



Shipping containers and floods

Shipping containers are often seen on properties around Aotearoa New Zealand, but in a major flood, they can float and become dangerous. It's time to consider the legislation regarding their use.

The terrible February storm that wreaked havoc across the east coast of the North Island was one of the worst in living memory. The damage to public and private property, not to mention the harm and suffering to the people living in these areas, was unprecedented.

I was born in Hawke's Bay and still have extensive friendships and family connections to people who live in the areas decimated by the awesome destructive power of the Category 3 Severe Tropical Cyclone Gabrielle. Only after travelling to and seeing the devastation in these areas and speaking to the survivors did I begin to fully appreciate the magnitude of the destruction and the sheer terror of many of those who lived through it.

Floods causing containers to float

Perhaps the most chilling recollections were from friends who lived in the Esk Valley who had to self-evacuate in pitch-black darkness with raging floodwaters chest high and feeling they were extremely lucky to escape with their lives. Their homes, outbuildings and vehicles were all destroyed.

They described situations that seemed unbelievable such as a relatively intact house floating hundreds of metres down the valley. Special mention was also made of the destruction caused by shipping containers travelling at pace in the ferocious



A shipping container on a property. This looks benign, but in a flood, it may float and become a dangerous object.

floodwaters. There are eye-witness accounts of unrestrained floating containers causing immense damage to private and public property. These include destruction of public road

bridges – including one on the Tūtaekuri River – and an anecdotal report of at least one life lost due to a shipping container smashing into a residential dwelling. ▶▶

Shipping containers as buildings

The status of shipping containers as buildings is one that seems to be inconsistent – or at least variable – and not clearly defined or consistently policed across different territorial authorities. I have read one operative district plan that defines a building as ‘an enclosed structure built with a roof and walls’.

Another (proposed) district plan has a (typical) definition of a building as ‘a temporary or permanent movable or immovable physical construction that is (a) partially or fully roofed and (b) fixed or located on or in land but excludes any motorised vehicle or other mode of transport that could be moved under its own power’.

Under this second definition, a shipping container can be classified as a building. It is sufficient that it is located on land and does not need to be fixed to the land.

Common shipping container footprint sizes are 14.5 m² and 29 m² – both less than the 30 m² footprint of buildings that do not necessarily require a building consent. Buildings that are exempt must still comply with the requirements of both the local district plan and the New Zealand Building Code.

It appears, however, that most councils would not be involved with the issue of shipping containers being used as buildings unless they are submitted as building consent applications. They may get involved if there has been a complaint from a member of the public – for example, where the container is too close to a property boundary – but this is apparently not common.

If a building consent application is made to the council where the stated intention is to use the shipping container as a habitable space, the application will be checked against all Building Code clauses. Even if classified as an ancillary building – that

is, not for human habitation – it may be exempt from some amenity provisions but should still be required to comply with the structural and safety-related aspects of the Building Code. This would include clause B1, including connection with the ground (‘to avoid overturning’).

Flood implications not considered

Some MBIE determinations to date regarding the use of shipping containers have discussed these matters, but none seem to have considered the implications of the stability of shipping containers during flood conditions.

One determination issued in 2014 stated that ‘shipping containers are inherently stable even when empty when placed on a suitably flat site provided they are not multiple-stacked. I do not consider that foundations are required for a shipping container simply placed in a site where the container is being used to send or receive goods ... the containers are Importance Level 1 (IL1) as described in AS/NZS 1170. The consequences of failure for IL1 buildings are low with “low consequence for loss of human life, or small or moderate economic, social or environmental consequences”.’

The same determination stated that ‘the self-weight of the containers ... would have been sufficient to maintain stability (against overturning and/or sliding) in all likely wind conditions at the site’.

Several questions are raised by these points. It appears that little or no consideration has been given to date with respect to the behaviour of shipping containers during flood conditions. This point should perhaps be pertinent if a shipping container has been submitted as part of a building consent application or if responding to a complaint regarding a shipping container from a member of the public.

Why legislation needs tightening

While there is the question of how and when the territorial authority might become aware of the use of the shipping container as a building, the criteria of compliance seems poorly defined and open to interpretation. Along with this is the extremely common use throughout the country of shipping containers as informal storage structures.

Placed on site to enable storage of goods or used as makeshift workshops – and with the benign appearance of a temporary addition to the property that could be picked up and removed at a moment’s notice – they seem to be able to fly under the radar.

However, what Cyclone Gabrielle has taught us is that, when a shipping container is caught up in raging floodwaters, it can leave its moorings and become an uncontrollable projectile. A 6 m shipping container has an empty weight of approximately 2,200 kg, and when it is partially loaded, can easily weigh over 10,000 kg. The larger 12 m shipping containers can exceed 20,000 kg when only partially loaded.

Shipping containers are designed to be weathertight, so when they are afloat, they will be partially submerged but floating at the surface of the floodwaters. This, combined with the sharp right-angle-reinforced corners to the heavy steel construction of the container, means that the destructive potential upon impact with other stationary buildings and infrastructure is enormous and potentially fatally dangerous.

The legacy of Cyclone Gabrielle must include the tightening up of the legislation covering use of shipping containers beyond their original intended purpose. The health and safety of our citizens and communities is too important to leave this practice in such an ad hoc situation. ◀