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COBBAUGE KICK-OFF EVENT

RÉUNION DE LANCEMENT COBBAUGE

28th November 2017
Plymouth University

CobBauge

Interreg
France (Channel Manche) England
EUROPEAN UNION

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Agenda

Ordre du jour

Tuesday 28th November 2017
14:00 – 16:00
Student Kick-Off Event
Roland Levinsky Building – Senate Room – Level 3
Agenda to be provided at the event

18:00 – 20:00
Evening Kick-Off Event
Roland Levinsky Building - Senate Room – Level 3
Agenda to be provided at the event

Wednesday 29th November 2017
Site visits
To be confirmed, but this will be a 09:00 start.

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Présentation du projet CobBauge

Introduction of CobBauge project

Professor Steve Goodhew
Plymouth University

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The Project

Le projet

The CobBauge project (a merging of the English and French words for the technique) will run until the beginning of 2019 and has received funding from the Interreg VA France (Channel) England Programme, co-financed by the European Regional Development Fund (ERDF).

The project aims to produce an optimised cob mix that will comply with thermal building regulations.

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project partners

partenaires du projet

Academics from Plymouth will work alongside the

- Ecole Supérieure d'Ingénieurs des Travaux de la Construction de Caen (ESITC),
- Syndicat Mixte du Parc naturel régional des Marais du Cotentin et du Bessin (PnrMCB),
- Earth Building UK and Ireland (EBUKI) and the
- Université de Caen-Normandie (UCn).

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Types of earth construction

- Earth blocks, (Adobe, clay lump, cob blocks, compressed earth blocks)
- Monolithic (Rammed earth, cob)
- Infill (Wattle and daub, mud and stud)

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The Material

Le matériau

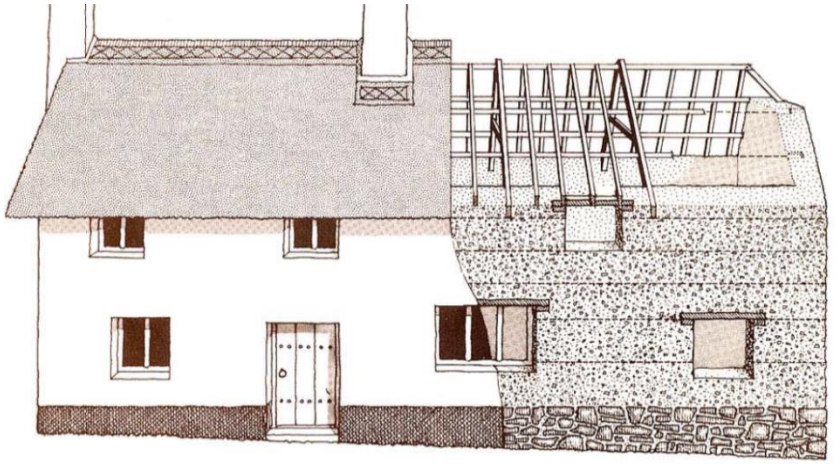
Cob

Layer of subsoil mixed with straw, laid upon a plinth in layers of approx 700mm high.

Allowed to dry before the next layer is laid and the windows and doors cut out afterwards.

ALWAYS needs '*gud 'at and boots*'

Traditional method of cob construction showing mixing, placing material on the wall, compaction by treading and paring back the wall face.



A typical 17th century cob house showing some constructional details. The wall is built off a stone plinth in several layers, or lifts, and lintels and roof timbers are supported on the cob, using timber pads or cross pieces where necessary.

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Traditional Cob Buildings

Bâtiments traditionnels en bauge

Cob cottages in the village centre at Inner Hope, South Devon.

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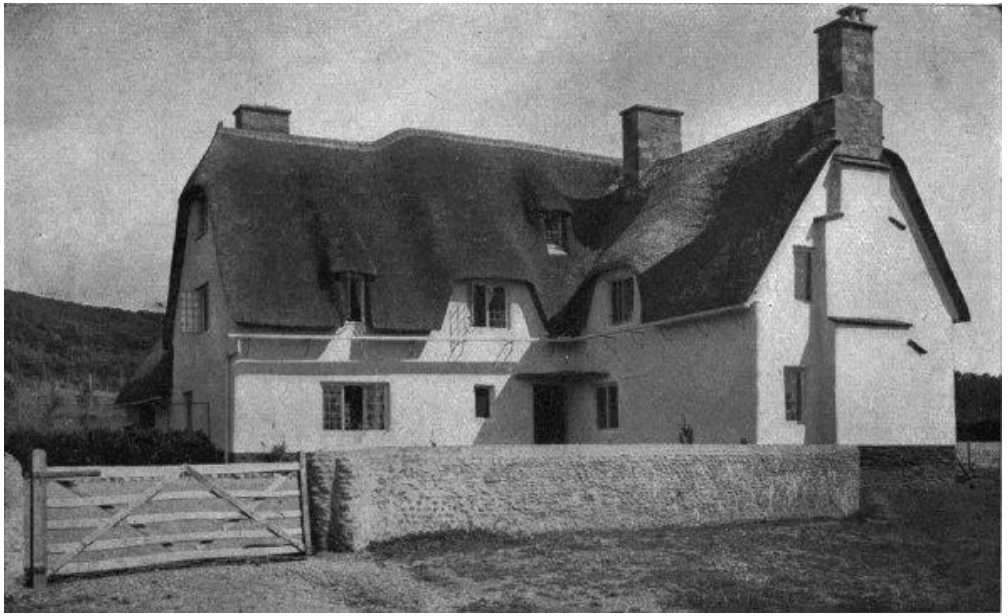
Long Orchard, a cob cottage at Budleigh Salterton, 1912 for Basil Young by Mr. Ernest Gimson, near Budleigh Salterton, Devon



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In 1980 Alf Howard was asked by Down St Mary Parish Council to construct a shelter in the village for children waiting for the school bus. This was the first example of a new cob building in Devon since the 1930s.

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New cob buildings

Nouveaux bâtiments en bauge

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Alterations and refurbishment

Modifications et rénovations

Structural alterations

Re-render

Fire

Partial collapse

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Why is Cob a good material?

Pourquoi la bauge est-elle un bon matériau?

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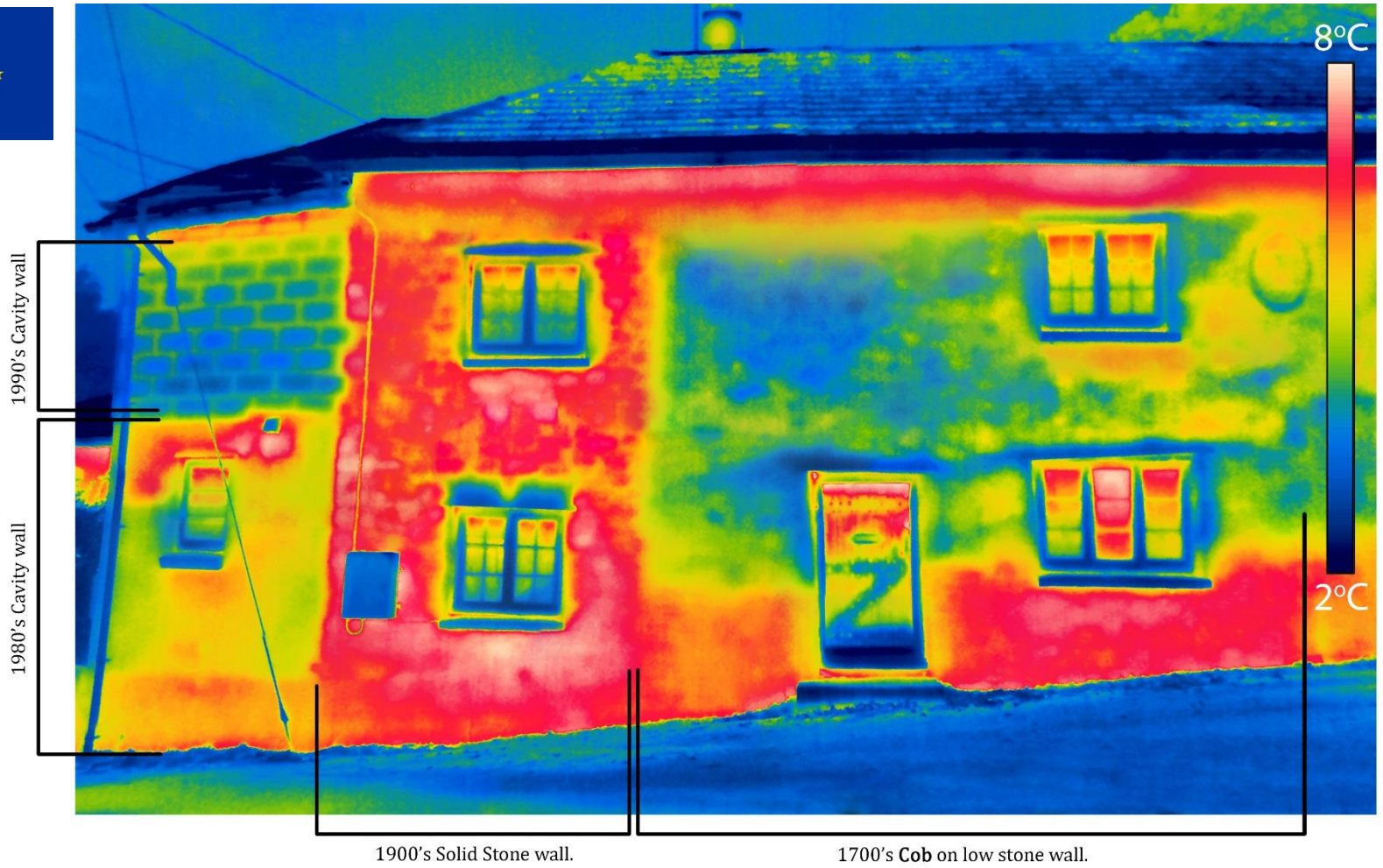

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City	Country	Degree Days	U-value requirements [W/m2 K]					
		Heating/cooling	Wall		Roof		Floor	
			low	high	low	high	low	High
Vienna	Austria	2844/221	0.35	0.50	0.20	0.25	0.35	0.40
Bruselles	Belgium	3067/67	0.60	0.60	0.40	0.40	0.90	1.20
Zagreb	Croatia	2723/257	0.90	0.90	0.65	0.65	0.75	0.75
Prague	Czech-R	3431/67	0.30	0.38	0.24	0.30	0.30	0.45
Berlin	Germany	3296/102	0.30	0.30	0.20	0.20	0.40	0.40
C-hagen	Denmark	3720/22	0.20	0.40	0.15	0.25	0.12	0.30
Madrid	Spain	1860/596	0.66	0.66	0.38	0.38	0.66	0.66
Paris	France	2702/114	0.36	0.36	0.20	0.20	0.27	0.27
Athens	Greece	876/1020	0.70	0.70	0.50	0.50	1.90	1.90
Dublin	Ireland	2846/1	0.27	0.37	0.16	0.25	0.25	0.37
Rome	Italy	1253/786	0.50	0.50	0.46	0.46	0.46	0.46
Riga	Latvia	4430/41	0.25	0.40	0.20	0.20	0.25	0.25
Vilnius	Lithuania	4339/50	0.20	0.50	0.16	0.40	0.25	0.50
Amsterdam	Netherlands	3039/27	0.37	0.37	0.37	0.37	0.37	0.37
Warsaw	Poland	3747/82	0.30	0.50	0.30	0.30	0.60	0.60
Lisbon	Portugal	846/410	0,50	0,70	0,40	0,50	–	–
Bucarest	Romania	3051/273	0.70	0.83	0.33	0.50	0.60	0.91
Stockholm	Sweden	4210/43	0.18	0.18	0.13	0.13	0.15	0.15
Bratislava	Slovakia	3152/150	0.32	0.46	0.20	0.30	0.25	0.35
Belgrade	Serbia	2753/279	0.90	0.90	0.65	0.65	0.75	0.75
London	UK	2800/58	0.25	0.35	0.13	0.20	0.20	0.25

U-value requirements and heating and cooling degree days of European cities.

Rodríguez-Soria, B., Domínguez-Hernández, J., Pérez-Bella, J.M. and del Coz-Díaz, J.J., 2014. Review of international regulations governing the thermal insulation requirements of residential buildings and the harmonization of envelope energy loss. Renewable and Sustainable Energy Reviews, 34, pp.78-90

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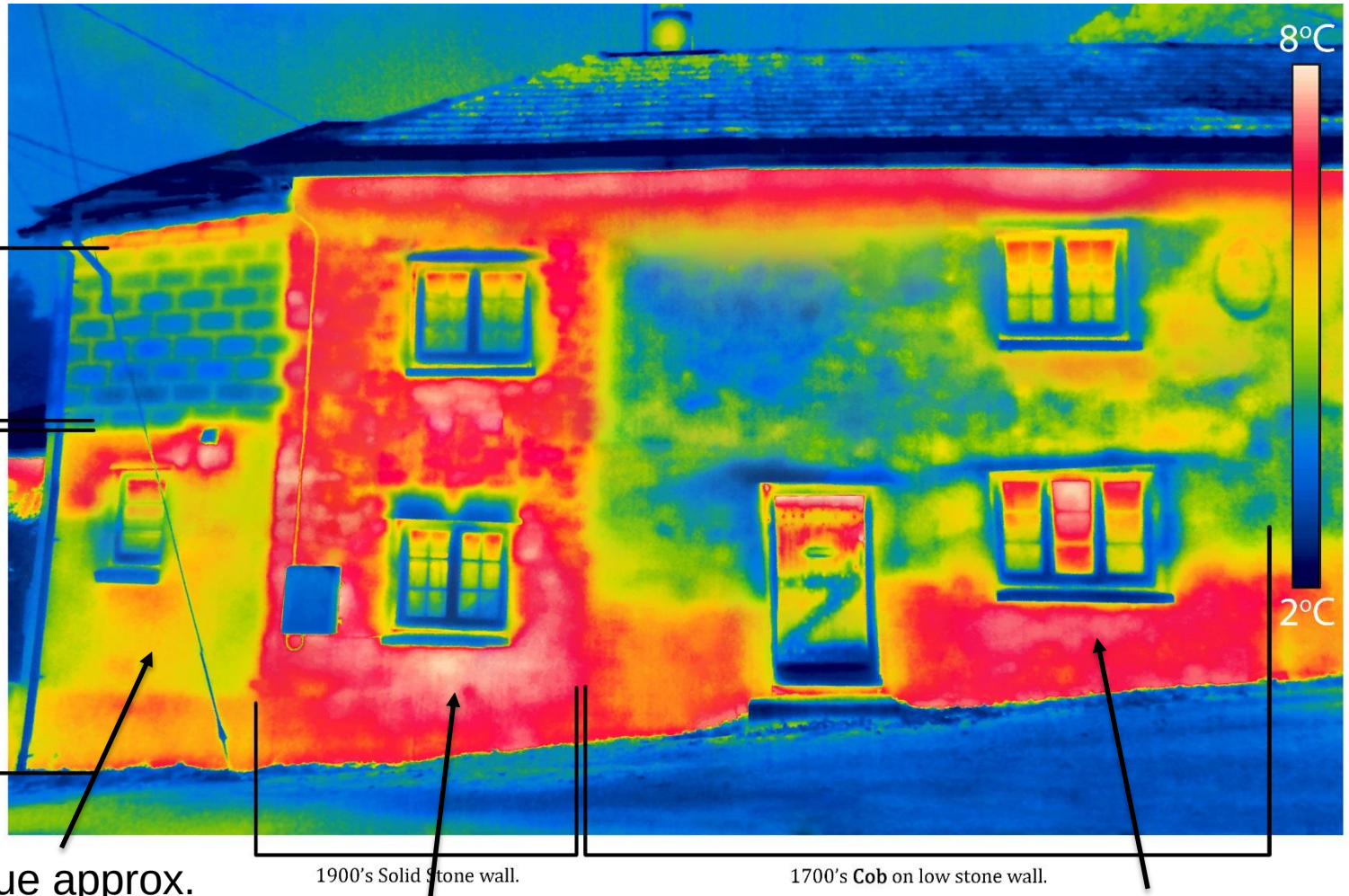
The problem?
Le problème?



U Value approx. 0.5W/m²K

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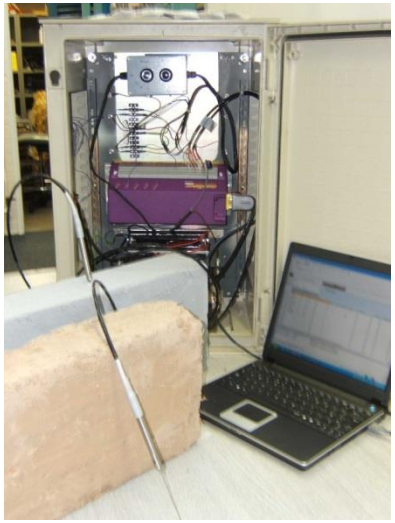
Thermal measurements

Mesures thermiques

What are the thermal properties of earthen building materials? (whilst still maintaining appropriate structural and moisture related properties/appropriate construction methods).



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Context and objectives

Contexte et objectifs

	Density ρ (kg/m^3)	**Thermal conductivity λ (W m^{-1} K^{-1})**	**Specific heat capacity c (J/kg K^1)**	**Volumetric heat capacity ρc ($\times 10^{-3}$ J m^{-3}K^{-1})**	**Diffusivity $\lambda/\rho c$ ($\times 10^7$ m^2 s^{-1})**
Cob (Devon earth, mean)	1450	0.45	800	1153	3.93
Clay (USA)	1460	1.3	880	1285	10.12

(Goodhew & Griffiths, 2005)

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Context and objectives

Contexte et objectifs

Wall description	**Thickness (mm)**	***U*-value ($W/m^2 K$)**	**Mass per unit area (kg/m^2)**
Cob (Devon earth, mean)	400	0.94	580
Cob (Devon earth, mean)	600	0.66	870
Cob (Devon earth, mean)	800	0.51	1160
Clay (USA)	400	2.05	584
Clay (USA)	600	1.56	876
Clay (USA)	800	1.26	1168

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Next stages
Prochaines étapes

- 20 mixes of Cob that show ‘promise’
- 4 mixes, 2 French and 2 UK that are optimal
- 2 mixes selected for a potential stage 2 project.

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Thank you for your attention

Merci de votre attention

ENVIRONMENTAL BUILDING RESEARCH WITH PLYMOUTH UNIVERSITY

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FOSTERING EARTH BUILDING IN THE UK AND IRELAND

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