IGI / GSI PEAT STABILITY SEMINAR 7th OCTOBER 2010

Update on Irish Peat Slides 2006 – 2010 & Appropriate Investigative Methods for Peat

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UCD School of Architecture, Landscape and Civil Engineering. Scoil na hAiltireachta, na Tírdhreacha agus na hInnealtóireachta Sibhialta UCD.

Outline of presentation

- Update general
- 2006, 2008 and 2009 events
- Review of causal factors
- Appropriate investigative methods
- Logging
- Profiling
- Sampling
- Routine lab testing
- Strength testing
- Health and safety

Update on number of slides





Ref: GSI Landslides database (Charise Mc Keown)

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2006 slides - rainfall



4/34

2006 slides



Clare Island slide

Bengorm slide (Photographs courtesy Cáitriona Douglas, NPWS)



2008 slides - rainfall



2008 slides





Corrie Mountain slide Photograph courtesy Dr. Paul Jennings, AGEC

Ballincollig Hill slide

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(a) peat cutting by "sausage" machine, (b) peeling action of peat during slide (c) general view from head of slide and (d) peaty debris

2009 slide at Glencolumcille



Glencolumcille slide





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Other 2009 slides





Slides on Croaghmoyle Mountain Co. Mayo July 2009 (a) general view (b) detail on failure plane in mineral soils Photographs: Dr Paul Jennings, AGEC

Analysis of slide causal factors

Slide	Type of failure *	Heavy rainfall	Construct. activities	Turf cutting	Others	Notes and comments	
Gleniff	?	✓			Poor drainage		
Clare Island	Peat slide	~			Steep slope		
Bengorm	Peat slide	v			Steep slope		
Seltan	?	\checkmark					
Corrie Mnt	Peat slide	✓	?				
Derrysallagh	?	~			Relatively steep slope		
Geevagh	?	✓				Area has strong history of slides	
Garvagh Glebe North	?	~	~			Failure during access road construction	
Kilronan Mnt.	?					Little detail available	
Ballincollig Hill	Bog slide	✓	✓	✓		Failure during access road construction	
Glencolumcille	Peat slide	✓		√	Break in slope		•after (Dykes •& Warburton 2007)





Appropriate investigative methods

- Peat profiling
- Logging
- Routine testing
- Sampling for strength testing etc.
- Strength testing





Peat profiling by GPR





Approach can deal with a variety of challenging conditions. Ref: Later talk by Andy Trafford



Peat logging using Russian sampler: 4 m range







Peat logging





Appropriate use of von Post classification system Don't be lazy!

- Designation
- H (1 to 10)
- Water content
- F (0 to 3)
- R (0 to 3)
- W (0 to 3)
- N (shrub remnants)
- N (%)
- TV (0 to 3)
- TH (0 to 3)
- A (0 to 3)
- P (0 or 1)
- Acidity



GPR and peat profiling



Internal peat boundaries selected from GPR by Andy match von Post fibre scale logs done separately by Roselyn.



Definitely warrants more work

Routine lab testing

- As a minimum w, von Post, organic content
- w_L, linear shrinkage, density?
- Fibre content ASTM (2002) D1997-91









 $s_{u\text{-}FV}$ can be up to 4 times higher than $s_{u\text{-}LAB}$ and is influenced by increasing fibrosity

19/34

High quality sampling





Sherbrooke block sampling of peat in the Netherlands by TU Delft, NGI, UCD, Dec 2006





Peat sampling using SGI peat sampler







Aluminium sampler











Sampling – aluminium sampler

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UCD-DSS apparatus





Particle Image Velocimetry (PIV) software developed by White et al. (2003)

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Initiation of matrix failure, (sp_m)









Maximum fibre strength, (sp_f)









DSS test results



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Crayford marsh site - UK



DUBLIN

1953 floods 2400 people killed 307 in the UK



Full flow penetrometers



Ball / T-bar much less susceptible to fibres Give better representation of global strength

DUBLIN

Health and safety

Phone a lifeline for trapped man

A MOBILE phone proved to be a vital lifeline for a man who became trapped in marshes while working yesterday.

He was in marshiands close to the River Fergus, Clarecastle, Co Clare, where he was undertaking ground investigation works for a Cork-based geotechnical firm.

The technician, in his 30s, arrived at the location at about 8am and crossed a field before climbing over a mud bank to gain

access to the marsh. Carrying some heavy surveying equipment, he soon began to sink into the marsh and was submerged up to his waist when eventually rescued.

and emergency medical services travelled to the scene. Fire crews were in constant contact with the trapped man by phone so that he

could lead them to his location which was not visible from the road.

Rescue crews quickly located the man who was trapped and still sinking.

Rescuers believe the man had Two units of the fire brigade been stuck for at least half an hour before calling the emergency services. "He was using a pole to try and get out but he kept sinking even more."

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Irish Independent 30/9/2010



On going work

- Provide engineers with robust analysis input parameter
- Link $q_{ball} \implies w$ / fibre content $\implies s_{uDSS}$
- Need your help! Industry / academic co-operation.
 Provide access to sites where this work can be carried out.





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Thanks for listening!



