GSHPA
Research Gaps

by

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Gaps in GSHP research

- **Assessment of building**
- **Thermal conductivity of UK geology**
- **Vertical loop developments**
- **Thermal piles**
- **Horizontal loops**
- **Developments in heat pumps**
- **Case histories – extension of field trials**
- **Training**

Gaps in GSHP Research

Gap	Discussion	Possible research

Assessment of building	• Process in MIS 3005 for building heating assessment
	  • Validate against field data
	  • Establish variability in building user profiles	

Thermal Conductivity (TC) of UK geology	• BGS work – TC lab test based. - 2004 data not referenced
	• Industry – Use response tests – Commercially sensitive information – Options:-
	  o Possibly provide data to independent university to compile
	  o Test London Clay TC by Eurocode methods and compare with BGS
	  o Goal: to relate UK Clays MIS 3005
	  o Larger goal would be to check response test data for a range of locations and different geologies	

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Gaps in GSHP Research

Gap	Research	Possible Topic
Vertical Loops developments	• Very deep Loops • Thermal grouts – Thermal conductivity tests and reliability • Circulation fluids – types and inhibitors – tests for antifreezes - use of water • Electro fusion and other connections – Rehau systems • Specifications for plastic pipes – Other pipe tests?	

Thermal piles	• Control freezing at soil pile interface –
	  • Can circulation fluid drop below freezing and for how long?
	• Placing of U tubes in piles – scratching and protection
	  o Thermal piles – placing concrete can scratch pipes
	  o Significance of scratch needs to be understood
	  o Development of mitigation measures
	• Response tests with pile expansion – shaft friction – additional concrete stress
	• Design programs for thermal piles – increased axial stresses in concrete from heating piles
	• Thermal conductivity of piling concrete
	• How hot can we run ground loop systems?	

Horizontal loops	• MIS 3005 sets out guidance for horizontal loops in
	  o Modelling is not simple
	  o Objective is for academic organisation to run independent checks on the MIS tables and assumptions using a range of models
	  o Help to develop the table still further
	• Assumption of mean average air temperature – is this appropriate to use for the mean temperature at depth	

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Gaps in research

Gap	Discussion	Research Topic
Developments in Heat Pumps	• Where will heat pumps get to over the next 10 years?	
Case Histories – Extension of field trials	• Case histories must report information on COP . • Specification for monitoring to achieve this? • Report COP - balanced heating and cooling systems?	
Training	• Industry design training - University links – training / exams • Investment required – about £100k • Standards need to be set. Exams	

Ground Source Heat Pump Association (GSHPA) provides:

- **Information to Clients**
- **Standards for Industry**
  - Specifications / Guides on installation techniques
- **Training standards**
  - Competency standards - GSHP designers / installers
- **Seminars**
- **Influence Government energy policy**

- **Further details from www.gshp.org.uk**

Thank you for your Attention

Any questions?