



ROOT CAUSE

The movement of housing foundations caused by clay shrinkage is a headache for householders – and insurers.

Francesca Breeze reports on work being done by The Clay Research Group to speed up investigation.

Insurers receive about 40,000 domestic subsidence claims a year. Of those that are valid, 70% relate to root-induced clay shrinkage.

Insurers and their agents are required to diagnose and remedy the cause of the movement as quickly as possible to alleviate the distress caused to homeowners. The cost of investigations – soil testing and monitoring – must therefore be proportionate to the level of damage and the cost of repair.

More data, of a higher quality and at less cost for a quicker claims solution, is the key to tackling subsidence claims effectively, believes the Subsidence Forum and members such as The Clay Research Group (CRG). Greater use of technology and telemetry are undoubtedly the way forward.

The CRG has among its academic team a number of universities, each doing research into its own specialist field. The group conducts research into moisture change in fine-grained soils at its site in Aldenham, north London – the most instrumented in the UK – with neutron probes, TDR (Time Domain Reflectometry) sensors, a weather station and electrical resistivity tomography arrays.

Its objective is to image moisture movement in the soil, in the proximity of mature trees, over time without the disruptive excavation of trial holes, sinking of bores and testing of soils – activities that in themselves change the soil profile.

Specialists collect disturbed and undisturbed soil samples using a variety of techniques, most notably the filter-paper test and oedometer. Readings are taken from over 40 stations in the vicinity of both an oak and willow tree. Alongside this has been root imaging, along with validation of electrolevels (from elsewhere).

Group founder Stephen Plante says: "Our research allows us to characterise the interaction between soils, trees and climate, and enables us to model ground movement and possibly the effects of climate change."

"In addition we are exploring telemetry. Gathering data from

remote sensors and delivering it to the desk of the investigating engineer via the web would remove much of the process, and collating high-quality data by the hour would speed-up diagnosis, enabling repairs to be done quickly."

Over the next 12 months the CRG will be measuring the benefits of a variety of ground treatments, including electrokinesis, and attempting to trigger the expression of the stress hormone in mature trees to regulate stomatal aperture as part of the biosciences programme.

Plante says: "Dealing directly with the cause of the problem – the tree – is possibly the most exciting development. It may one day be possible to retain the tree while reducing its moisture uptake, through developments in molecular biology."

The CRG is also building software applications to model the complex interaction between soils, climate, trees of varying species, height and distance from buildings, and to arrive at an estimate of ground swell, and therefore risk.

"Industry practice," says Plante, "is to retrieve soil samples and carry out tests that provide a snapshot in time. We then try to determine, using rather crude tests, what the moisture content of the soil was on the day the investigations were done."

"Using TDR sensors we can measure moisture change over time from our office, taking readings as often as we want. Is the ground getting drier near the tree in the summer than further away, and is the building moving at the same time? Are the two linked?"

"Monitoring is another example. Whether we measure movement using precise levels or crack monitoring, engineers may take readings at quarterly intervals over 12 months to diagnose the cause of the problem."

"Inevitably, this means that sometimes vital changes can be missed if the building moves between readings. Using electrolevels, the data is wirelessly transmitted via the web every hour of every day. Nothing is missed, no matter how busy the insurer."

Change can be detected much quicker, diagnosis speeded up and claims resolved earlier at less cost. It is estimated the cost of investigating a complex claim could be reduced by at least £1,000, ignoring service benefits to the homeowner and the adjuster.

It is hoped that the research programme will change the way claims are investigated over the next five years, with benefits for all parties. The main objective is to reduce the significance of surge years when high claims numbers are received, resulting in a potential slippage of service standards. Use of remote

sensors and wireless communications will speed up investigations.

The Aldenham site will continue to deliver valuable information. Plante concludes: "Working in partnership with the industry, delivering the results as they are gathered and sharing the benefits is unique in our field. The open structure of this virtual organisation means that we see the benefits much quicker than would be the case in comparable research institutions."

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