The Clay Research Group

RESEARCH AREAS

Climate Change ◆ Data Analysis ◆ Electrical Resistivity Tomography
Time Domain Reflectometry ◆ BioSciences ◆ Ground Movement
Soil Testing Techniques ◆ Telemetry ◆ Numerical Modelling
Ground Remediation Techniques ◆ Risk Analysis
Mapping ◆ Software Analysis Tools

The Clay Research Group

January 2013

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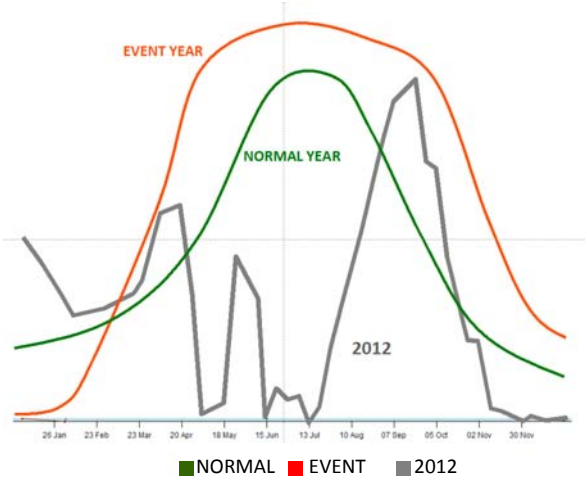

Weather Watch – data courtesy of Met Office
SMD at end of December, 2012

Weather Update

The Met Office report that 2012 was the wettest on record for England and the second wettest for the UK.

Steve Running at the University of Montana in Missoula says "If global drought is not increasing, if warmer temperatures are accompanied by more rainfall and lower evaporation rates, then a warmer wetter world would mean a more benign climate". The suggestion for UK insurers is that subsidence events may become less, rather than more, frequent.

IPCC Draft Report Leaked

A leaked report on the IPCC conference suggests that some predictions made in 2007 may have been wrong. The new report says that climatologists may have been using the wrong statistical measure of drought occurrence.

The current thinking is "decreasing trends in the duration, intensity and severity of drought globally".

They also report that the predicted increase in cyclone activity in their 2007 report needs to be revised.

An article in The New Scientist goes on to say "Elsewhere, the report reassures us that the ocean circulation, and with it the Gulf Stream, is "unlikely" to collapse in the coming centuries – a doomsday scenario that was "too early to assess" in 2007."

On the downside, the IPCC remain pessimistic about Arctic sea ice, and suggest it (the Arctic) may see ice-free summers by 2100. They are predicting greater sea level rise than in 2007 due to newly included models of ice sheet movements.

The full report should be issued shortly.

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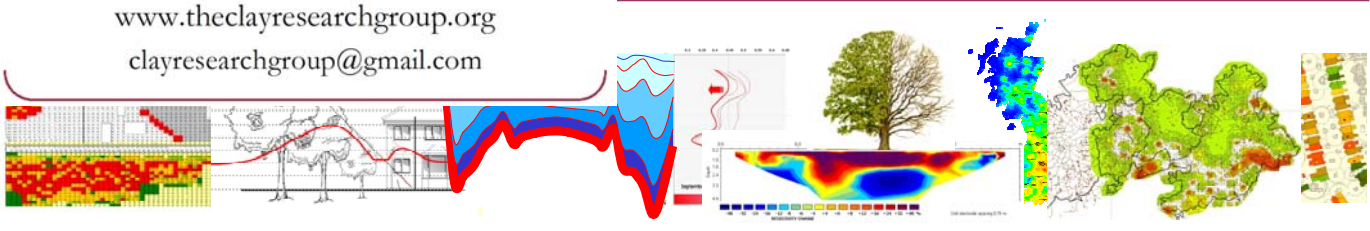

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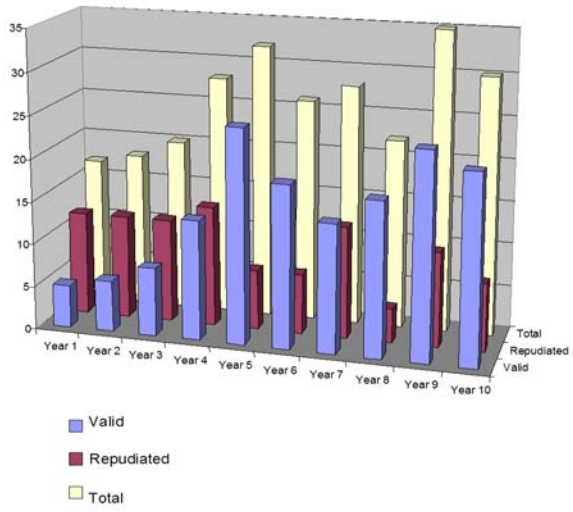
Relating Policy Term and Risk



The above graph illustrates the increasing likelihood of a claim being valid the longer the period of policy cover – i.e., the time on risk. The total number of claims increases from year 1 to year 10, as one might expect. The number of repudiations tends to decrease with increasing age of policy.

The output is significant and useful for Triage in deriving probabilities.

Is it the case that the property gets riskier the longer the policy is in force? No, it is simply a case of client retention. Insurers don't churn policies every year. The bulk of their policies are long term. It's just due to frequencies. Why more valids with increasing policy age? One would anticipate a claim at some stage, so the longer the policy duration, the more likely but also, it suggests that fewer claims will be frivolous.

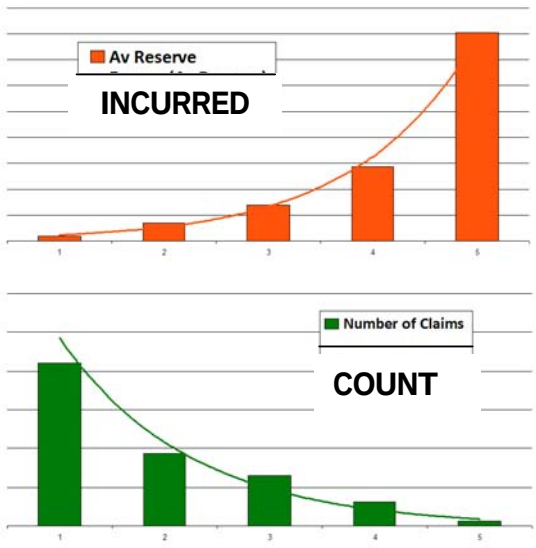
These aren't policyholders who make claims without thought.

Time is Money

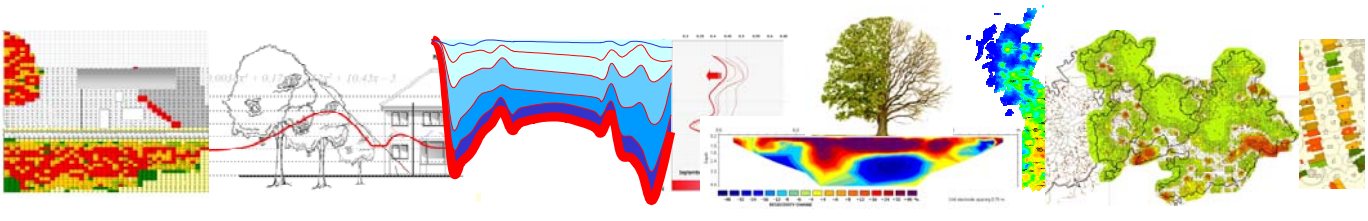
Adjusters and engineers understand that time is money, and the longer the duration of a claim, the higher the settled cost is likely to be.

It is no surprise that complex technical claims involve more investigations, testing and monitoring etc., but quantifying this to assist in budgeting and estimating deterioration over time is important.

The analysis helps by putting figures to something we all understand. Yes, time is money, but exactly how much? Red is the cost in five development timeframes, and green is the number of claims, diminishing over the same period.



Quantifying the cost of elapsed time and understanding the claim development.



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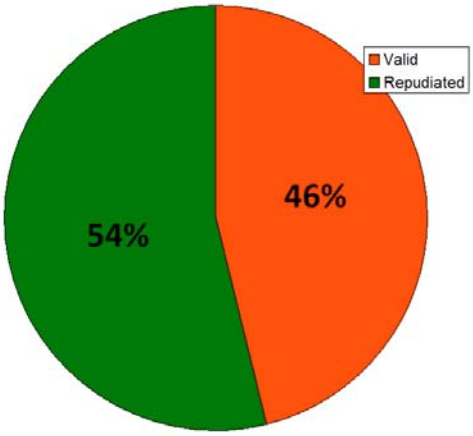


The figure of 30% for root induced clay shrinkage is from the total, including repudiations. Expressed as a percentage of valid claims, the figure would be closer to the recognised industry figure of around 70% - i.e. (30/46) x 100 = 65.2%

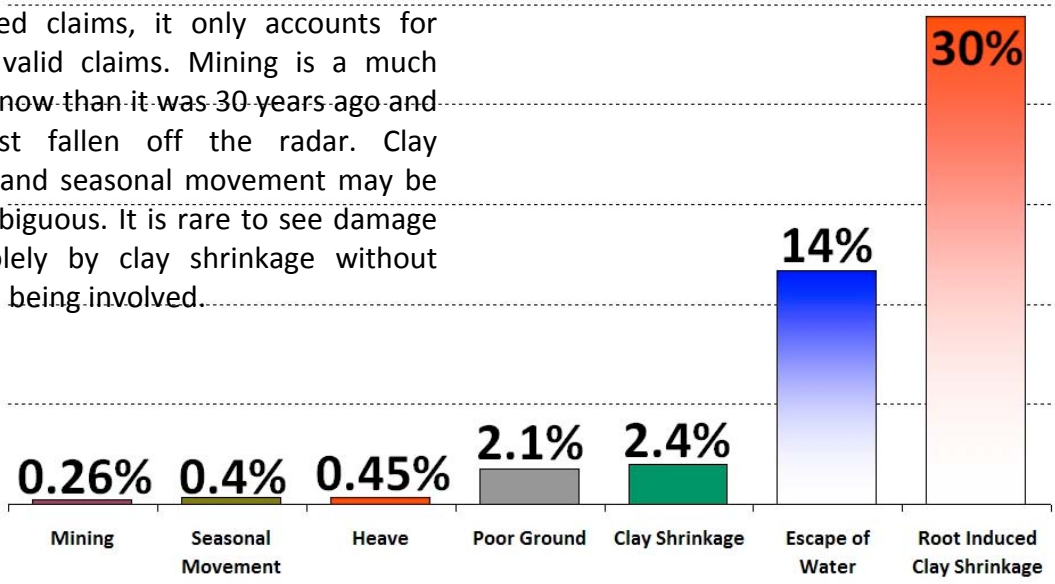
Interestingly, although heave occupies much of the engineers time when handling tree related claims, it only accounts for 0.45% of valid claims. Mining is a much lower risk now than it was 30 years ago and has almost fallen off the radar. Clay shrinkage and seasonal movement may be a little ambiguous. It is rare to see damage caused solely by clay shrinkage without vegetation being involved.

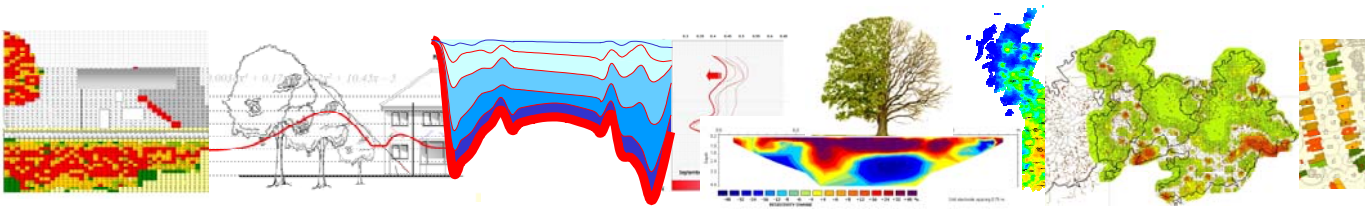
Five Years Claims Experience

Putting 'claims by cause' into perspective, we have taken a sample of around 12,000 claims spanning a 5 year period, including 2003 – a surge year with high claim numbers. This provides a representative sample for the industry, including a 1 in 5 event year.

The analysis reveals that the average number of valid claims is slightly less than 50%. The percentage from the total claim population, listed by cause (escape of water, seasonal movement…) is shown below.

The graph doesn't list all possible causes – this appears in an earlier Newsletter - but it does provide some idea of their relative standing.





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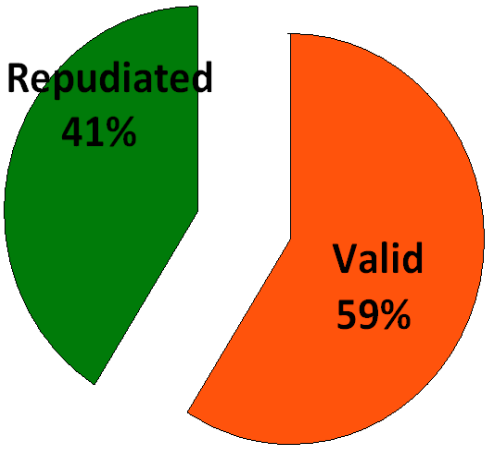


In contrast, claims associated with water leaking from drains etc., reduces from 14% throughout the year, to 9.3%.

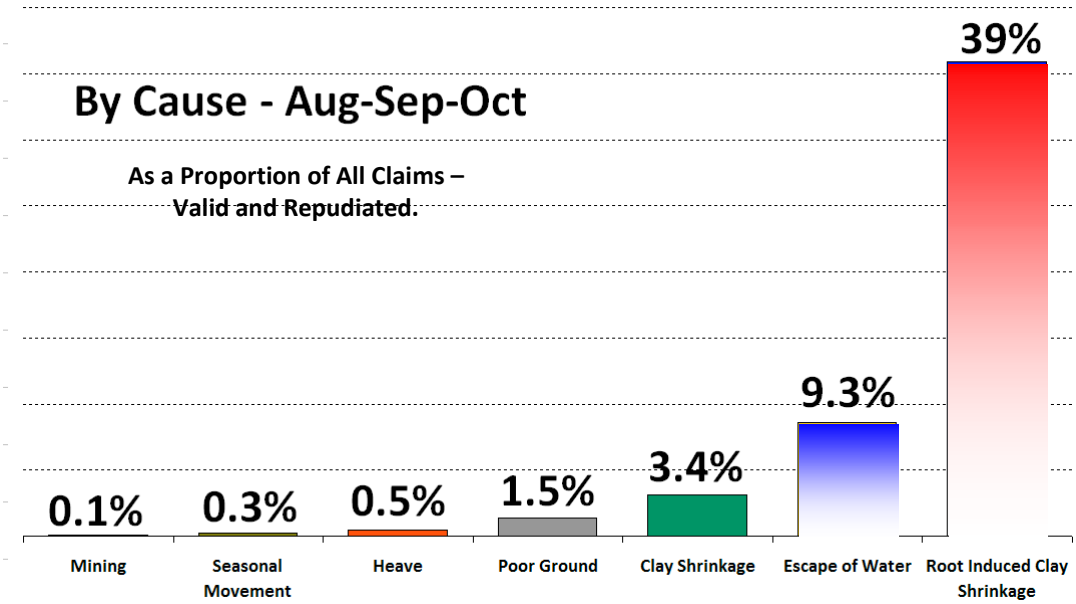
The Summer Months – Average Year

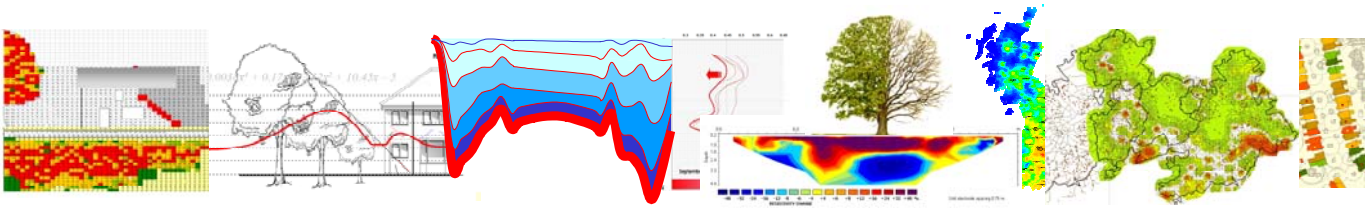
August, September and October

The summer months extract (for the purposes of this analysis the summer is defined as August, September and October based on peak claim notifications) reflects the increasing number of valid claims, and the associated reduction in repudiations.

The difference is the number of root induced clay shrinkage claims – compare below with previous page.

The number of claims involving clay and trees/shrubs has increased from 30% throughout the year, to 39% over the three month term and represents around 66% of valid claims.





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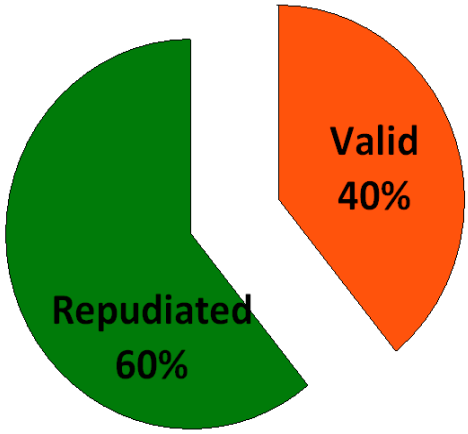


Experience suggests that the 20% or so of valid claims related to root induced clay shrinkage in the winter months will be attributable to late notifications.

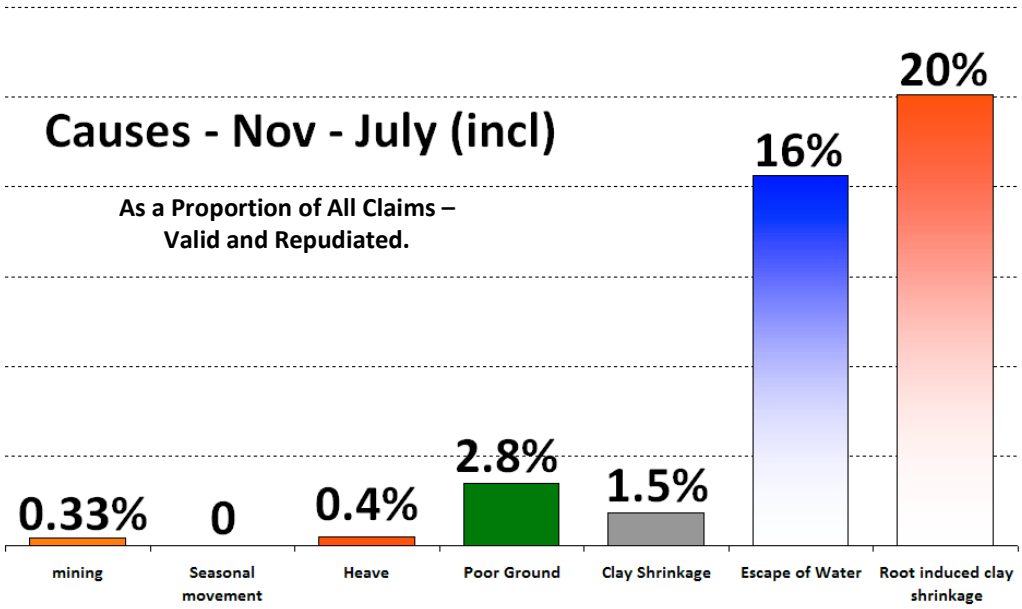
November through to July

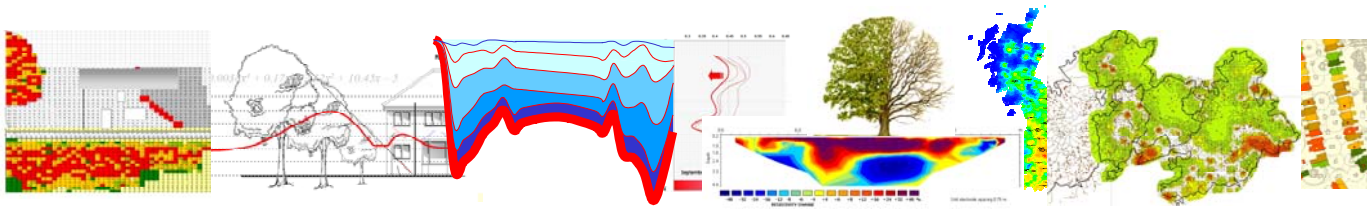
The 'winter' distribution reveals fewer root induced clay shrinkage claims down from 39% in the summer to only 20%, and a significantly greater proportion of subsidence associated with water leaking from drains or water services.

These percentages (the 39% and 20% figures quoted above) relate to the total sample, including both valid and repudiated claims.

If account is taken of valid claims only, then root induced clay shrinkage accounts for 50% of valid claims, and Escape of Water, 40%

In the summer (5 year sample, with one surge year included), the difference between them was 30%. In the winter, this reduces to 4%.





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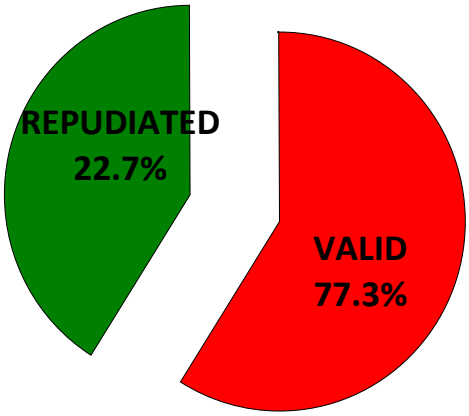


Not only do we see an increase in claims in so-called 'event years', but more of the claims received will be valid, which puts a strain on the adjusters and the supply chain.

To exacerbate matters, the valid claims will be of a more technical nature as we see from the perils graph below. They will often require monitoring, site investigations and soil testing, plus the involvement of experts and, in some cases, lawyers.

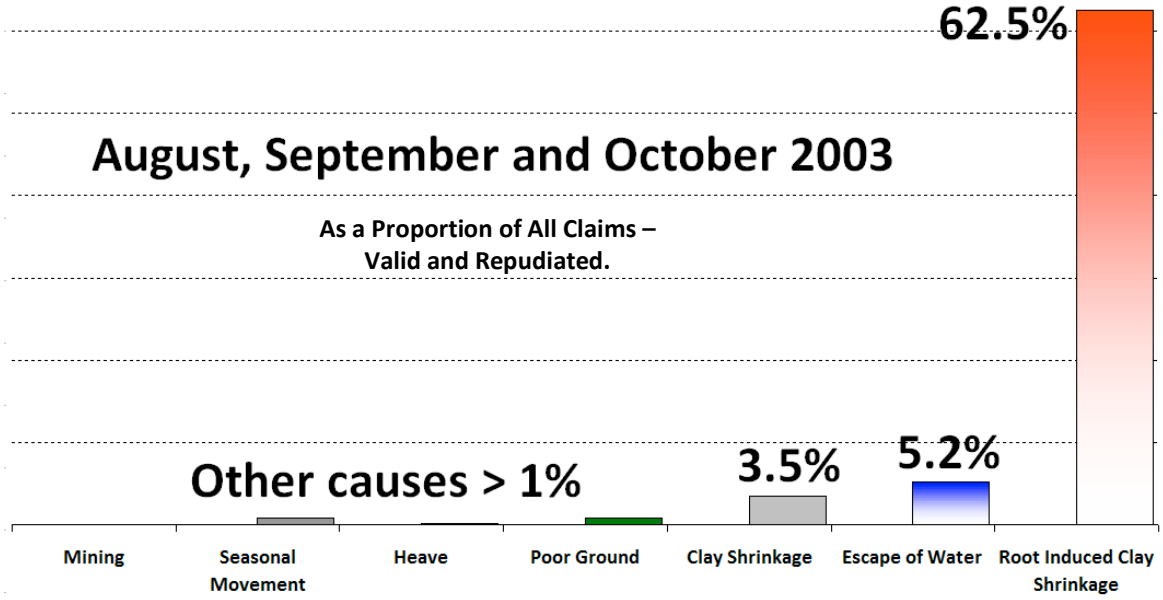
August, September and October 2003

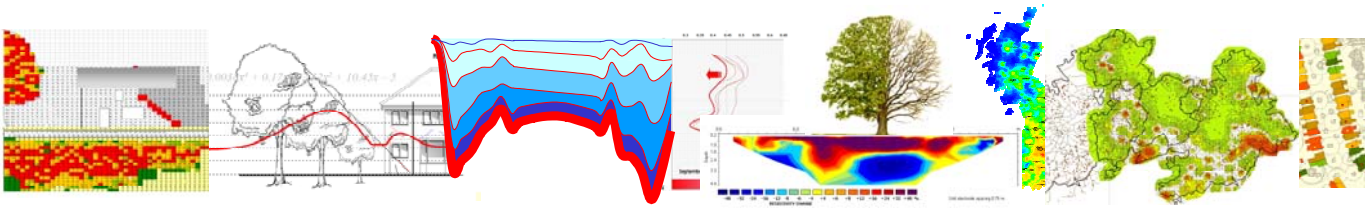
In the summer of 2003, root induced clay shrinkage accounted for 80% of all valid claims.

In contrast, subsidence damage caused by leaking drains accounted for only 7%.

In the winter of the 5 year sample, with one surge year included, the difference between the two perils was 30%. In the summer this reduces to 4%. In the summer of 2003, the difference was 57%.

The proportions are dynamic in the sense that 70% of valid claims may be due to root induced clay shrinkage, variable by year, but this annualised figure quantifies their contribution in the summer months.





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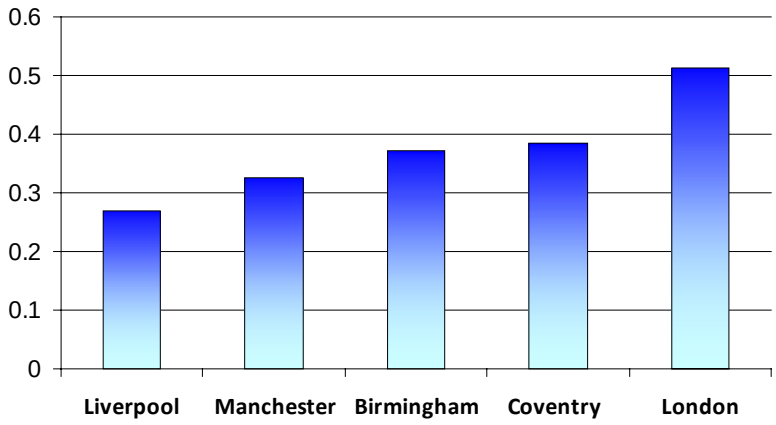
'By City' Comparisons



From a sample of nearly 30,000 claims covering benign years (in terms of both climate and claim numbers), the number of valid claims by City, expressed as a probability, can be seen, left.

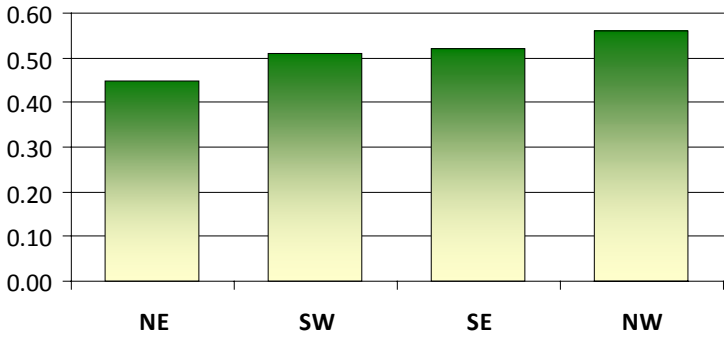
The 'y' axis reflects the probability of a claim being valid on a scale 0 - 1.

From the entire sample, the probability of a claim being valid is close to 50%.

From the above chart, the probability of a claim in Birmingham being valid in a benign year would be slightly less than 40%. In London, the probability would be just over 50%.

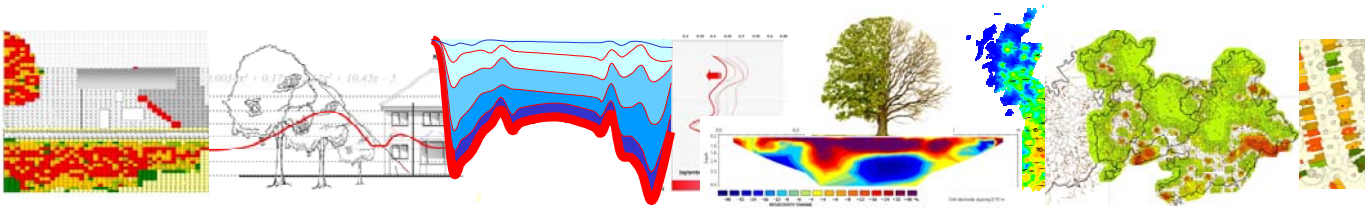
The data allow us to estimate probabilities at a very granular level in terms of both likelihood of a valid claim and peril.

London by Quadrant



Splitting London into quadrants as shown above, it can be seen that the NW sector has higher than the average valid claims. The figure for valid claims would increase for houses on clay soils to the SE of the UK in a hot, dry summer as we have seen on previous pages where we have valid claims as high as 77.3% in the summer months of 2003. In terms of count of claims (as opposed to frequency), London is far riskier due to it's large population.

Where are we most likely to come across a valid claim? Southend-on-Sea has one of the highest rates for valid claims, standing at 64%. In contrast, Liverpool has the highest rates of repudiations – valid claims in Liverpool amount to only 27% - from this sample.



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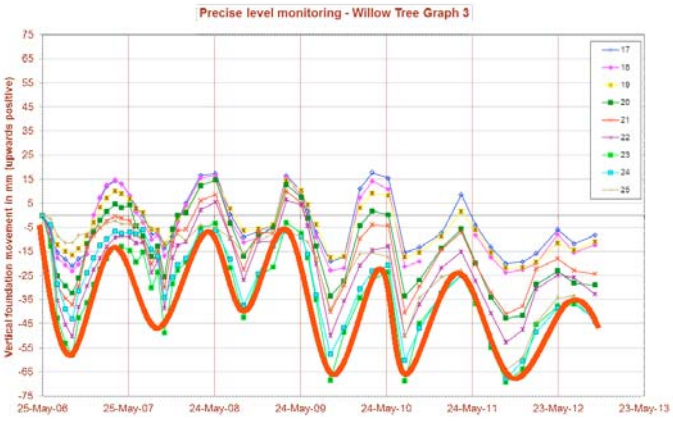
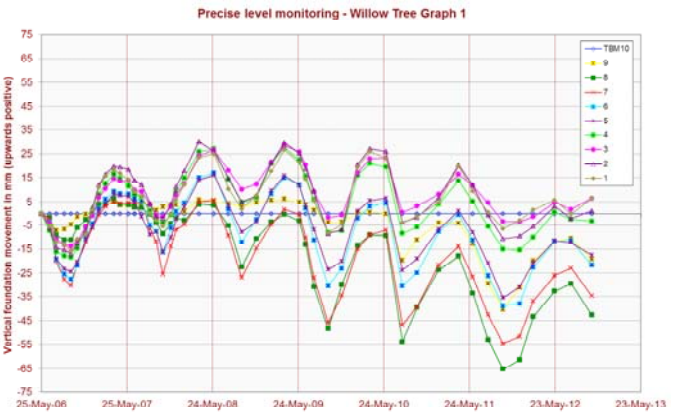
Aldenham Willow Levels

Precise levelling has revealed the build-up of a persistent deficit measuring 35mm at periphery of Willow root system in the winter.



We have emphasised the periodic signature at Station 23 in the graph above. Total subsidence measured 65mm in the summer of 2011. This is a very similar profile to the one recorded at Stations 7 & 8 – see below.

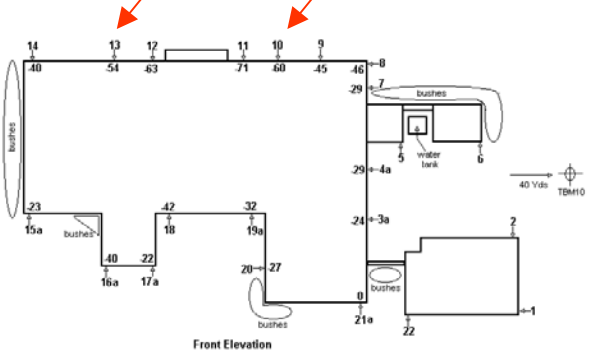


The results from two lines of levelling reveal a remarkable consistency between the two arrays, several metres apart.

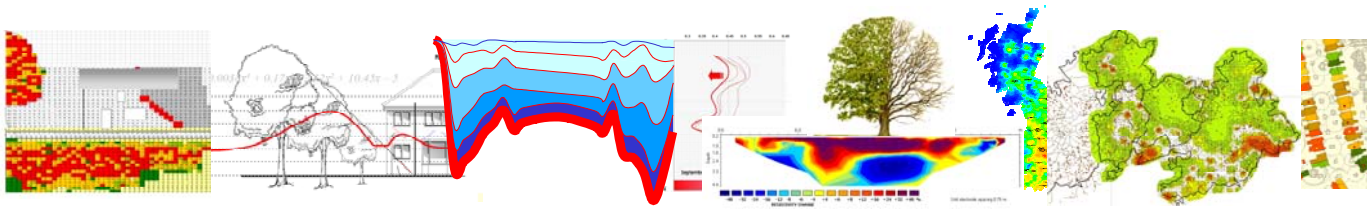
Headmasters House

It appears from the readings taken in October 2012 that the initial recovery following reduction of vegetation has been followed by further subsidence at Stations 10, 11 & 13.

These stations are situated close to the shrubs that were identified as the initial cause of damage and we assume that they have been allowed to re-grow.



10 & 11 13



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Acknowledgements

Our thanks for the support we receive from industry colleagues both in terms of sponsorship and contributions. InFront Innovation are the major financial sponsors, followed by Aldenham School who provide the research site in North London, Marishal Thompson (funding weather station), and Crawford & Co., (funding precise level monitoring taken by GeoServ).

Over the years, articles have been provided by some of the industries leading experts, including Tim Freeman, Tony Boobier and Mike Crilly. Many others have presented at the annual Aston Conference including John Parvin, Richard Driscoll, Mike Lawson, Giles Biddle, Peter Osborne, Gary Strong, Tony Greenfield etc.

Richard Rollit has played a major role acting as Chairman and presenting on current topics.

Behind the scenes, our thanks to Cyril Nazareth who liaises with Aldenham School and collects data from site. MatLab have also made a significant contribution over the years, undertaking site investigations and testing soils in a variety of ways, all without charge. OCA have been kind enough to provide climate updates, and thanks to The Subsidence Forum and the RICS for allowing our newsletter to be downloaded from their web sites.

SMD data is supplied weekly by the Met Office, funded by Innovation.

Finally, our thanks to industry colleagues who have provided data over the years, some of which is analysed in this issue. The data is accepted on the basis that it will not be released or shared with others, but that the output of the analysis will be used in studies from time to time.

Research Programs

The last few years have seen an increasing number of research projects, and people working together to improve our understanding of domestic subsidence. In particular the role played by trees.

Margaret MacQueen from OCA was the initiator of a review of the Hortlink project, and after a lot of hard work has, some 18 months on, managed to get industry agreement to look at the benefit of crown reduction in the urban environment.

Neil Hipps is the lead researcher and hopefully funding is in place following the efforts of Neil Curling from HBOS, and Jim Smith from the Forestry Commission. We gather that Dr Hipps starts his initial review shortly.

More recently, Ian Brett-Pitt has initiated a review of precise levels to help in mitigation with expert help from Richard Driscoll. Ian sees levelling data as an essential factor in evidential standards.

This project is at the very early stages, but evidence that the industry is recognising the value of research and in the next few years we should see some benefits.