

# 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

July 2013

# The Clay Research Group

## CONTENTS

Issue 98, July, 2013

### THE ASTON EDITION

**Page 1**

Aston Conference and Weather Update

**Page 2**

SMD and Jet Stream Update

**Page 3**

Jackson & Berent - Anthony Davies

**Page 4**

A New Suction Sensor – Nic Harrison

**Page 5**

Local Authority Tree Officer – Jake Tibbetts

**Page 6**

Electrokinesis – Tom Clinton

**Page 7**

Landslides – Katy Freeborough

**Page 8**

The Last 20 Years – Richard Rollitt

**Page 9**

Aston Summary

## NEXT MONTH

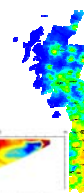
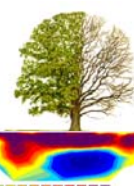
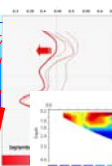
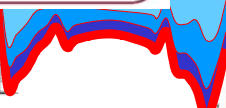
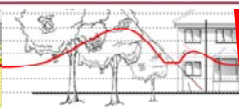
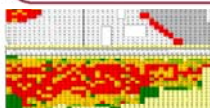
Next month we compare ground movement with the Soil Moisture Deficit. Is there a link? Is it the case that when the deficit increases, the ground sinks and if so, what is the correlation?

Away from the climate, we also have articles on the possible benefit of using anti-transpirants. No doubt they would help reduce transpiration, but at what cost? Also, more about claim frequencies, looking at the extremes that make the averages.

## THE CLAY RESEARCH GROUP

[www.theclayresearchgroup.org](http://www.theclayresearchgroup.org)

[clayresearchgroup@gmail.com](mailto:clayresearchgroup@gmail.com)

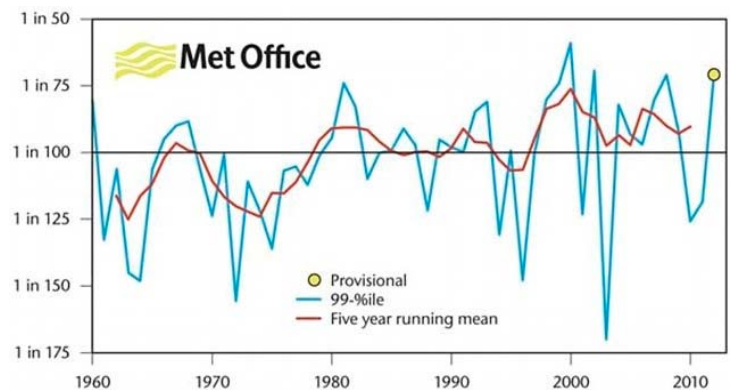


## Aston Conference

This month's edition covers the Aston Subsidence Conference. Highly rated by those in attendance, although a slightly smaller event than usual. Speakers covered a wide range of topics from testing and treating soils to the latest changes to the law and how foreseeability is viewed in cases of root induced clay shrinkage claims caused by Third Party trees.

## Rainfall Days Increasing

The Met Office plot of 'days of rainfall' tells the story. The prediction for 2013 – the yellow dot – reinforces the view that an upturn in subsidence claims is highly unlikely.



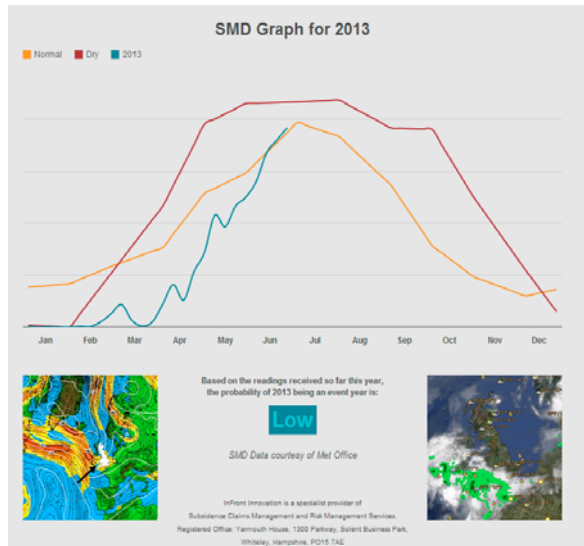
The gradual trend of the increasing number of rainfall days started around 1960 with most (but not all) event years picked out by the graph – 2003 being the most notable example.

A meeting of 23 experts from the Universities of Exeter, Leeds, Oxford, Reading and Imperial College London, as well as the Met Office, attended the summit held in Exeter in June.

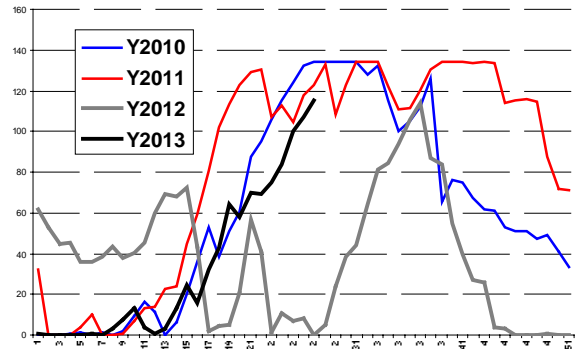
They concluded that the current spell of wet summers and rainfall could continue for the next 10 years although the Met Office do predict that July could be very warm.

# The Clay Research Group

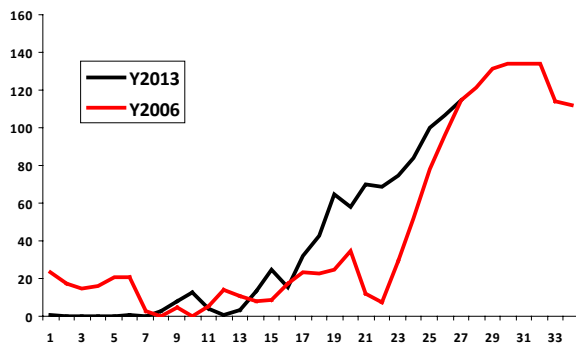
## SMD and Jet Stream



The current SMD would have to rise further than it has done over the last 20 years and then maintain it's position for a few uninterrupted months to power a large increase in claim numbers.



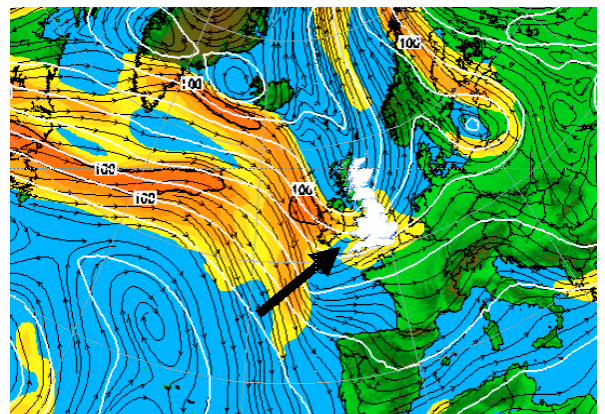
Although the SMD has risen fairly sharply after a late start, there is no sign yet of a possible surge. 2006 was characterised by a very steep incline, which started late in the year. Using our 'energy' model we believe this gradient drove the higher numbers.



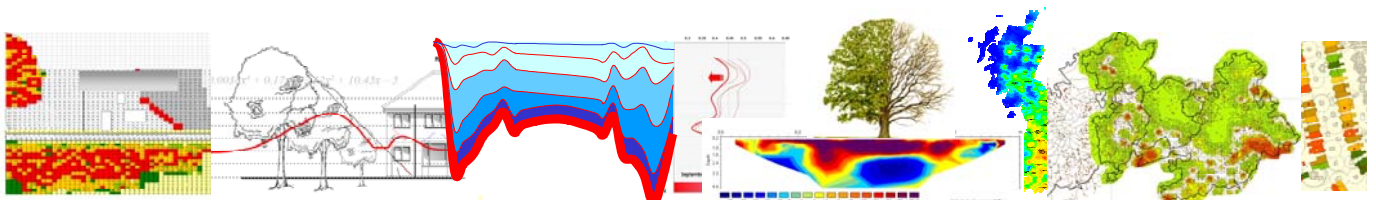
The wettest year in England on record, 2012, is shown as a grey line on the above graph so hopefully the industry will see more claims than last year, although we do not expect them to reach 30,000.

What are the chances of a 2006 event year? Somewhere between 4 and 5%.

The Jet Stream is lingering over the UK, although nudging northwards a little on the 1<sup>st</sup> July, 2013 so cause for cautious hope.



Looking at the following graph (next column) we can see that, so far, 2013 is tracking 2010. It would take a particularly dry and hot summer to deliver high claim numbers. In the light of the Met Office predictions for a changeable and possibly wet summer, this seems unlikely.



# The Clay Research Group

---

## The Jackson Reforms & Berent 12 Months On Anthony Davies



AnthonyDavies@eversheds.com

Anthony explained that Conditional Fee Agreement (CFA) will no longer be available to plaintiffs as proportionality comes into force. 'Free' litigation is a thing of the past.

Instead, fees will be paid from damages received. The objective is to make Plaintiffs consider the rights and wrongs of their case, hopefully leading to a reduction in costs.

Also, in the case of After the Event Insurance (rarely used in cases of domestic subsidence) premiums are no longer recoverable so effectively, no free litigation for claimants.

There are changes to the upper limit of 'small claims' cases. It was £5,000, but rises to £10,000, probably increasing to £15,000.

The outcome might be that the cost of recovering in cases of smaller domestic subsidence claims will be uneconomic going forward.

Details of the Part 36 offers are a little complex for this extract, but in essence there is an increased risk for the Defendants and it is aimed at encouraging Claimants to make offers.

In summary, the changes are aimed to improve cost control of litigation and are about 'budgets and proportionality'.

Anthony described the issues surrounding Berent, but didn't think it changed the world. It just added a complexion.

In essence, Local Authorities have an obligation to balance risk with preventative action. In the case of Berent, and considering risk, it was determined that "there was no reliable methodology for predicting precisely which tree would cause damage".

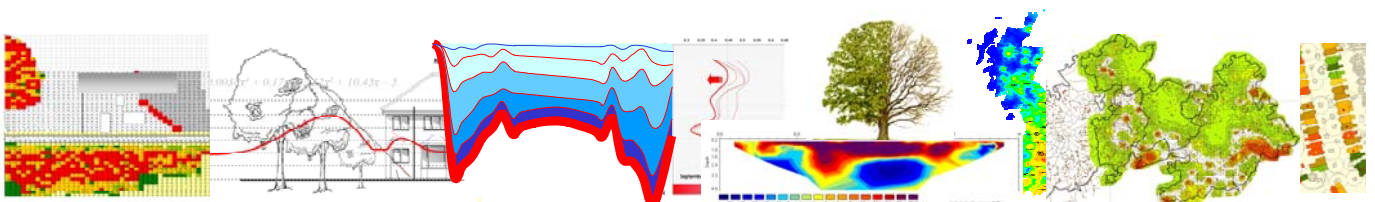
The Local Authority acted responsively, dealing with trees when notified of damage.

The alternative of felling every tree in influencing distance of a building would lead to desertification of the landscape and was unacceptable.

Going forward, a 'good case' might be one where (a) the tree had little amenity value, (b) the owner ignored warnings, (c) the tree owner did not have a policy and (d) had knowledge of the risk.

A riskier claims would be one where (a) the risk was nominal, (b) the tree had significant amenity value and (c) there was adherence to a reasonable maintenance/response policy.

In summary, it remains that each case turns on its individual merits but in general Claimants face a greater risk, we need to understand the efficacy or otherwise of tree maintenance and expert advice and evidence is essential.



# The Clay Research Group



## An Improved Suction Test



**Nic Harris** from **MatLab** outlined the problems with the filter paper test and explained the benefits of a new ‘suction sensor’ developed by Clive Bennett as part of his PhD research.

The filter paper test was introduced as a means of testing clay soils within a sensible budget for domestic subsidence claims, and gave practitioners a means of assessing soil stress resulting from desiccation.

However, for accurate results each batch of filter papers has to be calibrated, and this doesn’t happen routinely. This can produce wide variations in results and Nic gave an example showing two results from filter papers drawn from differing batches that led to a difference in suctions in excess of 1,000kPa.

Also, exposure of the filter paper to the atmosphere in the laboratory can influence the results dramatically - see graph below.



Contamination of the filter paper by picking up clay residue by contact with the sample was also a potential problem.

Weighing a filter paper contaminated with clay particles (see below) would result in an over-estimate of moisture content and produce erroneous results.

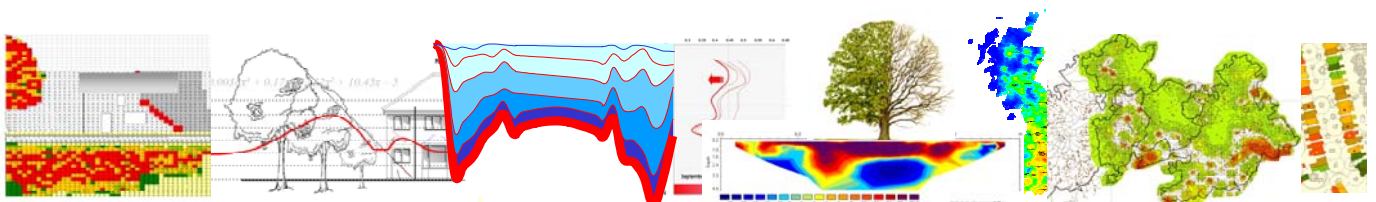
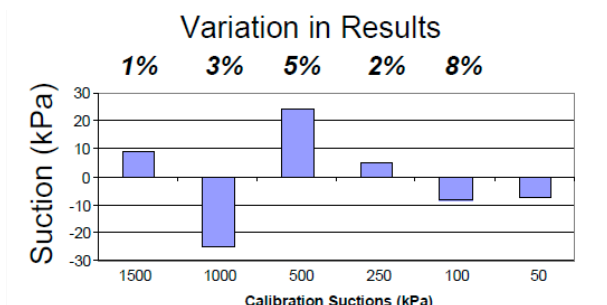


*A contaminated filter paper, stained with clay, will deliver erroneous results and over-estimate the moisture content.*

To overcome this problem MatLab use two sacrificial filter papers, one placed either side of the test paper, separating it from direct contact with the clay sample.

These issues led Clive to look at the method again and he has developed a UKAS accredited test that uses a clay sensor, which delivers results quicker and with an improved accuracy.

Instead of taking one or two weeks, the method delivers results in 8 hours. In terms of accuracy, the results indicate +/- 10% at low suctions, improving to +/- 5% at high suctions – see below.



# The Clay Research Group



## Local Authority Tree Officers Viewpoint

**Jake Tibbetts**

Chair, LTOA - [jake.tibbetts@islington.gov.uk](mailto:jake.tibbetts@islington.gov.uk)

Jake provided some really useful background relating to the duties of a Tree Officer. Whilst subsidence is high on the list for those of us investigating claims, the Tree Officer has many clients and duties.

They are required to respond to enquiries from numerous Council Departments including Highways, Housing, Parks, Social Services, Education, Building Admin and Planning. They also have a wider Duty of Care in maintaining a Council asset. Stakeholders include Residents, the various clients departments listed above, Councillors, Risk Managers, Press, Directors and Residents Groups etc.

Subsidence wasn't the priority that insurers may have assumed and Jake estimated that typically it accounts for only around 5% of a Tree Officers duties.

Dealing with varying requirements is also a challenge. Some residents would prefer trees to be felled to avoid nuisance from falling leaves etc., whilst others can be very voluble in pressing for tree retention. To put it in a nutshell, Jake felt that on some occasions, the Tree Officer was "damned if they did, and damned if they didn't".

The picture painted reinforced that provided last year by Paul Harris. Paul had asked for clearer reports with explanations of what the various graphs in reports actually meant.

When did the periodic signature of root induced movement become significant over and above the normal seasonal movement? What did the suction graph actually mean?

Jake echoed these sentiments in his talk and asked if it would be better perhaps if we presented a unified front to our clients - i.e. the homeowner. Instead of arguing, would our time be better spent talking to each other and improving communication?

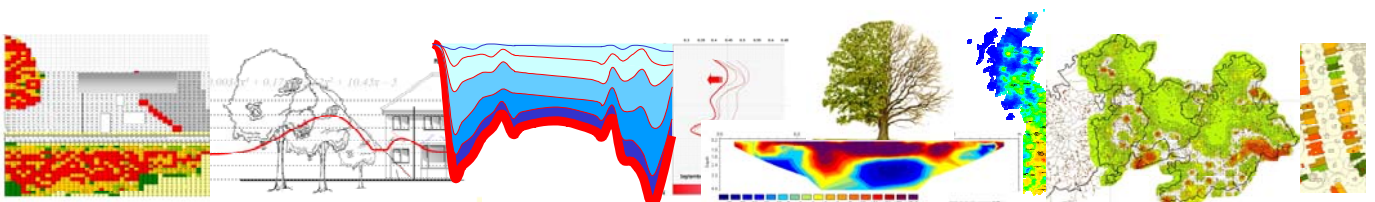
In an interesting presentation it became clear that we (engineers, insurers, Tree Officers) shared the same objectives - quicker claim resolutions at a sensible cost with better evidence - and concluded with some thoughts following the decision of Berent.

*A year in the life of Islington: Managing 40,000 trees, pruning 7,000, planting 800 ... and dealing with 42 subsidence claims.*

Apparently there has been a sharp increase in the number of requests for data under the Freedom of Information Act as insurers and their agents seek to identify so-called 'hot spots' – whatever they are.

The Joint Mitigation Protocol has been useful, although perhaps too few have taken it up to make a difference, although it does introduce the need to value the amenity of the tree.

Hortlink II may provide some guidance on the benefit or otherwise of crown reduction and Council Tree Officers need to carefully consider management strategies and ensure regular cycles of management where the need has been identified.



# The Clay Research Group



## Electrokinesis

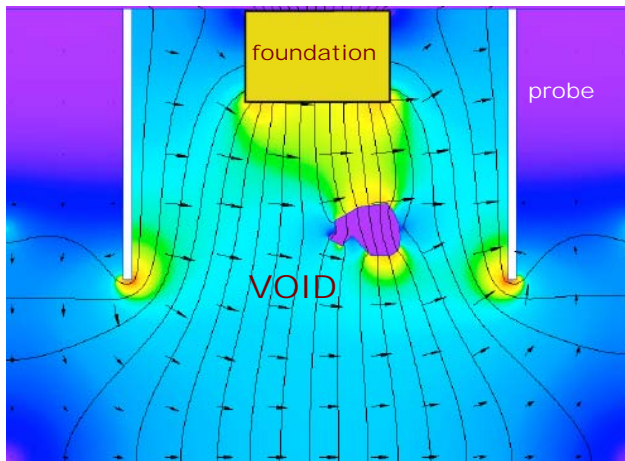
**Tom Clinton**  
Birmingham University



Tom is a second year PhD student at Birmingham University, part sponsored by John Peterson of Foundation Piling Limited, Bristol.

He is researching the use of electrokinesis (EKO) to stabilise shrinkable clay soils with the objective of developing a relatively quick and economic method of reducing building movement caused by tree root activity.

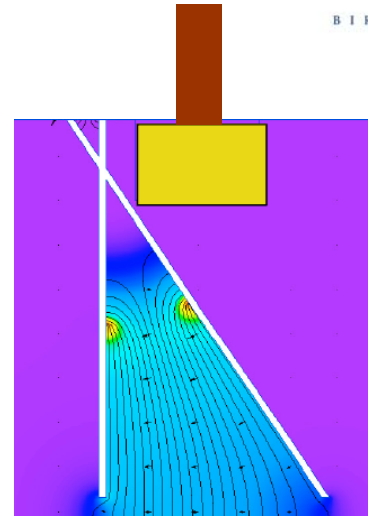
The technique has a long history in geomechanics, dating back to WWII.



The first stage of the research was using finite element modelling to understand how electrical current flows through the soil for a range of conditions.

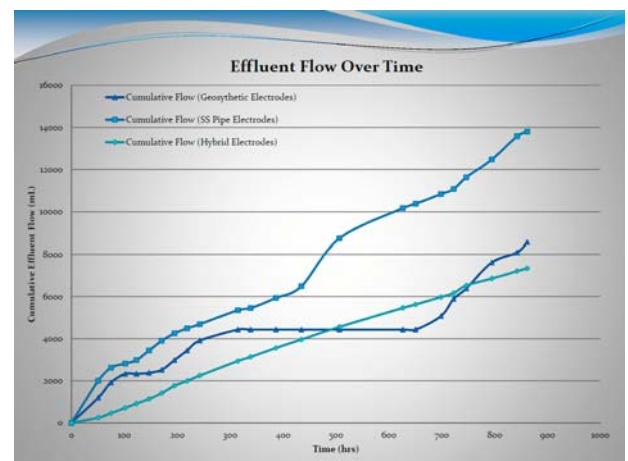
The picture above introduces a void – other trials model changes in clay strata and show how the treatment can be targeted.

The yellow block, top centre of the images, represents the position of the foundation.

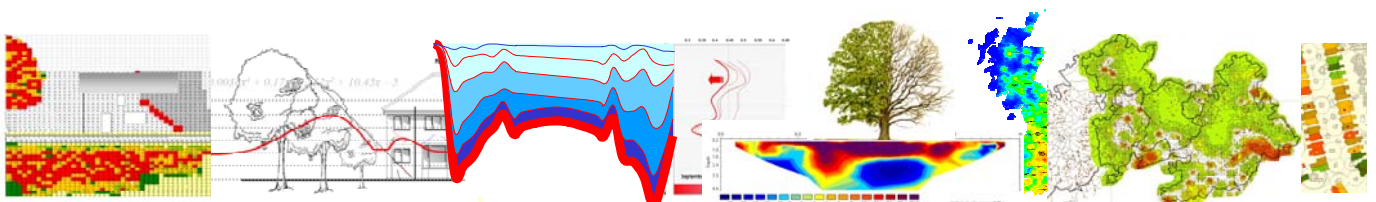


The most favourable arrangement – the one that avoids going inside the property – is a raking arrangement as illustrated above.

Tom has also been researching the most efficient probe comparing steel, geosynthetic mesh and hybrid electrodes. For example, whilst the stainless steel probe is efficient at driving flow in the soil, it uses more electricity.



The next steps will be to test different electrolytes at various stages and look at the benefits of current intermittence followed by field trials on London clay.



# The Clay Research Group



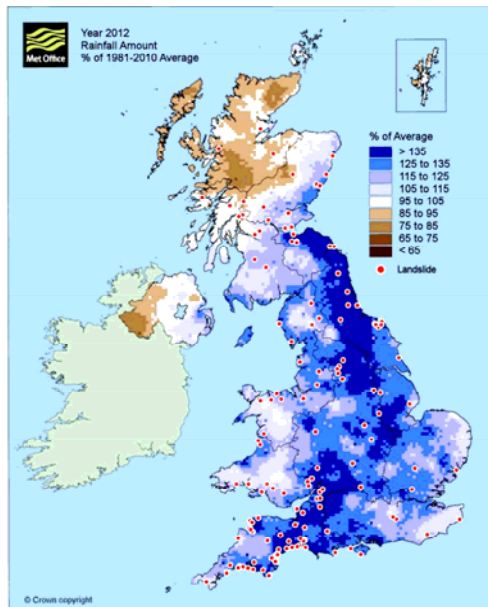
## LANDSLIDES

Katy Freeborough from the British Geological Survey told us that the BGS hold over 16,000 records of landslide events (including slope failures) in their National Landslide Database, each of which has to be verified and mapped.

They form the basis of the BGS susceptibility model along with other perils - shrink/swell, soluble rocks, collapsible deposits, compressible ground and running sand.

The Met Office reported that 2012 was the second wettest year since records began in the UK, and the wettest year for England.

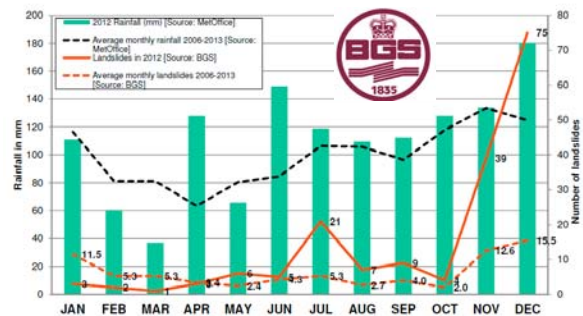
This has led to an increase in reported cases of landslides associated with heavy rainfall due to (a) reduction in shear strength with strata becoming weaker and (b) the soil becoming heavier due to saturation. Apparently, there were 56 landslides reported in January 2013 (five times the national average for the period 2006 - 2013), compared with only 3 in January 2012.



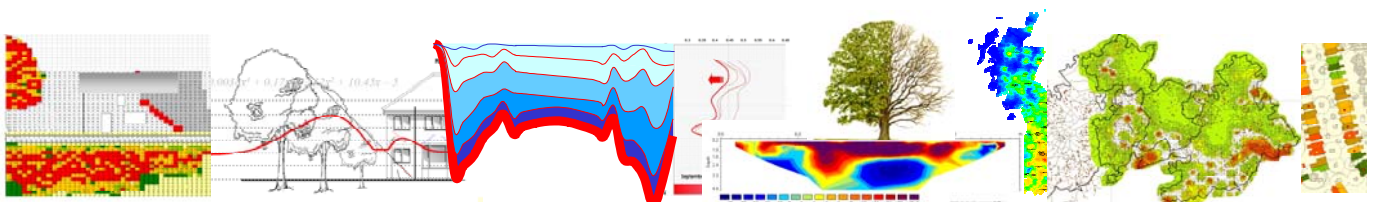
*Landslides superimposed onto the Met Office map of rainfall for 2012 compared with the 1961 – 2010 average.*

Although there is little doubt that the increase in rainfall over the last few years has resulted in an increase in reported cases of landslide, Katy explained that this may - in part at least - be due to the formation of the BGS 'landslide response team' who use social media sites like Facebook and Twitter to receive reports of sightings.

### UK rainfall and landslides 2012



The BGS are currently carrying out research on behalf of The Forestry Commission (amongst other clients) who have concerns over the potential for damage to infrastructure at their sites in England, Scotland and Wales. Scores, based on speed of movement, depth and area of influence are ascribed. The BGS are also measuring movement and volume change at a coastal site at Aldbrough, Yorkshire using inclinometers, piezometers combined with data from a weather station. They are also taking measurements using a terrestrial laser scan.





# The Clay Research Group

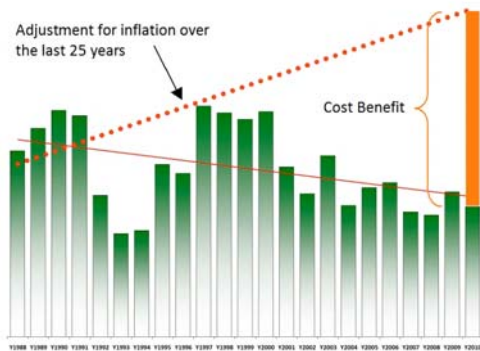


## 20 Years of Data

**Richard Rollitt**

InFront Innovation

Richard looked back over the last 20 years and drew a picture of how the industry has changed from the time when half of all valid claims were underpinned, to today, when the number is probably less than 5%. Settled costs have halved taking into account inflation. The subsidence policy excess was £500, and is now £1,000 - almost unchanged when taking inflation into account.



**Falling Cost of Subsidence Claims.**  
Over the last 25 years, the cost of subsidence claims has fallen by more than 50% when adjusted for inflation.

Richard explored how such economies were achieved. The endless chain of referrals involving the insurer, adjuster, engineer and various other parties (arborists, monitoring, site investigations etc.) has been shortened by the introduction of Delegated Authority and the merger of roles. Most practices now engage dual experienced adjusters and engineers.

Also, the business process is very different. We now have Management Information, gathered from ever more sophisticated computer applications, and targets - something that was unthought of 20 years ago.

The idea then was that "claims cost what they cost", and setting targets has changed that. The adjuster is following the retail model and we have moved from the 'corner shop' mentality, to the world of supermarkets. Well, only in general terms of course, but we got the message.

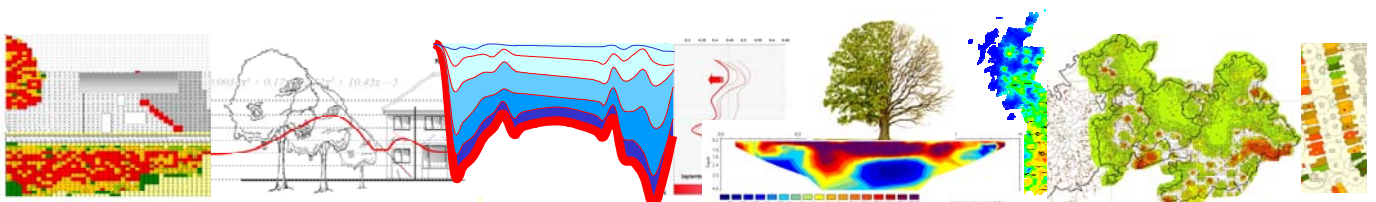


Today ... or maybe tomorrow

More is being done at the time of first notification with sophisticated Triage applications that refer not only to geological maps, Google Earth and Street View, but historic claims data. What is the probability of a claim in this postcode, notified at this time of year, on a clay soil and with a tree nearby, being valid?

Technically we have moved from Avonguard tell tales, through the Vernier caliper through to remote monitoring devices measuring movement every hour of every day, and reporting it via the web.

The driver behind this change? In large part, insurers engaging the services of procurement experts who know a bargain when they see it.



# The Clay Research Group



## The Aston Conference in Summary

There can't be many opportunities to see lawyers mingling with geotechnical experts talking about new soil tests, and the possibility of moving molecules around below ground using an electrical charge, joined by people that know lots about trees and others wondering what the eventual liability might be.

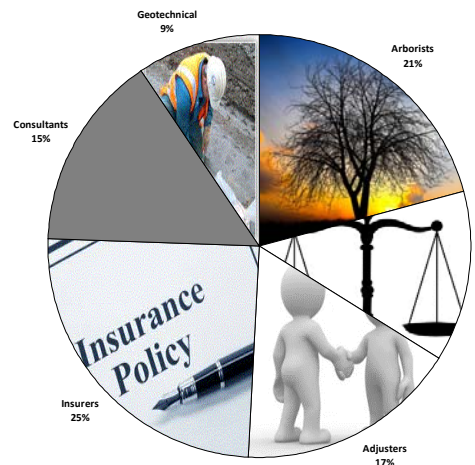
We have all of this at Aston, and maybe a little more. It has become quite a social event and often we learn more about our industry by chatting with colleagues over lunch than we see in the press. Which contracts have been placed where, who has moved/retired and how we see the future developing.

This year was a particularly pleasant event. We came away with an insight into where several research projects are headed plus an update on legal matters.

Feedback from last year was that delegates wanted genuinely fresh insights. They didn't want sales pitches. Arboriculturalists thought we spoke too much about soils, and geotechnical experts wanted less about trees, so we didn't please everyone, but even with this in mind, the conference scored an approval rating of 98%.

The main concern this year was the cost of attending. Costs have increased over the years, which may explain the reduction in numbers attending. Budgets are tight and on top of the ticket price, delegates have to pay for travel and in some cases, accommodation.

All of that said, the feedback remains positive and the hope is that Aston continues to run.



The agenda for 2014 is already in the planning stage. Some new projects include the non-invasive tracing of tree roots using electrical resistivity. Many remember the stirring talk delivered by Nigel Cassidy from Keele a few years ago. Being able to visualise the layout of roots would be an exciting development.

At least two members, working independent of one another, are looking at the interpretation of level monitoring and re-visiting the work of Burland & Wroth etc.. What sort of angular distortion is needed to crack a low rise building? Is it 5mm, or 50mm?

On the same topic, others are developing a system for monitoring buildings remotely, at a sensible cost, and accurately. A development of past work that was hampered by the cost of telemetry and equipment.

