



The Bulletin Kaikōura earthquake update

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CRANES RISE OUT OF THE COUNTRYSIDE - BRIDGE 103



New piles and beams are being installed at Bridge 103

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Permanent repairs to rail Bridge 103 over the Kowhai River, just south of Kaikōura, are getting underway - if you're passing Kaikōura's golf course on SH1, you may see cranes rising out of the countryside.

New piles and a crosshead beam will be installed and fixed to the existing bridge to allow trains to pass over the bridge at higher speeds. Giving the bridge its 'new legs' is expected to take about six months, with the team working from one end of the bridge to the other.

Each pier will have two new 900mm diameter piles with a crosshead beam connecting the two. The piles will be about 20m deep and will be constructed using a steel case with reinforced concrete. The beam between the piles will also be reinforced concrete.

Bridge 103, a 12-span bridge, sustained damaged to its piles in the November 2016 earthquake. Last year temporary repairs were carried out to enable trains to pass over the bridge under a 25km/hr speed restriction. This involved injecting epoxy resin into the cracked piles. Damage to the northern abutment was also repaired with core drilling work and a new concrete collar.

Once the new piles and beams have been constructed, the existing piles will be cut away from the bridge. This is done to transfer the load from the bridge through the new piles instead of the old ones.

The repair work means a walking and cycle track, the Kowhai Trail, will be closed at the site as it passes beneath the bridge on the river's northern bank. When work is finished on first piles, the team will assess whether the track can be safely reopened while work continues on the bridge.

This bulletin provides the latest information about the rebuild of road and rail networks damaged by the Kaikōura earthquake in November 2016. The bulletin is produced by the North Canterbury Transport Infrastructure Recovery (NCTIR) - an alliance representing the NZ Transport Agency and KiwiRail, on behalf of Government.





WILD WEATHER AND STATE HIGHWAY 1 CLOSURES



Please ensure you keep up to date with the latest travel conditions

Challenging weather conditions can affect anyone at anytime

For the first time in many months, Kaikōura recently had no road access overnight with winter weather closing State Highway 1, north and south of Kaikōura and the Inland Road (Route 70) to Kaikōura. Decisions to close the highway and the Main North Line railway are never taken lightly.

The NZ Transport Agency and KiwiRail place top priority on the safety of the travelling public and the crews working along the coastal route, as well as ensuring freight is not stranded in an inaccessible location. The Kaikōura coastline is still fragile and the area is vulnerable to severe weather with rain increasing the risk of rockfalls, surface flooding and small slips.

Decisions to close the highway are based on forecasted rainfall, using a range of predictive tools, and geo-tech inspections. One tool used is the Trigger Action Response Plan (TARP). The rainfall TARP is a risk management predictive tool that uses real-time monitoring of rainfall and forecasted wet weather events to determine the likely impacts on Kaikōura’s fragile landscape.

Forecasting of expected rainfall volumes in relation to previous rainfall conditions enabled the development of this predictive tool. Probable thresholds were established based on the rainfall-slope failure relationship that was found for the Kaikōura area.

Once a decision to close the road is made, it doesn’t stop there. There is a huge amount of logistical organisation and co-ordination required. For example, communications to the travelling public via the VMS signs and other supporting channels are updated to provide the public with real-time information and emergency services advised.

It is important to remember that a significant amount of construction work continues along the coastal corridor. Much of this is aimed at making many of the temporary measures put in place to reopen the road the public in December 2017, more durable and resilient over the longer term.

Much of the construction work you see along the coast today focusses on improving slope stability, and as this work is completed, adding more resilience to the hillsides, TARP thresholds will continue to adapt. This means over time we will have more confidence in how the coastal corridor will perform when tested by Mother Nature.

We understand these road closures and diversions can cause frustrations and changes to travel plans. Everyone travelling along this route has a destination – whether that’s a doctor’s appointment, a ferry to catch, a freight delivery or to attend a concert. These closures mean changes to plans, but the safety of travelling this route has to be balanced against getting to a destination.

Thank you for your on-going patience as we continue on improving the resilience and the speed at which the corridor recovers after major weather events on SH1.

WHERE TO FIND REAL-TIME INFORMATION?

- Call **0800 4 HIGHWAYS** (0800 44 44 49)
- Visit www.nzta.govt.nz/p2c
- Visit www.journeys.nzta.govt.nz
- Check www.facebook.com/nztasouthisland/
- Follow twitter.com/nztatots



SAFETY AND RESILIENCE WORK ALONG THE KAIKŌURA COASTAL CORRIDOR

On Thursday 28 June the NCTIR team hosted a project update information evening at the Kaikōura Museum. It was great to have so many people attend and talk to our team of experts about the draft concept designs for the safety and resilience work. Thanks to everyone that came along.

What is the safety and resilience work?

This work signifies a \$200million investment along the Kaikōura coast that will make it safer for everyone travelling in the area. It will also provide better and safer access for enjoying the coastal environment.

Residents and visitors to the area will be able to enjoy improved and enhanced parking, and access to key visitor destinations along the route. There will also be better amenities such as public toilets and panels telling stories about this iconic stretch of coastline.

While our teams are working along the coastal corridor to rebuild the transport networks, it's a great opportunity to deliver work in a way that minimises impact and maximises potential.

What will the safety and resilience work achieve?

Safety is a top priority for this work which includes widening shoulders, putting up safety barriers, creating safe stopping areas, and separating cyclists and pedestrians from road traffic where possible.

As well as making the road safer and improving journey time reliability, the work will also bring benefits to the region by supporting tourism growth, and encouraging people to stay for longer.

When will work be completed?

We're currently in the design stage. At this stage work will begin later in 2018 and will finish in late 2019. The first area we expect to complete is Ōhau Point in October 2018.

For more information and to see concept designs go to: www.nzta.govt.nz/kaikoura-earthquake-response/safety



NCTIR BY THE NUMBERS

May 2018



GEOTECHNICAL

HEAVILY LOADED
RETAINING WALLS,
UP TO 5M ABOVE THE
ROAD, ARE MADE UP OF
200+ PILES
WHICH ARE DRILLED
10M BELOW THE ROAD

**MORE THAN
33,000M²**
OF ROCKFALL
PROTECTION MESH
HAS BEEN WRAPPED
AROUND 7 SLIPS
SOUTH OF KAIKOURA
PROTECTING THE ROAD
AND RAIL BELOW

**MORE THAN
2700**
ROCK
ANCHORS
HAVE BEEN
INSTALLED ACROSS
7 SLIP SITES
SOUTH OF KAIKOURA

ENVIRONMENT

210
ARCHAEOLOGICAL
SITES IDENTIFIED

50 CONSENT
APPROVALS

PROFESIONAL
SEAL HANDLERS
HAVE PERSONALLY MOVED
13,200+ SEALS
(ADULTS AND PUPS)
SINCE FEBRUARY 2017

DURING CONSTRUCTION,
2350 FISH
FROM 13
NATIVE SPECIES
HAVE BEEN MOVED INTO
A DIFFERENT SECTION OF
THE SAME STREAM

SEAWALLS

2.5KM
OF SEAWALL
BEING CONSTRUCTED

7500
BLOCKS PLACED
TO BUILD SEAWALLS
NORTH OF KAIKOURA

EACH SEAWALL
BLOCK MAKING
UP THE BASE OF THE
STRUCTURE WEIGHS
5 TONNES

THE TALLEST SEAWALL
TOWERS TO
10M
ABOVE SEA LEVEL

EX-CYCLONE GITA

**THE ROAD REOPENED
EIGHT DAYS AFTER IT SHUT**

FREIGHT STARTED
MOVING JUST
13 DAYS
AFTER EX-CYCLONE GITA
BURIED RAIL TRACKS

300 MLS
OF WATER
FELL OVER 24 HOURS AT
ROSY MORN CAUSING
MATERIAL TO BURY A
HOUSE AND SECTIONS
OF RAIL & ROAD

300,000 M³
OF MATERIAL CLEARED
FROM 60 SITES
BOTH NORTH
AND SOUTH OF
KAIKOURA

PEOPLE


NCTIRS WORKFORCE
1100 PEOPLE



**1,700 AT THE PEAK
OF THE PROGRAMME
DECEMBER 2017**

MORE THAN
226 
ORGANISATIONS
HAVE WORKED WITH NCTIR
AS SUBCONTRACTORS

MORE THAN
4,500 PEOPLE
HAVE BEEN
INDUCTED 
INTO THE PROGRAMME

CREWS HAVE WORKED
 MORE THAN
3 MILLION
HOURS, CURRENTLY AVERAGING
200,000
HOURS EVERY MONTH

MORE THAN
2500 
SAFETY
LEADERSHIP CONVERSATIONS
WITH **700+**
HAPPENING EVERY MONTH

300 PEOPLE
LIVING IN THE TEMPORARY
ACCOMMODATION
VILLAGE 
IN KAIKOURA


KAIKOURA CAFES AND RESTAURANTS
HAVE SUPPLIED MORE THAN

 **100,000**
LUNCHES & DINNERS
FOR THE WORKERS AT THE
VILLAGE - HELPING TO KEEP
THEM IN BUSINESS WHILE
THE ROAD WAS CLOSED

THE EARTHQUAKE



**7.8 MAGNITUDE
KAIKOURA EARTHQUAKE**

THE SOUTH ISLAND MOVED
6M CLOSER
TO THE
NORTH ISLAND 



RUPTURES OCCURRED ON
21 FAULT LINES,
ACROSS **170KM**
IN A COMPLEX SEQUENCE THAT
LASTED FOR ABOUT 2 MINUTES

 THE EARTHQUAKE
GENERATED A
TSUNAMI OF NEARLY
7 METRES IN PLACES

HARBOUR


 **MARINA
REOPEN**
TO THE PUBLIC ON
14 NOVEMBER

22,000M³ 
OF MATERIAL
DREDGED FROM
KAIKOURA HARBOUR

RAIL


**RAIL REOPENED
TO RESTRICTED
RAIL SERVICES
10 MONTHS
AFTER THE EARTHQUAKE**

TRANSIT TIME OF
TRAINS REDUCED BY
1 HOUR 
SINCE REOPENING

MNL OPEN
90%+ 
(EXCLUDING CYCLONE GITA)

21,000+
FEWER TRUCKS

ON UPPER SOUTH ISLAND
ROADS BECAUSE OF THE
FREIGHT MOVED BY RAIL


**DAYTIME TRAIN
SERVICES AND
COASTAL PACIFIC
EXPECTED LATER IN 2018**

ROAD

SH1 NORTH AND SOUTH
OF KAIKOURA REOPENED
15 DEC 2017




**DURING DAYLIGHT
HOURS TO SUPPORT THE
TRAVELLING PUBLIC**

SH1 NORTH AND SOUTH
OF KAIKOURA REOPENED



AFTER THE EARTHQUAKE

BETWEEN CHEVIOT AND
CLARENCE THERE WERE
1,500+ 
DAMAGED SITES
**200+ WITH
MAJOR ISSUES**

100+  **ORIGINALLY
DAMAGED
STRUCTURES
OF THOSE NEEDING
REPAIRS WE ARE
MORE THAN** 
70% OF THE WAY THROUGH

85 
LANDSLIDES

 **184KM**
OF ROAD AFFECTED
BETWEEN WAIPARA
AND PICTON

NCTIR



THE TOTAL ESTIMATED
COST TO REPAIR THE
DAMAGE TO THE SOUTH
ISLAND TRANSPORT NETWORKS
CORRIDOR REMAINS AT
\$1.3 BILLION

 SEPARATE TO THIS IS THE
**\$65 MILLION
DOLLAR
ALTERNATE ROUTE
IMPROVEMENTS PACKAGE**

AS OF APRIL 2018
\$591 MILLION
 HAS BEEN SPENT ON CORE
EARTHQUAKE RECOVERY
WORK INCLUDING CLEARING
LANDSLIDES AND BUILDING
NEW INFRASTRUCTURE

BRIDGE 90 – ONE OF THE TRANSPORT REBUILD’S MOST REMOTE WORK SITES



Work is getting underway to build a permanent rail bridge over a tributary of the Conway River. It is at one of the transport rebuild’s most remote work sites, accessible only by a farm track on the southern flank of the Hundalees. And although few people will ever see the bridge, its story gives insight into necessary infrastructure recovery works after a natural disaster.

The piers of the original bridge, known as Bridge 90, were so severely damaged in the November 2016 earthquake, it had to be demolished.

KiwiRail needed to get its specialised construction work trains to the Kaikōura coast, so a temporary bridge was built in the early months of 2017. The bridge was able to be built quickly because KiwiRail keeps bridge spans on hand, precisely for the purpose of emergency repairs.

The use of those ‘spare parts’ is an example of the ‘fast but sometimes ugly’ approach which enabled freight trains to return to the Main North Line just 10 months after the earthquake.

A permanent replacement bridge will now be built adjacent to the temporary structure, enabling trains to travel faster along this stretch of the railway. The temporary bridge will then be dismantled. The construction team aims to finish this work by November.



PROVING THE EFFECTIVENESS OF THE GEOTECHNICAL WORK AT WHALE’S BACK

Work at Whale’s Back dip slip on the Inland Road (Route 70) is gathering pace now the area underneath the slip – the original road alignment – is safe to work on.

In the months since the November 2016 earthquake, geotechnical work has included placing a number of large rock bolts into the hillside rock to secure it. A large amount of debris were also removed from the area.

Route 70 Area Manager Doug Dold says the work to secure the site had to be complete before any other work on the 800-metre stretch of road could begin.

‘Proving the effectiveness of the geotechnical work required time, and once we were confident the area was safe, we could get on with work on the road,’ he says. This all-clear was given seven weeks ago and work has progressed steadily since, despite serious weather events.

The work includes 280m of fences and 280m of gabion baskets (cages filled with rocks used in road building).

There will also be 800m of new overlay over the stretch of road, although this work will have to wait until later in the year.

Doug says the road stabilisation work should start in September and all going well, the new road should be built in October.



SUNSHINE AFTER RAIN - KAIKŌURA RUGBY CLUB OPEN DAY

For the past 18 months more than 1000 workers have been engaged on the recovery of the road and rail – each of them calling Kaikōura ‘home’ for a period of time. For NCTIR workers, being part of the community and supporting local events such as Kaikōura Rugby Club’s Open Day is a demonstration of that commitment.

On Saturday 16 June the Kaikōura Rugby Club at Takahanga Domain was full of muddy rugby players and smiling faces. For the 2018 annual Club Day, NCTIR road logistics manager Kevin McGrath took his post at the BBQ, serving up lamb lollipops, pork belly and a whole rump steak donated by Titan Contracting to support the community. ‘The highlight for me was connecting with the locals and seeing all the kids having such a great day,’ says Kevin.

Rail protection supervisor Liza Vergottini and rail protection planner KC Van Der Merwe also pitched in to make sure everyone enjoyed the feast during the game. ‘It was awesome,’ says KC, ‘I loved seeing everyone gathered together.’

For NCTIR village facilities maintenance manager, Mikaere Brand, Club Day is all about family. He and his wife helped out with the free sausage sizzle in the morning, while their two sons played rugby, and then it was dad’s turn to hit the field for his third year on the Kaikōura Senior Rugby team. ‘Club Days are all about bringing the community together, and having the BBQ really added to the atmosphere,’ says Mikaere.

Titan Contracting track worker Matt Wickliffe and possession interface manager Kenny Down both moved from Auckland to Kaikōura a year ago and decided to join the Kaikōura Rugby Club. ‘Sport is a great way to meet people,’ says Kenny, ‘and I knew I was going to be living here, so I wanted to be a part of what’s going on. Being part of the community, makes it feel a bit more like home, and rugby keeps me fit, which contributes to health and wellbeing on the work end, so it’s a win-win.’ The day ended well with the Kaikōura Seniors winning against Glenmark Cheviot, 48-19.



Great competition on the field all day!



Kevin McGrath cooks up a storm for hungry players and avid supporters

TAKING YOUNG KIWI'S ON A VIRTUAL FIELD TRIP



NCTIR people and culture manager Belinda (B) de Zwart talks with members of the Virtual Field Trip team outside the NCTIR Village

This week, from all over New Zealand, 1500 young Kiwis were ‘virtually transported’ from their classrooms to Kaikōura, and then up to Ōhau Point as part of the LEARNZ virtual field trip (VFT) programme.

NCTIR partnered with New Zealand Red Cross and Core Education to facilitate the online series Adapting After Emergencies. The NCTIR Village in Kaikōura and the iconic slip 7, near Ōhau Stream were also featured.

The students from 56 classrooms logged in for the experience and learned how NCTIR looks after its’ 1700-strong workforce at the award-winning NCTIR Village - the result of a partnership with Kaikōura District Council and the Kaikōura business community. The VFT toured the Village learning all about the special features designed to support workers, many of who have moved to Kaikōura to support the region in the rebuild and are away from family and friends.

The story of the incredible feats of engineering required to move the more than 1 million m3 of material from the Kaikōura coastal corridor was also shared. On site at Ōhau Point students discovered how a mountain literally had to be moved to reopen the road to the public on December 15, 2017, just one year, one month, and one day after the November 2016 earthquake.

Watch the videos here: www.learnz.org.nz/redcross182/videos



BRINGING DESIGN TO LIFE – VISUALISATION SPECIALISTS IN ACTION

Visualisation plays a number of roles in the work NCTIR does and in this interview, we talk with the person leading the team doing this work, Dr Kathryn Salm.

How many people are on the visualisation team for the project?

We currently have a core group of three, with another three to four specialist resources available as needed.

How is visualisation used and why is it so important?

The benefit of visualisation is that it allows a view of the designs in a real life three-dimensional context, in a way that people can understand and identify with. In the design phase, it supports collaboration between designers and constructors (especially in a project such as NCTIR where there are multiple project sites and interfaces, multiple different areas of design, and complex environments), design review (internally and with NCTIR stakeholders), value engineering (understanding how and where designs can be streamlined for cost savings) and Safety in Design (to ensure the design and planning has safety at the forefront). Once the designs are progressed, it supports further communication of the designs to stakeholders, the community and public.

How long has the technology been around?

Making better use of digital information in the industry has been happening over a number of years. The technology itself is changing all the time and making it more effective to do visualisation – and I imagine that will only continue to improve.

What was used before the development of visualisation technology?

2D drawings mainly! We are definitely quite different from those traditional outputs of technical designs printed out on pieces of paper.

How does visualisation save time on a project?

In many ways. In the design phase, it can help to identify any design interface issues early, so they can be fixed before it goes too far down the track. It also helps to communicate the design, so that helps reduce misunderstanding/miscommunication and prevents rework. The value engineering aspect is an obvious area where it can support cost and time savings. Because we are creating a 3D model, it also means we can use and reuse the model to produce a number of different types of outputs relatively quickly, rather than having to start from scratch every time.

To see what our visualisations look like please check out page 3 of this issue.

TAKE A PEEK BEHIND THE SCENES THIS WEEK



While traffic flows south of Kaikōura, work continues at Sites 16 and 17 above the Parititahi Tunnels, and at Sites 18 and 19, south of the tunnels.



The crown of mesh adorning the Punch Bowl helps to prevent rock fall and slip movement, keeping the road below safer for travellers.



Tunnel 13 just south of the Kahutara Bridge is being transformed by the hard work of the tunnel crews involved.



Crews are pouring concrete for the shared path at Ōhau Point north of Kaikōura – this will also act as the capping beam for the seawall. This is the location of one of the massive slips that cut off Kaikōura from northern access to State Highway 1 last year.



The hydroseeding on Site 8 at Waipapa Bay is proving successful as it's looking less like the site of a major slip and more like an integral part of the scenic coastal route.