the world. How did the application of risk management in megaprojects develop over the last decades?*

R: In the 1990s, when I reviewed lessons-learned from my megaprojects at that time in Los Angeles, Toronto and San Francisco, I realized that risk management was probably more important than “normal” management. However, risk processes

were not well known in the underground industry and we did not have a good understanding of advanced risk processes. Following the ITA Conference in Vienna 1997, with co-authors from the UK and Sweden, we explored risk management and its application to underground projects. Many papers were presented and discussed in cities worldwide. This led to the development and application of probabilistic risk processes for the Washington megaprojects and then communication of these processes to agencies in the US, Canada and also in Europe. There is still much work needed in order to communicate the importance of advanced risk management, but we have made significant progress in the US.

S: *Owner and contractor – you have worked on both sides. Where do you see the main differences when it comes to risk management?*

R: The owners are more concerned, in the beginning, to define the scope, cost and schedule of their projects. They need to get funding from Legislatures so that means they must build support from the public and key stakeholders. They must understand the complexities and uncertainties of their projects to be able to manage them and deliver them within budget. This means that they must be concerned with risk and management of that risk. This means that they are generally more appreciative of the need for advanced risk management and use of a probabilistic approach. They also better

understand the need to continue the risk management process in construction.

Contractors take a simpler approach to risk management (generally a qualitative approach). They rely on historical, and perhaps more basic, risk processes to help establish their tender price and to avoid financial loss in construction. They are reluctant to share their risk information with owners. We are working to show contractors that a more specific, probabilistic approach can give them a competitive advantage, which could also improve the possibility of more profit from their projects.

S: *You are the father of the Cost Estimate Validation Process (CEVP®) of the Washington State Department of Transportation (WSDOT). What was the benefit for the owner implementing this risk management process?*

R: The WSDOT Secretary, Douglas MacDonald, realized that WSDOT had difficulties with estimating the cost of complex projects and asked for a better method. A colleague and I combined validation of the base cost (the cost if all goes as planned) with the consequences of potential risk events, should they occur. Our goal was to demonstrate to the public and politicians that WSDOT had a good understanding of the projects and their probable cost. A good understanding also meant that WSDOT could commit to manage the projects within budgets (“we can’t manage what we don’t understand”). The public understands that there is always a “range of cost” and that a single “number” is often too low, and will be exceeded in many cases. Communicating the reality that future costs are always a range was understood by the public and was a key factor in the State Legislature approving funding for the WSDOT megaprojects.

S: *Risk management standard today: What do you think both worlds (Europe and US) can learn from each other?*

R: Both Europe and the US understand that there are major consequences if risk management is poorly done – i.e. cost and schedule overruns, accidents, loss of credibility and delayed facility use. Risk processes developed in the US can help in Europe and those developed in Europe can help in the US. International Standards and Codes (e.g. ITIG) are applicable in all countries. Owners who apply these processes – for example WSDOT, Federal Highway and Federal Transit Agencies in the US – can set an example for each other and make a “business case” for improved risk management.

S: *Quantitative risk assessment: You are a strong supporter of the probabilistic approach. What is the value added of this technique and how can it be applied in projects?*

R: There are many benefits – in addition to a better understanding of risk, the probabilistic method is more detailed and specific than qualitative and approximate risk methods. It gives more information, which can be used for an improved understanding of potential risk events, more accurate risk charac-

terization and improved risk mitigation. Risk dependencies and inter-relationships can be modeled and their potential consequences more completely understood.

Additionally, we have found that the risk workshops create more “engagement” by the project teams – leading to an earlier, more complete understanding of their project – thus allowing more timely and strategic approaches to project management and risk mitigation.

S: *What are the biggest challenges for risk management in megaprojects?*

R: Risk management processes are well developed and understood in theory – however, their practical application requires that executive management understands the need for, and the benefits of, risk management. They must ensure that risk management is used, taken seriously and implemented continuously. Programmatic risk management – in the case of planning, design and construction for multiple projects – is a higher-level risk management application, which is essential to meet programmatic goals and objectives.

The treatment of low probability/high consequence events – such as the Alaskan Way Tunnel problem now in Seattle or, previously, the possibility of squeezing rock impacting the TBM under Niagara Falls in Canada, is difficult. How to best address this type of risk has not been well resolved.

S: *What future trends and challenges do you see for risk management in megaprojects?*

R: Trends are: a more-widespread understanding and use of risk management; more papers on and discussion of risk at underground construction conferences (ITA etc.); more owners who understand the need for risk management; more awareness from the public of the need for better cost estimating; more contractors who will ask questions about risk management; requirements in more contracts that the ITIG Code and best risk practices must be used; simplified risk registers should be included in tender documents for response by contractors; risk will be more widely recognized as important.

Challenges include: continuing education of owners, designers and contractors of the need for risk management; a better understanding of good risk management procedures and “best practices”; consistent application of risk management; use of probabilistic cost estimating in planning, design and construction and; adoption of explicit, advanced risk management by contractors – who should be more open and participative with the owner and designer in the development, maintenance and application of construction risk registers.

S: *John, thank you for this interview!*

R: You’re very welcome.

Das Gespräch führte Dipl.-Ing. Dr. techn. *Philip Sander*, Geschäftsführer zweier Beratungsunternehmen in Innsbruck.

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