

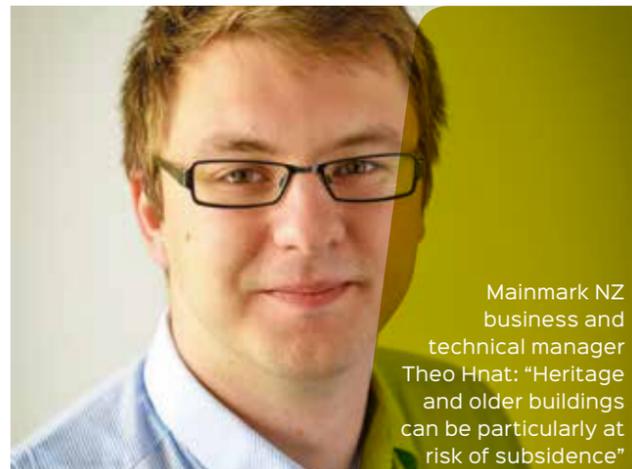
The impact of prolonged extreme weather on commercial properties and businesses

The current drought in Auckland is a far cry from its renowned rainy weather. The city endured a record-breaking 29 days of rain in August last year, preventing the ground from drying out, and now the extreme heat has caused soil to dry to an excess, resulting in ground subsidence.

Subsidence occurs as soils react to changing moisture levels in the ground, causing the building to gradually settle in a specific area or across its entire footprint. Many Auckland properties are built on reactive clay, which can expand or shrink under different weather conditions, putting them at higher risk of subsidence.

As Theo Hnat, New Zealand manager for ground engineering specialist Mainmark, explains, the age of the property can be another compounding factor to foundation issues. "Heritage and older buildings can be particularly at risk of subsidence as the construction methods of the time may contribute to foundation stability being compromised today. In some cases, foundations may be smaller than is required by the current building code, which means changes in soil conditions over time, or the added weight of additions and refurbishments, may lead to structural movement."

Weakened ground can compromise the structural integrity of the building, resulting in damaged plant and machinery and decreased productivity, and pose a significant occupational health and safety risk.



Mainmark NZ business and technical manager Theo Hnat: "Heritage and older buildings can be particularly at risk of subsidence"

WHAT SHOULD PROPERTY OWNERS DO?
It is important to recognise the signs of subsidence early and act without delay. Regardless of the underlying cause, unlevel buildings and weak foundations should be corrected as quickly as possible before the problem gets worse.

Every property is different, and the signs may not be immediately obvious, so it helps to know what to look for. Cracks in walls and sinking or sloping floors may indicate structural settlement caused by subsidence. Windows and doors becoming jammed or misaligned, skirting boards separating from the wall, or the formation of puddles around the perimeter of the building may also indicate foundation ground issues.

CONSIDER DIFFERENT SOLUTIONS
When buildings become unlevel due to subsidence, it can result in significant and expensive damage. Often, property owners assume the only solution is to 'underpin' the building without realising there are alternative and far less disruptive methods for addressing foundation issues.

"Once the underlying cause has been identified, there are several solutions to consider, including ground improvement by non-invasive resin injection," says Theo. "This type of remediation can be applied with minimal disruption to the property, and is generally more cost-effective than traditional underpinning methods. Buildings can often be re-levelled quickly and with minimal disruption."

An example of how businesses can be impacted by subsidence is The Farmers Trading Company (Farmers) Whangarei store, which was set to be redeveloped, but had experienced significant differential floor settlement due to underlying soil subsidence. The building had become unsafe due to undulating floor levels, so it was important to first re-level the floor to allow the rest of the redevelopment to be carried out safely and effectively.

The subsidence caused the retail store's shelves to become unlevel, compromising the safe display of merchandise, and the uneven ground was a trip hazard for customers and employees.

Mainmark was able to re-level the floor while ensuring the store was kept clean, free of debris, and safe to continue trading

throughout the project. Using its proprietary Teretek® resin injection solution to raise and re-level the floor, Mainmark completed the project in just four nights with no interference with normal

There are alternative and far less disruptive methods for addressing foundation issues – Mainmark NZ remediated this low-rise building using JOG computer-controlled grouting

store operation as the product shelves were corrected as the floor was re-levelled.

ALWAYS SEEK EXPERT ADVICE
In addition to subsidence, building movement may also be caused by other underlying or site-specific issues which require a professional assessment and working knowledge of the local area.

If signs of subsidence have appeared, consult structural and geotechnical engineers or ground engineering experts. Mainmark has treated more than 11,000 sites throughout Australasia, from single-storey homes to large commercial buildings.

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