

# Understanding Ground shaking

If an earthquake causes strong ground shaking our built infrastructure (like buildings and dams) and lifelines (like our power and water networks) can be severely damaged.

Ground shaking will vary due to the ground conditions as well as the proximity to the earthquake fault rupture. These all affect the way the seismic waves travel through the ground.

Peak ground acceleration (PGA) is a measure of earthquake shaking on the ground. It tells us the *maximum acceleration* of the ground that occurred during shaking at a particular location.

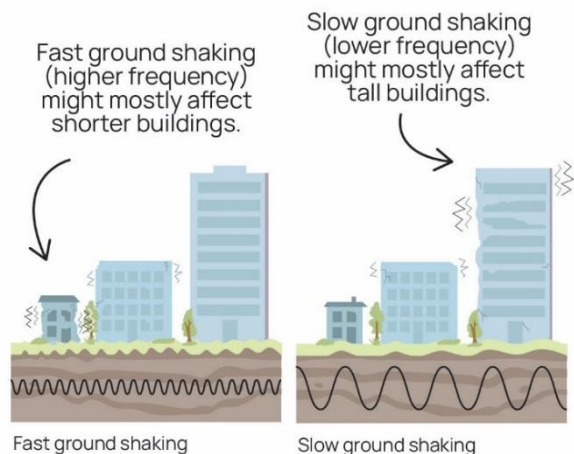
Acceleration describes how the ground moves from slower to faster shaking speeds, much like accelerating in your car. Greater acceleration means the ground is moving from slow speeds to rapid speeds in a very short time.

As well as PGA, we are also interested in the frequency of shaking, which is the number of times the ground goes up and down or back and forth during a period of time, High frequency rapid ground shaking) will mostly affect shorter buildings, and low frequency (slow ground shaking) will mostly affect tall buildings.

If an earthquake and the resulting ground shaking is dominated by rapid shaking, it is possible that smaller buildings can be significantly damaged, while tall buildings stay relatively untouched.

The opposite is also true. Slow shaking may damage a tall building but leave shorter buildings untouched. This explains why we have seen some buildings affected more than others in previous earthquakes.

## Earthquake waves can be short and fast or long and slow



The type of building shaking produced during an earthquake is influenced by the unique combination of earthquake source, ground shaking, soil type, and building design and structure. Ground shaking will vary due to:

- the ground conditions
- the land deep beneath our feet
- earthquake location and magnitude
- proximity to the earthquake fault rupture

These factors all affect the way the seismic waves travel through the ground and how the ground will shake. So, for the same earthquake affecting one region, an area of reclaimed land will shake very differently to an area of more solid rock. The different conditions that impact ground shaking are the reason we sometimes see a range of hazard results in our earthquake forecasting, even within one geographical region.

We can help prepare our homes for earthquakes and keep our whānau safe. Visit the [NEMA Civil Defence](#) and [Toka Tū Ake EQC](#) websites.