

Kaikoura Earthquake Transport Links Re-Building Forum, Wellington 13 March 2018

New Zealand has suffered from a number of significant events in recent years and the Kaikoura Earthquake left its mark on a large area of the South Island. The magnitude 7.8 Kaikoura earthquake struck just after midnight on 14 November 2016 causing widespread damage, disruption to local communities and severing key road and rail connections.

Nine months after the earthquake struck, the Main North Railway Line was reopened and State Highway 1 reopened in December 2017.

Through a huge amount of hard work, team work and doing things differently allowed more than 100 landslides and slips to be cleared, repairs made to over 700 hundred sites including road and rail bridges and tunnels. The workforce had one main aim in mind to “reconnected the local communities which had been cut off”. The reinstatement of the road and rail links between Picton and Christchurch were critical to their survival.

Fast forward to Tuesday 13th March 2018, saw more than 70 engineers, planners, and other interested parties all come together in Wellington at Engineering New Zealand’s offices to listen and learn from those who were directly involved with this amazing outcome. The forum was brought together through the collaborative efforts of Engineering New Zealand Wellington Branch and Transportation Group and the Rail Technical Society of Australasia.

As a country we need to learn from these events and ensure that we build on those learnings for when future events occur.

The Master of Ceremonies, **Dame Fran Wilde** ensured that all who attended both enjoyed and learnt something new from each of the speakers. This ranged from how we should organise ourselves, people having to pull together to get the job done and seamless delivery – One Team with a total focus on delivery. Perception on progress was important that the public was kept up to date at every stage of the work

Following a welcome from **Craig Price**, President of Engineering New Zealand, we heard from a range of speakers including:-

Stuart Smith, Member of Parliament for Kaikoura who described the aftermath as it looking like the sea had gone out, a Tsunami....but it wasn’t, it was where the land had lifted up to 6 metres above where it had been. Stuart shared about impact that the loss of communications had on the local community. Money machines couldn’t operate which meant it became a cash only society for a period of time. How the locals pulled together and everyone helped each other even if you had just been passing through and got caught up in the earthquake

Dr Kelvin Berryman, GNSS shared on the ability to be able to benefit from the new data source through the use of science and technology. This included GPS data, Satellites providing accurate details from out of space and how LiDAR scanning was able to show where the shallow water was now

Tommy Parker, NZTA and **Todd Moyle**, KiwiRail shared on building a partnership that works. An alliance approach was determined as the best way to get everyone aligned quickly which was key to delivering a fast response and where difference companies could work together. This brought together the likes of NZTA, KiwiRail, Downer, Fulton Hogan, HEB Construction and Higgins into the North Canterbury Transport Infrastructure Recovery Alliance (NCTIR)

The remoteness of the damage was the biggest challenge for all that were involved. Moving mountains to reconnect communities was the Alliance Tag line and focus which helped to drive the outcome required. The design team had to be flexible and agile in producing solutions to meet the site work demands. Zero Harm was the key focus and there was a careful watch kept on staff who at times worked long hours. The other challenge was to keep people fresh and motivated throughout the project.

A panel discussion ably chaired by **Susan Freeman-Greene** from Engineering New Zealand, of senior managers from the different organisations; **Brian Kirtlan**, NCTIR, **Tim Crow**, NZTA, and **Walter Rushbrook**, KiwiRail provided a wonderful insight to the workings of the alliance. Whilst the work was managed by the NCTIR Alliance, the wider industry provided a large amount of support including design staff, who came from large and small business around New Zealand. The team focus was based on certainty of outcome within the time allowed for. They had to be agile without having to follow a linear project design process. They integrated the design & construction team so people better understood what the outcome had to look like. Both groups were able to make quicker decisions and were outcome focused.

Manea Sweeney, NCTIR, **Jane Small**, formerly NZTA and now at Auckland Transport, & **Tania Wati**, from Mahaanui Kurataiao Ltd shared their experiences on Planning and Relationships Stakeholder and Environmental Management. The project had to develop legislation and the resource management act had to be modified sometime with limited engagement and consultation. Desktop assessments were used and effectively they were saying “Trust us we know what we are doing”.

A broad range of technical challenges were faced by the NCTIR alliance, some of which were outlined by **Daniel Headifen**, **Richard Justice** and **Steve Proctor**. This included what had to be done and how it was achieved through design, construction management and Integration and striking the right balance between them. The alliance team shared about challenges such as just getting to site which wasn't easy, the lack of communications as many telecoms sites had been destroyed by the earthquake. Key issues were how to keep the staff safe without communications which they overcame by providing staff with emergency kit bags (bright orange) with locator beacon and food.

A resilience study using LiDAR data is now being used to help determine future potential slips. Looking for erosion and predicting where there is a risk of where future movements may be located along the road/rail corridor

Phil McQueen, KiwiRail, and **Richard Topham**, NZTA then shared about the assurance required for reopening the road and rail corridors.

For rail, they followed a structured assurance process which included risk assessments, the required sign off's and how they were able to demonstrate to the rail regulator that the safety case was safe.

For road, the road risk assurance process had to accommodate over 5,000 vehicles a day with lots of different types of vehicles. The road is currently closed at night and inspected daily before its opened. There are higher levels of inspections during wet weather just to ensure that the road is safe to be used.

Both road and rail teams were able to work together as there were clear lines of communications as part of the network operating framework. It's all about providing an adequate level of safety to all who are involved and users of the network.

Dave Brash, then facilitated an interactive audience Q & A session: This covered the wider implications for New Zealand and touched on the “Alliance Approach” – how can we retain the learnings and apply them into future works. Where to next and what do we want to see? Dealing with communities – facts vs emotions. As engineers we need to bring it back to the emotions. Change is needed to the law to allow us to work smarter and how can we make this happen.

The challenge moving forward is to capitalise on the learnings from this disaster and apply the learnings for future events. Let's not reinvent the wheel each time an event happens, but instead work smarter for the good of New Zealand.

Notes prepared by Steve Boshier, RTSA