

Is our critical infrastructure vulnerable?

Infrastructure for a better future

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Please note: the transcript has been edited to make reading as easy as possible.

Introduction: Welcome to Infrastructure for a better future, a series where we have honest conversations about the infrastructure challenges we are facing and how we can build a better Aotearoa. In each episode we talk to experts from here and overseas about what works when it comes to addressing these issues.

Simon Thomas: Kia ora, welcome to our Infrastructure for a better future podcast series. In this episode, we speak to Roger Fairclough from the New Zealand Lifelines Council.

Hi, Roger. Welcome to the podcast. So, Aotearoa New Zealand's Critical Infrastructure National Vulnerability Assessment, this is a report that's just come out from the Lifelines Council and it's quite timely I guess. We've had a year with quite a lot of natural disasters seen in the East Coast, Auckland, and Nelson. In one sense, I guess we shouldn't be surprised. These aren't unexpected things in New Zealand. I think New Zealand was recently rated second highest natural disaster loss risk in the world. Is that right, Roger?

Roger Fairclough: Thanks Simon and good afternoon. The New Zealand Lifelines Council have always promoted the concept of improving our infrastructure resilience. A little along the lines you've just touched on, we continue to have natural hazard events and there's potential for other types of events as well. They're certainly not unexpected. Every event has slightly different characteristics and obviously, in terms of our infrastructure response, that plays out differently as well. But essentially, this is something that we've been promoting since our inception. One of our key products is this National Infrastructure Vulnerability Assessment.

Simon Thomas: So lifeline utilities, Roger, tell me what are lifeline utilities? People also talk about critical infrastructure - what's the difference?

Roger Fairclough: Very good question. Up until recently, we quite often added the word 'utilities' to lifelines, because obviously lifelines has a number of other connotations. In New Zealand, the term lifelines is something that comes through our civil defence emergency management frameworks. Lifelines are defined

under the current CDEM Act (Civil Defence Emergency Management Act) from 2002, as energy, transport, telecommunications and water service providers. What is changing is that internationally there are many jurisdictions moving to the terminology of critical infrastructure. New Zealand is in the process of shifting in this direction as well. We have a number of elements of legislation coming through the system where the term critical infrastructure will gain greater traction. One of the aspects that will lead to is, what do we mean by critical infrastructure? Will it still be energy, transport, telecommunications and water? The simple answer to that is - it's up for discussion. But more than likely, it will broaden in scope. We've put forward and suggested that flood protection, financial payment systems, and fast-moving consumer goods, could for example also be included as critical infrastructure.

Simon Thomas: So this report that we've got, the National Vulnerability Assessment was first published in 2017. I understand there was an updated version in 2020. So now this is a revised version again. What's the difference? Where are we now compared to the 2020 version? What does the 2023 one add to it?

Roger Fairclough: Very good question. Very deliberately, this has been structured along the lines of doing an update every two to three years. We aim for two years, but in reality it plays out more like three. So 2017, 2020, and now 2023. Each time, we kind of develop the thinking. I shouldn't really just refer to us either, because the whole product is reliant on quite a number of conversations with many, many parties. Some of those directly with infrastructure providers, some with government agencies, some of them in the sort of research academic area, and so on and so forth. Each time we refine it, we feel as though we're improving as we go. In this particular upgrade from 2020, we've expanded the definitions of critical infrastructure, pretty much as we've discussed. We've also added more context and content related to climate change impacts and the exacerbation of natural hazards, particularly on infrastructure.

Probably the most important change is that we have oriented it more to communities and customers of infrastructure. Our view is that communities and customers can contribute considerably more to improving overall infrastructure resilience. Included in that are aspects like raising awareness for customers and so on around the vulnerabilities to outages,

encouraging infrastructure providers to be more transparent around the hazards they face and what are the potential outages. That also puts greater focus on something that we're really passionate about, which is, let's consider the interdependencies of infrastructure a lot more than what we have in the past. As Cyclone Gabrielle has clearly demonstrated, almost all our infrastructure is reliant on another part of infrastructure in order to operate and in order to respond to events, and so on.

Simon Thomas: So, raising awareness of consumers and customers - expand on that a little bit. What sort of awareness and how and where?

Roger Fairclough: I quite often use the example of a fish and chip shop. If I was a fish and chip shop owner in a suburban environment, anywhere here in New Zealand, what are the elements of infrastructure that I'm reliant on? Pretty quickly you get to a view that you need everything, you need the internet, you need the telecommunications capability, you need the energy supply, and probably gas, and so on. So every element of infrastructure you are probably reliant on. When you look at those and ask the question, if there was an event, like an earthquake, like a flood, like a volcanic event, how fast can each one of those services maintain their service delivery? If they lose the service delivery, then how long is it going to take for each one of those to be able to reinstate service? Because I, the fish and chip shop owner, actually need them all there in order to operate at all. When you get to that level of consideration, you start finding very quickly that some can be reinstated very fast, and others will take considerably longer.

This is playing out with Cyclone Gabrielle. But in every event that we participate in we have the same element that not everything can recover at the same time. Where that leads to is that right now, we aren't really actively prioritising which parts of infrastructure are most important or will take the longest time to reinstate service and therefore would deserve let's say earlier investment or greater investment in terms of reducing the time to recovery. That's the mechanism that we would love to see more broadly examined. Our recommendation suggestions in our report are that ideally this be undertaken at a regional level in what we call 'resilience improvement business cases'.

Simon Thomas: So who's responsible for developing these regional resilience business cases?

Roger Fairclough: This is part of the problem that we have. The only precedent at this point in time is one undertaken here in the Wellington region in 2019. It had certain constraints, not the least of which is budgetary availability. At the end of the day, despite their ambition being that they would look at all natural hazards, they could only look at earthquakes. They came up along the lines of what I've just talked about with, you know, how many days does it take to reinstate gas. How many days does it take to reinstate electricity under a major earthquake event. In order to do this further, and in other regions, fundamentally, there is not a funding pathway that enables this to be undertaken. Our regional lifelines groups would be very, very keen for these to be undertaken, and even to lead them. But right now, there isn't a funding mechanism to be able to do that. We believe that if these progressed further, then we could at a regional level, and at a national level, be in a much better state to prioritise investments across infrastructure and enable the community to be more contributing to overall resilience.

Simon Thomas: When you say the community to be contributing, is that a certain amount of individual responsibility - 'I've gotta make sure I've got 20 liters of water sitting in my back cupboard so that I can kind of have drinking water for the first few days'. I guess there's also a council level or a supply level of resilience that needs to be built on, is that right?

Roger Fairclough: Yeah, totally correct. At the individual resilience level, it is absolutely correct, that we need to be more prepared. Infrastructure providers cannot guarantee delivery of service at all times. There's bound to be events that happen that we haven't even thought about yet. There could be interruptions in supply merely because of a technical failure or some road accident, and it takes out, you know, a power pole or something takes out telecommunications. There are any number of hazards that could interrupt supply. So yes, at the individual household level, absolutely correct. At the community cluster level, for example, around school communities, and so on, could also be more self-sufficient. Some of our more remote communities, we could enable them to be more self-sufficient with solar and battery configurations, and so on.

When you get to the kind of broader community level, this is where community pressure, community willingness to pay, and all those sorts of things contribute to priorities for investment. But also, I think it's appropriate here to add, we cannot add resilience by just keeping on building, we actually need to work with many of the assets that we already have. For most of us in our lifetimes, any infrastructure we will be reliant on already exists. It's how we use it better and how we understand that better can only help in terms of adding to resilience.

Simon Thomas: Infrastructure providers being more open about the level of service is all part of this picture and the business case you're talking about?

Roger Fairclough: Yeah. And I'll just say a wee bit about that. For many of our infrastructure providers, their biggest customers are actually other infrastructure providers. For example, I'll use telecommunications and energy suppliers. The energy suppliers are reliant on telecommunications, and telecommunications is reliant on energy. So that's what I'm touching on. These interdependencies, we need infrastructure providers to be talking to each other in the first instance, in terms of understanding their dependencies, but also each one understanding the vulnerabilities of the other one. It's only then that they can start thinking, 'well, if this road is going to be out, I can't get my people in and I can't get my supplies in to do a repair until that road is fixed, or I have alternative means', for example, being able to helicopter people and materials. And then you become reliant on other helicopters.

Simon Thomas: Good point. That's something we see in all natural disasters, but we did see it particularly in the Tairāwhiti – Hawkes' Bay example.

Roger Fairclough: Totally agree. I'm certainly participating in some of the briefings following Gabrielle, and it's coming out in almost every conversation. People expected access to certain resources, and they weren't available for a myriad of reasons.

Simon Thomas: Why do you think that surprises us, given that we have second highest disaster loss risk in the world? Why is this a surprise?

Roger Fairclough: Yeah, well, that's a very good question. We continue to ask ourselves, but it shouldn't be a surprise. It would be really beneficial for all of us to sort of sit back and think

well, yes, we live in a hazardous country. How could we better understand what that means in terms of our operations, our positioning for the future? Where do we locate our population? The reality is that as we add people, we add assets, and they inevitably will be in vulnerable locations. That is New Zealand. How do we work with that? The other bit of this is that the recent experiences further highlight that we need to be asking questions. It's not good enough to just say, 'I've got a contract for a helicopter to be available for servicing this asset'. Who else has access to exactly that same asset, with that same helicopter, with the same presumption? I think that's kind of what played out in Gabrielle, and its played out in numerous of these events.

Simon Thomas: The other thing I think that played out in Cyclone Gabrielle and in the Auckland floods was resilience levels. Now a lot of our infrastructure is planned at a 1-in-a-100 year event, for example, a flood. But I guess you'd say at some places, 1-in-a-500 year, would we want some critical infrastructure to be at this high level, or even higher than that?

Roger Fairclough: Yeah, this is along the lines of where we are pointing in that when you look nationally across all our infrastructure, there are what we term 'pinch points'. Within a network there are constraints on that network and that's the pinch point. What we also use as a term is 'hotspots', and this is where we have quite a number of elements of infrastructure, geographically within quite a confined area. One of the best examples is around our Wellington Interisland ferry terminal. Where I'd say we've got every element of infrastructure, except an airport. We've got gas, we've got electricity, we've got telecommunications and so on. All in a very confined space. Other hotspots, for example, the Kawarau Gorge through to Queenstown that's carrying a number infrastructure pathways and Auckland Harbour Bridge is another one.

When you get to this understanding of where we have hotspots and where we have pinch points, you know that those particular locations could warrant higher levels of resilience to natural hazard events and could demand a bit more investment. An example in the building sector is that we have buildings with different importance levels. That in itself is a reflection of what the demands on the asset could be, and it's built to a higher seismic resilience. So we already do this in some areas, and for some asset classes, but we could certainly do more of that.

Simon Thomas: Do you think we are sort of still in the early stages of maturity in our thinking about resilience at a national level? Or are we quite advanced at the moment?

Roger Fairclough: I'd say somewhere halfway between. There are a number of us that feel as though we've been pushing this message of improving infrastructure resilience for decades now. It is very pleasing to see some of the references being made, the apparent greater acknowledgement, particularly following recent events. But it's not actually a great state to be in where we need events to highlight this. So there is a level of frustration that persists. Until we start seeing material benefits and gains, and undertakings - like these regional resilience business cases - we continue to be a little bit cynical, I suppose, in terms of our ability to really make progress in this space. So yeah, as I say, somewhere in the middle there. Having said that, I'll always say New Zealand is pretty resilient already. What we're talking about is adding to our resilience and getting better and better and better, and giving more acknowledgement to the hazardous environment that we actually all live in here in New Zealand.

Our reflection would be in most cases, when we're responding, it's almost like a knee jerk - we have to start from scratch again, we have to establish some sort of new framework for addressing things for recovery. Whereas we would say, where we should be is that we are fully prepared, we have arrangements in place that automatically kick in when events occurred. We have a very high level of understanding already of where the vulnerabilities are likely to be in an event. In every region we have pre planning that says, when we do have to repair this bridge, this is how we repair it to be more resilient. As opposed to the current state where the event happens - "oh dear - what do we do now?" And over six months to kind of get your head around things, and then years and years to actually recover? That's really the ambition that many of us have. We can't do it on our own. This needs to be a full community effort.

Simon Thomas: It sounds like it's a good place to stop. I'm certainly going to read the report now.

Thank you very much Roger.

Roger Fairclough: Thank you.

Narrator: Thanks for listening. Find out more about the work Te Waihangā is doing to transform Aotearoa at [tewaihang.govt.nz](https://www.tewaihang.govt.nz)

