# Data and Decision Making in the Transport System following the Kaikōura Earthquake

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## Background and Objectives

The 14 November 2016 $M_W$7.8 Kaikōura earthquake had major impacts on New Zealand's transport system. Road, rail and port infrastructure was damaged including parts of State Highway 1, the Main North Line railway, Port Marlborough in the upper South Island, and CentrePort Wellington in the lower North Island. This created substantial disruption for transport operators, residents, tourists, and business owners in the Canterbury, Marlborough and Wellington regions, with knock-on consequences elsewhere.

During the response and recovery, a large amount of information and data relating to the transport system was generated, managed, analysed and exchanged within and between organisations to assist decision making. In many cases these information exchanges were effective, enabling the transport system to respond and adapt successfully, allowing continued mobility of users and goods nationwide. In some cases, however, there is scope for improvement.

To improve information and data exchanges, and related decision making for future natural hazard events affecting New Zealand's transport system, it is necessary to learn from the Kaikōura earthquake.


**We conducted a post-earthquake assessment, which aimed to investigate what information was available, useful, where it came from, how it was transferred between organisations, and how data might be better managed and used to improve resilience across the transport system in the future.**

## Methods

To address the objective and collect the required information, two key project tasks were planned and conducted:

1. **Stakeholder workshop** (conducted in November 2017 – one year after the earthquake event)
2. **Extended data collection interviews**, further developing the workshop outcomes (conducted early to mid 2018).

35 different stakeholder groups from across the transport system were involved in the workshop and subsequent interviews including the NZ Transport Agency, KiwiRail, airport and port infrastructure managers, Maritime New Zealand, the North Canterbury Transport Infrastructure Recovery (NCTIR) alliance, transport forums, New Zealand Police, shipping and freight companies, emergency management groups, consultancies, and agriculture, viticulture and tourism bodies.

## Insights and Lessons

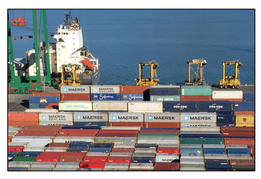
### 1. Information flow & data usage

Following the earthquake, there was an increased demand for information and pressure to make critical decisions in short timeframes.

**Organisations drew on existing data sources in new ways, collected novel datasets and maximised both existing and new relationships to manage the flow and distribution of critical information.**

- New information included geospatial data and that from rapid damage assessments. Damage and Level of Service classification systems were developed and web portals used to manage information.
- Processes established following the 2010-11 Canterbury earthquake sequence were useful in the aftermath of the Kaikōura earthquake.
- New classification and reporting systems were developed (e.g. between the Police and NZ Transport Agency).
- Some necessary information and data were not easy for organisations to obtain and if obtained, were not always available in an appropriate format or timely manner. Other barriers to information flow included the communication of tsunami warnings, patchy dissemination of damage assessment data, and commercial sensitivities.

*Following initial difficulties, new information was obtained from NZ Customs to gauge how much cargo was being re-routed between ports and assist ground-based port operations.*



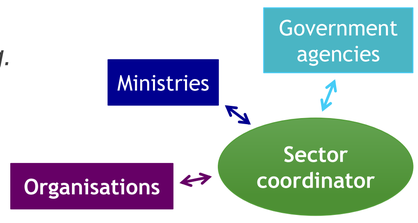
### 2. Enablers of effective communication & information flows

- **Existing relationships** improved the efficiency of response. For example, having relationships and agreements in place allowed technical experts to be quickly pulled from regular roles.
- **Sector coordinators** with ministries and other government agencies meant information requests could be filtered to avoid duplication. This ensured consistency in messages and communication
- **Public and private industry groups** (e.g. Kaikōura Earthquake Tourism Action Group / KE-TAG, Visitor Sector Emergency Advisory Group / VSEAG) facilitated intra-industry support and assisted information flows while accounting for commercial needs.
- **Contacts in the media** helped build a picture of the situation, although caution is needed with this secondary information source.

### 3. Consequences of effective communication channels

- Data for specific attributes of the transport system allowed improved response and recovery for other attributes (e.g. transport scheduling information to manage reconstruction processes).
- Maritime information was disseminated effectively due to the existing culture of collective responsibility within the shipping industry.

*NCTIR and sector representative bodies (e.g. NZ Shipping Federation, Road Transport Forum) acted as conduits of information, providing consistent communications.*




### 4. Consequences of less effective communication channels

- Challenges and delays with transport system response planning and delays to purchases due to inadequate communication of hazard, damage and disruption information.
- Increased resource requirement due to burdensome number of requests for data.
- Additional enforcement activities and consequences for road maintenance and residents due to misleading auto-generated navigation information (e.g. Google Maps).

## Recommendations

- Further develop relationships between different transport sector stakeholders, including tourism organisations – clarify responsibilities and expectations and consider commercial sensitivities.
- Explore and enhance processes for communicating relevant information to necessary parties, including the efficacy of sector and sub-sector coordinators, and sector representative bodies.
- Proactively consider communication and information needs for international markets.
- Assess resilience capacities and make necessary improvements. These should involve multiple stakeholders within the transport system and in other infrastructure networks where possible.

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