How the best ideas win: the role of collaboration in successful innovation

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Summary

This white paper describes two of the most important features leading to the success of transport infrastructure alliances and partnerships based on insight from T+T’s experienced transport leads, Peter Millar and Chris Perks. Millar is a principal geotechnical engineer and past managing director of T+T who’s worked on dozens of transport projects and led four transport alliances. Perks is a specialist transport project manager who’s worked on major British transport projects for Mouchel in the UK and Dubai, and for MWH in Australia. He migrated to New Zealand six years ago and worked for the NZTA before coming to T+T.

Their thinking, based on years of experience and success, is that large-scale collaboration is essential to achieving success for clients. Successful innovation is the result of listening to and then evaluating and implementing ideas in a collaborative process. It requires trust and a willingness to evaluate ideas from many sources.

The link between collaboration and innovation is illustrated using examples from recent NZTA successes.
In 2016 and beyond, agencies in the public and private sector face unprecedented pressure to achieve the best value for money within limited budgets. Engineering consultancies and constructors procured to deliver as part of an alliance, partnership or design and build arrangement, need to deliver sustainable, safe and robust infrastructure solutions without compromising quality for cost and time.

When coming together as a team, however, designers and constructors face significant challenges. Alongside essential project deliverables, they must manage complex contractual arrangements along with new team dynamics and intense public scrutiny. Initially, each party is also hyper vigilant - keen to protect interests critical to their contribution. In this environment, it’s easy to see how constraints may become barriers to innovation and best project outcomes.

In T+T’s experience, trust and collaboration are the precursors to innovating the processes, techniques and materials that achieve the best project outcomes. We’ve found that when trust and collaboration are mixed with the right people, disciplines and experience, innovation follows - regardless of technical complexity and budget constraints.

Chris Perks, T+T’s transport lead says, “Constructors frequently seek T+T as a partner based on the understanding that T+T’s approach will support projects where significant innovation is required to meet tight deadlines or achieve cost efficiency. Many consultancies and constructors view these environments as limiting and stressful. But we commit to working together rather than as individuals because we know that teams can surpass expectations of themselves and their clients.”

T+T characterises collaboration as individuals taking personal responsibility for individual and group decisions, sharing their insights and differing perspectives on common goals, working through times of tension and conflict, and simply behaving well. Courage is essential to our definition of collaboration. Innovative ideas and approaches naturally invite opposition and discouragement. Individuals must be willing to ride out the initial discomfort when sharing their potentially innovative solutions.
Co-location plays a critical role in developing a healthy, collaborative team culture. When working in close proximity to others, people become aware of others’ circumstances and constraints. This helps them to employ a degree of mindfulness and care in their behaviour and actions.

Close proximity also increases trust in other’s intentions. When sitting beside or opposite the person or group communicating a controversial or conflicting point of view, it’s easy to understand their intentions regardless of the content of their opinion. Compare this to an email with a conflicting point of view, for example. Regardless of the sender’s intentions, an opposing view nearly always sounds antagonistic as there’s no context for interpreting meaning other than words. One-to-one conversations are also more likely to occur when working in the same location, and these are always valuable because they reveal people rather than organisations.

For organisations and individuals who are unfamiliar with each other but must depend on each other for deliverables in a high stakes environment, co-location fast tracks strong, trusting relationships. A genuine team culture forms because all members understand they are equally committed to the same goal.
Agility and flexibility - the role of trust in innovation

Trust is an essential aspect of innovation. With a trusting attitude, we’re prompted to genuinely consider different thinking and solutions, and this flexible mind set is part of the innovation process.

For designers and constructors, mutual trust means that ideas for design and build processes can be tested, revised and modified literally over the table. This significantly reduces the time it takes to get a good decision over the line and ultimately helps teams to meet or exceed expectations for delivery times.

The recent Memorial Park Alliance contracted to deliver the Arras Tunnel and Pukeahu National War Memorial Park in Wellington is a great example of the link between collaboration, trust and innovation. This alliance - seen by the New Zealand Transport Authority (NZTA) as one of New Zealand’s most successful - was characterised from the outset by a high degree of trust and collaboration. It was the alliance's strong team culture that supported the development and assessment of many innovative techniques and processes which resulted in exemplary design and rapid construction of works.

The alliance team completed the tunnel before its due date and generated significant cost savings, both of which boosted the reputation of the NZTA. The NZTA now view the Memorial Park Alliance as a model for best practice. Based on its success, both Wellington City Council and the Ministry of Culture and Heritage followed up with planned complementary works in Wellington using the same alliance team.

Peter Millar, principal geotechnical engineer and a former managing director at T+T, has worked on dozens of transport projects in the last 30 years. He’s provided guidance on four successful alliance projects for the NZTA and held a lead governance role on the Memorial Park Alliance. He says, “The Memorial Park Alliance’s guiding principles were established early on. We wanted all team members to act on a ‘best for project’ and ‘best for team’ basis so we created an environment for these behaviours to occur. A courageous, collaborative culture was our point of difference before we were awarded the contract and is still a constant of the relationship.”

Memorial Park Alliance - Arras Tunnel and Pukeahu National War Memorial Park

“The mark of a good alliance is not knowing where everyone’s home base is. I for one couldn’t tell you where most of the staff hail from.”

Brent Maguire, NZ Transport Agency Interface Manager

- 86 per cent of stakeholders satisfied or very satisfied with alliance communication and interaction
- Protection of a historic sewer still in use - geotechnical and geometric design and construction teams revised foundation works to leave the sewer in place
- Straight shaft tension piles vulnerable to severe liquefaction – constructors installed belled piles after modifying a belling tool

Arras Tunnel and Pukeahu National War Memorial completed in time for Anzac Day celebrations 2015
- Arras Tunnel completed five weeks early
- Pukeahu Park completed three weeks early
Choices and opportunities - the process of innovating

Without input from constructors into the build implications of their innovative ideas, designers can spend a lot of time chasing things on the periphery. An innovative idea - with its intention of reducing costs and creating a novel, lasting piece of infrastructure - can easily become impractical, time-consuming and expensive. Millar says, “There’s not a lot of value in having designers work in isolation. The design must be optimised by the expertise and input of consultant, construction and client partners. Once a decision is made, the principles of ‘best for project’ mean that everyone will support it.”

Allocating enough time and resource to working through ideas and their potential maximises the chances of identifying worthy opportunities. Millar explains that the NZTA’s provision of adequate time for the scoping and design phase of Memorial Park was the main reason the alliance surpassed expectations for timing, cost, and the quality of design and build.

“Major opportunities most often occur in the early phase of design rather than during construction. So a rule of thumb is to focus on opportunities where the potential gain is at least five times the cost of design and development. This helps teams to make the most of the opportunities that are available in terms of innovation in process, techniques or material,” says Millar.

To ensure that only the best, workable concepts and solutions make it to final design, Millar always pushes to bring partners together at the start of a project’s design and scoping phase.

“Ideas need to be tested quickly for cost, merit and build practicality, otherwise there’s potential to be diverted onto things that don’t matter. It’s important to have cost information going to designers, so that designers are hunting for those things that make a real difference to the project. This stage of collaboration between constructors and designers really is the most critical element of a project’s success,” he says.

Pukeahu National War Memorial Park, Wellington, New Zealand
The value of early collaboration is illustrated with an opportunity that emerged in the scoping phase of the Memorial Park Alliance’s Arras Tunnel. Alliance designers recommended the constructors create belled piles rather than deeper friction piles. Although the constructor’s preference was to use a deeper pile approach, this didn’t economically deliver the capacity required for uplift resistance under design earthquake conditions. After discussion and a clear articulation of the structural implications of the alternative, the team developed an effective belling tool to carry out the required work. “This opportunity encouraged our constructor partners to revise their conventional thinking and turned a major problem into a large cost saving”, says Millar. “They were open to our concerns because we took time to articulate the situation and convey the project benefits to be made. Ultimately, the constructors were the real innovators - creating a variation on technology to achieve something new,” he says.

As part of the Well-Connected Alliance - the team responsible for the tunnelling infrastructure and design of Auckland’s Waterview Connection - T+T was involved in another opportunity to reduce project costs at the design phase. This time, the alliance team wanted to reduce the significant costs associated with tunnel boring method, so designers and constructors spent considerable time and resources evaluating the merits and potential outcomes of different evacuation methods. Both sides put forward strong cases for their proposed technology. Options included investigation of several smaller road header tunnelling machines working simultaneously as a cheaper alternative to one large machine. Ultimately, however, the constructor’s concerns around the increased risk associated with the more cost-effective excavation option was the decider. Both agreed that the safe, but more expensive single tunnel machine solution was best for project.

“The collaboration itself was the winner,” says Millar. “In this instance, going for the expensive, low risk option was the right decision. Understanding and accepting this early on gave us time and the freedom to find other ways to innovate for reduced cost and performance,” he says.

This collaborative action is especially important when designs incorporate technology and processes without a precedence to follow. Perks explains that T+T works in tandem with constructors to design both the solution and construction methodology. “Integrating a constructor’s expertise into the design of a project is fundamental to a great outcome for everybody. You’ve got a design the constructor has confidence in and can build quickly - they also know what the job’s going to cost because they’ve had input into it. And, the client’s happy because the job is built to the standard they want within the timeframe and costs they were expecting,” he says.
The Auckland Waterview Connection

9+ team of experts
• Engineering geologists
• Geotechnical engineers
• Civil engineers
• Stormwater engineers
• Ecologists
• Hydrologists
• Environmental managers
• Constructors
• Tunellers

5 km highway
• 2 x 14.5m diameter tunnels with 3 lanes each
• 4 x major motorway interchange viaducts
• 15 x mined cross-passages
• 1 x 5 km highway/2.5 km underground highway

7+ collaborating organisations
• NZTA
• Fletcher Construction
• McConnell Dowell Constructors
• Beca Infrastructure
• Tonkin + Taylor
• Parsons Brinkerhoff
• Obayashi Corporation

NZ $1.4 billion project Innovations = NZ $36 million savings

The inside of Alice

Waterview Connection, Auckland, New Zealand
Collaboration culture - the foundation for success

While a collaborative approach is expected in any infrastructure partnership and supported by co-location and allocation of responsibilities, it’s not a given. T+T’s extensive experience as a major project partner has repeatedly shown that successful project outcomes occur when the project organisation minimises hierarchy, and gives smart, capable people the permission to make the right decisions.

Both Millar and Perks stress the importance of participating organisations to have a genuine collaborative culture they can bring to force in an alliance or partnership. The concept of leaving all company hats at the door and operating on the ‘best for project’ basis is useful.

T+T’s workplace culture, perhaps ironically, legislates trusting, innovative and collaborative behaviour through its modus operandi.

As an employee-owned business, our growth and success depends on employees’ deep understanding of our clients’ businesses and using this insight to develop strong, trusting relationships that lead to more business. The office environment is naturally open to hearing and testing compelling ideas and staff are provided with the cultural and logistical support to manifest values of collaboration and courage. These traits are critical to developing the experience and expertise needed for successful teamwork and projects.

“The character and culture of T+T means we’re always looking for the opportunity to do something better in the context of achieving success for our clients,” says Perks. “We’ve got smart people working for us, we cooperate and we work well in teams. These things create an environment which cultivates innovation and success.”
Conclusion

It’s T+T’s view that alliances and partnerships who commit fully to the process of collaboration and developing a team culture who are most likely to innovate successfully. Their collaboration ensures that only best for project, high quality designs are delivered in a timely and cost effective manner.

Development of mutual trust is essential to effective collaboration because it helps people to listen to new ideas and information which can then be objectively evaluated for merit. Trust encourages great teamwork and making excellent ‘best for project’ decisions.

Collaboration, trust and innovation go hand in hand. By evaluating good ideas quickly and comprehensively within an environment mixing the right people and experts, teams focus their best efforts on the processes and technologies that deliver the most successful project and client outcomes. When alliance or partnership team members come from companies with a genuinely collaborative culture they positively support their temporary new colleagues to work in the same way.

With all alliance team members taking a high level of personal responsibility for processes and actions and freely sharing their thinking and ideas, innovation and success will follow.