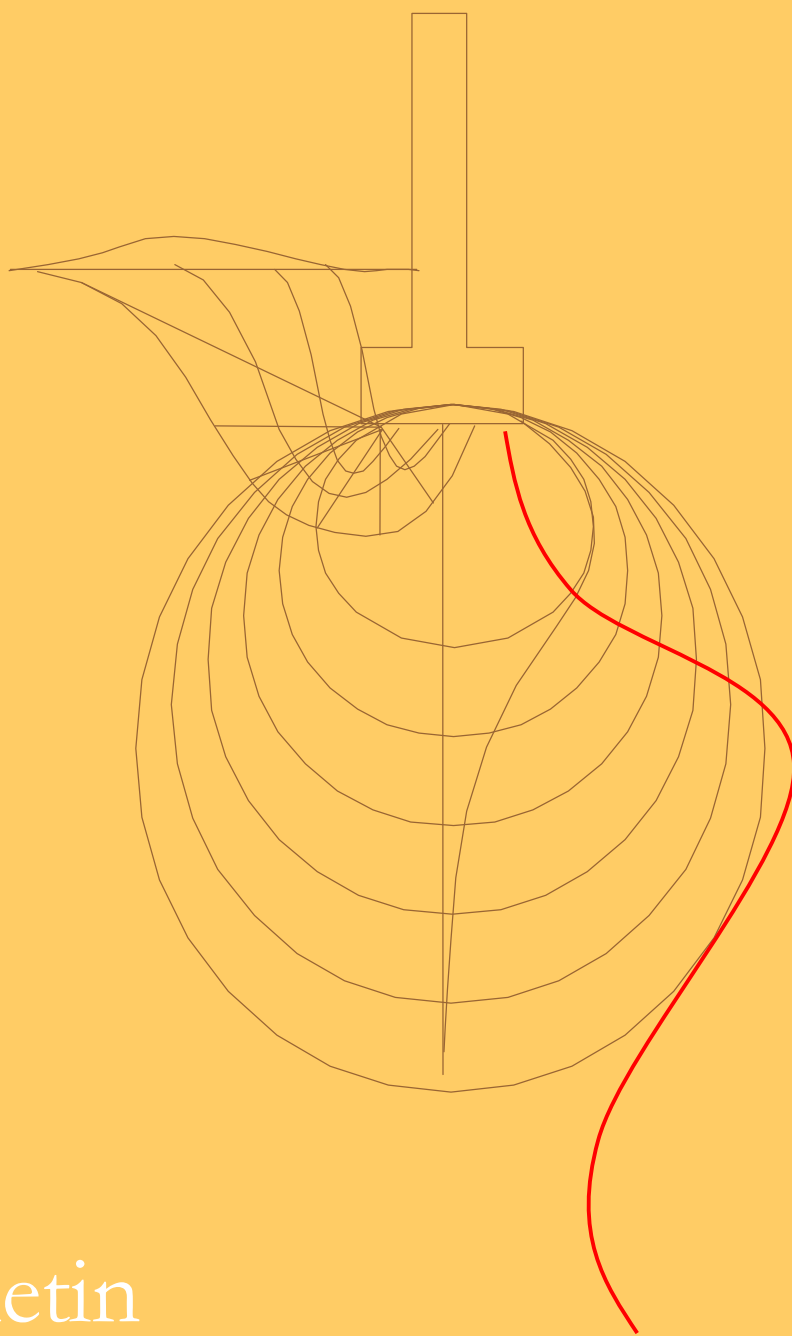


The Clay Research Group



Monthly Bulletin

Wet Weather

Data from the weather station at Aldenham confirms what we all know. It's been exceptionally wet of late, and the heavy rainfall from the 8th May onwards is clearly recorded, exceeding the February values. If you would like to be added to the distribution list to receive weather data, please let us know.

CONTENTS

Page 1

Wet Weather at Aldenham
Count of Claims by Area

Page 2

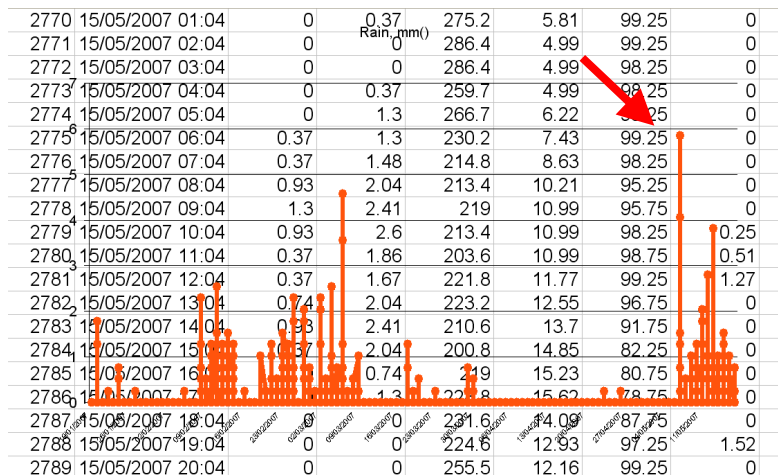
SMD and Ground Movement
- The Relationship -

Page 3

Stomatal Conductance
BioSciences Page

Page 4

Web Applications for Busy Engineers
Small Changes
Program Update
Aston Reminder



Count of Claims by Area

Here are the Top 20 cities listed in order of number of subsidence claims notified, per area - not as housing frequency.

As expected, we see London top of the list, with Birmingham and Manchester appearing in the top 20 but the surprise might be Bristol, Reading, Coventry and Norwich?

| | | | |
|----|-------------|----|-----------------|
| 1 | London | 11 | Hull |
| 2 | Bristol | 12 | Manchester |
| 3 | Northampton | 13 | Derby |
| 4 | Reading | 14 | Liverpool |
| 5 | Coventry | 15 | Wolverhampton |
| 6 | Norwich | 16 | Sheffield |
| 7 | Ipswich | 17 | Stoke-on-Trent |
| 8 | Southampton | 18 | Leeds |
| 9 | Birmingham | 19 | Leicester |
| 10 | Nottingham | 20 | Southend-on-Sea |

They aren't all on clay soils and those that aren't contribute towards the 30 - 40% of claims in the insurance industry relating to escape of water, poor ground and so forth.



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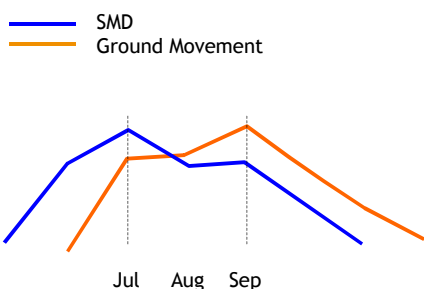
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SMD and Ground Movement Relationship

Pattern Matching

By 'fitting' the plots of the SMD for Tile 161 to match the ground movement graph at Aldenham we see a relationship. Although ground movement peaks in September, there is little doubt that the stage is set possibly one or even two months earlier.



What is the relevance?

We may be able to detect movement in sensitive buildings and apply a soil treatment prior to damage occurring.

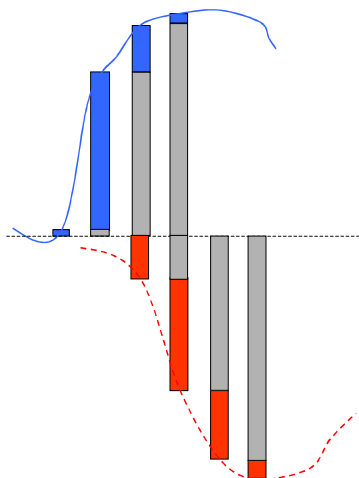
The 'change by month' values may be more important than those we see in September.

If vulnerable houses were fitted with sensitive movement devices, we would know statistically which of them was moving most out of the population and take remedial action before cracks developed.

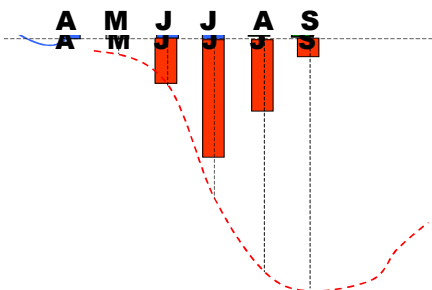
Norwich Union manage it with cars already.

Just imagine letting the homeowner know that their home might suffer damage in September and taking preventative action in July. At a cost within the excess.

Below we see the cumulative plots and the SMD (blue) and ground movement (red) changes are 'by month' differences.



It makes interesting reading to see the maximum ground movement takes place in July in 2006 and reduced significantly in August and September.



Detecting Causation Earlier

DataREADER and electrolevels help users to identify movement and trends much earlier than traditional monitoring techniques.

Right, we see how the DataREADER application has assigned very different probabilities to two very similar graphs.

One has a 95% probability of being clay shrinkage, whilst the other (the datum), has only a 35% probability.

Personal Stuff

Giles Biddle

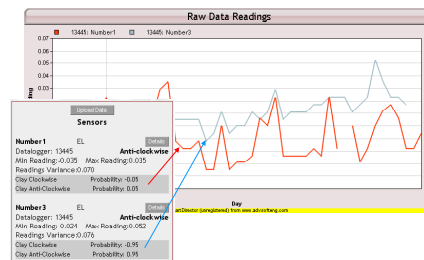


Congratulations to Giles on his forthcoming wedding, which takes place on the 6th June.

He is using this as an excuse not to join us at Aston this year. We did suggest he might want to postpone the wedding, but this wasn't well received.

Giles has made a significant contribution to the world of domestic subsidence both in terms of its diagnosis (advocating precise levels) and analysis of the interaction between soils and tree roots.

His mapping of moisture change beneath a variety of trees is of major importance and much of the research we do at Aldenham refers to his work.



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BioSciences

Stomatal Conductance

Research into reducing evapotranspiration by triggering a natural hormonal response has moved forwards, after a stumbling block in 2006.

Briefly, reducing the hydraulic conductivity of a soil (or increasing its osmotic potential) will increase the concentration of abscisic acid (ABA). The problem is, ABA can be 'switched off' at any stage in the transportation process between root and leaf by a change in the pH.

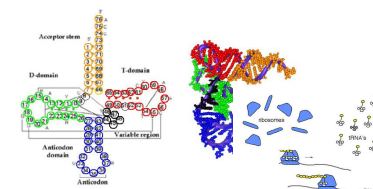
Recent published work suggests that alternate cycles of drying and wetting actually help. Dry spells lead to increased concentrations of the hormone, whilst the wet periods provide water flow to transport the hormone. As long as the balance is just right, cell turgor is maintained, but moisture uptake is reduced significantly.

We also know ABA production is very sensitively linked to even small changes in soil suctions.

If we look at the Aldenham Oak for example, the persistent moisture deficit beneath the canopy almost certainly means the tree is already transpiring less than it might otherwise do.

The reduced amount of moisture available and the activity of the root system to the periphery are good indicators.

The cycle is illustrated below. ABA triggers a change in the production of transfer and messenger RNA and the root promotion protein is triggered in the ribosomes.

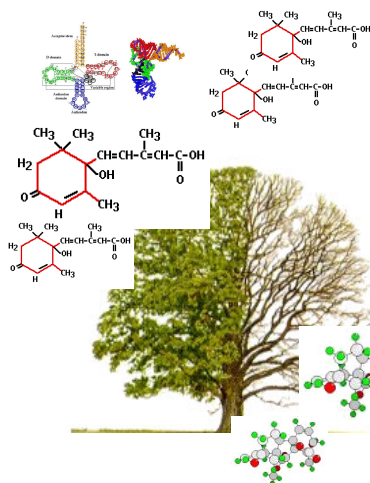


Although the message is cast in DNA, it isn't cast in stone and changes can be made 'on the fly' in response to changing situations, environment etc.

This is part of the in-built protection mechanism of trees and shrubs that allows them to cope with change.

Simple rehydration and a prompt treatment with ABA and a binding molecule should provide a quick fix.

A longer term change in the mechanics of both the soil and the tree is needed, and hence the current study.



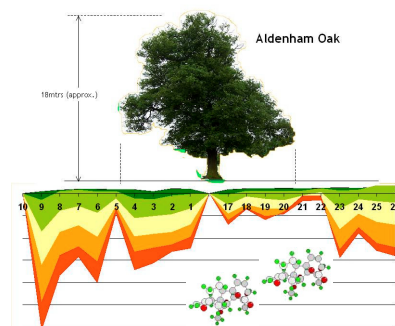
The half-life of naturally produced ABA is less than a day. From a practical viewpoint, any treatment is problematic. Explaining to a householder that if cracks develop they need to do 'x' isn't sensible.

The more recent advance relates to binding a molecule to the hormone to increase its (a) strength and (b) period of influence. Our reluctance to trial ground treatment at Aldenham has been the persistent moisture deficit beneath the tree. Depriving the Oak of water in any way could threaten its health.

Triggering a response whereby the tree survives and is healthy on a reduced water supply would be an ideal solution.

We are confident this will be effective as a way of tackling the problem, but it isn't likely to be a permanent solution.

This is where our research into the application of gypsum is taking us. A naturally occurring salt, known to increase the osmotic potential of soils applied in a sand column might well help.



Production of a protein in the ABA cycle promotes root growth for good reason. As it is a stress hormone, sending roots further afield in search of moisture is a natural response. However, for our purposes, it is one we would like to avoid if possible.

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Subsidence: Emerging Issues 2007

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Conference Reference Code: 30527

Contact details
Telephone enquiries: Helen Mallinson 0121 204 3593 or Claire Wallis 0121 204 3624
Fax: 0121 204 3684 or Email: cpd-seas@aston.ac.uk

Our courses are intended to contribute towards the CPD requirements of the relevant professional institutions.

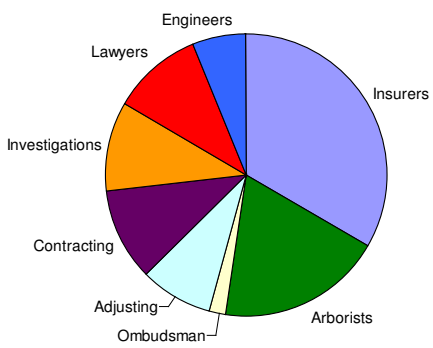
Course Organiser: Dr M Sadeghzadeh 0121 204 3606



Don't forget to join us on the 12th June to see the results of our research at Aldenham and talk with some of the participating members. We will also be talking about the applications listed below for anyone interested. Both Nigel Cassidy and Tim Freeman will be present.

To book, call Helen Mallinson 0121 204 3593 or Claire Wallis 0121 204 3624. Fax: 0121 204 3684 or Email: cpd-seas@aston.ac.uk

Aston Attendees



The distribution of attendees has changed compared with previous years. We are happy to see representation from Local Authority arborists, the Ombudsman's bureau and contractors.

Nearly all of the major adjusters will be there, along with insurers.

Local Authority arborists have recently launched an excellent campaign touching on 'the chain saw massacre' of innocent street trees with the finger pointed directly at insurers. An article appeared in the last edition of The Sunday Times.

Hopefully the day will pass off without incident but we note a good presence of lawyers to act as witnesses if not!

Small Changes

GeoServ Limited are taking over precise levelling at Aldenham.

Their director, Tim Freeman (below), is a recognised expert in the field of monitoring and root induced clay shrinkage and he is the author of several BRE Digests and academic papers on the topic in his time as Head of Foundation Research.



We are looking forward to Tim's interpretation and any comparisons that he might make with previous data from the research site at Chattenden.

Soils Interpretation

Identifying desiccation isn't always easy, even for trained geotechnical engineers. The Soils Interpreter helps users spot not only desiccation, but also under-draining, anomalous test results and variable mineralogy.

SOILS INTERPRETER

Home New Claim Reports Contacts Information Applications Logout

Claim Details - SOILS 1

Address: 52 High Street
Postcode: G72 3ED

| Depth (m) | Value | Depth (m) | Value |
|-----------|-------|-----------|-------|
| 0.5 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 |
| 1.5 | 180 | 0 | 0 |
| 2 | 220 | 0 | 0 |
| 2.5 | 370 | 0 | 0 |
| 3 | 600 | 0.5 | 50 |
| 3.5 | 230 | 1 | 80 |
| 4 | 120 | 1.5 | 300 |
| 4.5 | 120 | 2 | 450 |
| 5 | 50 | 2.5 | 1200 |

Output
Likely matches in descending order (top2)
Correlation

| Soilcode 1 | Soilcode 2 | Correlation |
|------------|------------|-------------|
| 1 | 1 | High |
| 2 | 2 | Positive |

1. Evidence of desiccation - consider heave.
2. Evidence of desiccation.

1. Soils may not be desiccated. Refer to engineer. None
2. Possible under-draining. Refer to engineer. None

The application accepts data as strains as well as suctions.