COBBAUGE KICK-OFF EVENT

RÉUNION DE LANCEMENT COBBAUGE

28th November 2017
Plymouth University

CobBauge

Interreg
France (Channel Manche) England
EUROPEAN UNION

Présentation d'EBUKI

Introduction to EBUKI

Rowland Keable
Earth Building
United Kingdom
& Ireland

Who are EBUKI?

Qui est Earth Building UK and Ireland ?

EBUKI are a registered charity, formed in 2009, registered as a charity in 2012

EBUKI is a largely volunteer led organisation involved in all aspects of earth building

- Training
- Design
- Standards
- Research
- Networking
- Events

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ECVET Earth Building	Building with earth - masonry, cob, rammed	Unit B common part

Learning outcomes — Levels **3+4**

KNOWLEDGE	SKILLS
- Geological, geographical and cultural issues affecting traditional and modern earth building techniques - Schedule plans, specifications and bills of quantities - Seasonal appropriateness and timing - Protection before, during and after building: covering choices, and how they aid or impede drying - Basic knowledge about building physics/structural behaviour - Characteristics of curved walls / walls with complex geometry - Height and width ratio (slenderness) in humid and dry state, how high to build according to the technique, weather and site conditions - Foundations, wall base and DPC (Damp Proof Course) - Connections with other walls or components, expansion- and structural joints, bonding techniques - Particular issues with scaffolding: fixing, splash-back - Fixing structural or non-structural elements, insulation, etc. - Protection / reinforcement of edge and corner - Openings: frames, lintels, sills - Services - Top of walls, interface with other built elements - Technical or decorative elements: furniture, stairs, stoves, chimneys... - Sourcing and use of earth products - Machinery and tools for mixing, cutting, lifting, laying, placing, compacting - The schedule of works: reporting of building progress - Significant defects. Signs of deformation and collapse or slumping. Means of prevention - The impact of drying on speed of build - Methods to test and control moisture content (site or lab) - Drying process, shrinkage - Quality control on building site - Site organisation, storage, access, scaffolding - The ergonomics of the workstation - Health and safety regulations	**Preparatory works and planning** - Read plans and technical specifications - Check dimensions and quality of foundations and subflooring - Plan for seasonal appropriateness and timing - Prepare during-the-work protection - Regularly control mix moisture and/or fibre content - Protect adjoining surfaces **Execution** - Create capillary break (e.g. place DPC Damp Proof Course) - Connect earth walls to other components (earth or not), create expansion/shrinkage and structural joints - Place/fix structural and non structural elements (wall plates, frames, sills) - Integrate appropriate insulation systems - Make chamfered, shaped or reinforced corners - Key/dampen day work - Create openings - Chase/build in services (pipes, boxes, fixing) - Integrate reinforcing (geo grid, wire mesh) - Prepare top of wall interface with other built elements - Execute special elements following instructions - Produce required surface finish - Make the necessary surface repairs **Site organisation** - Check scaffolding, avoiding wall damage and splash-back - Install a small building site with or without on-site production - Select appropriate tools, machinery, equipment - Organise the work place and supply materials - Manage plant for transport, lifting and handling of prefabricated elements - Protect the work during and after building (water, damage/abrasion, paint...)

COMPETENCE	Level **3**

Decision making process
- In the design brief, identify details proper to earth that need particular attention
- Recognise conditions including weather and seasonal issues which may require precautions

Planning and organising for own work
- With the materials provided, plan and organise each step of the building process, according to the specifications and program

Execution, quality control and coordination within the earth building team
- Work in accordance with the schedule of works, adjust to general work process on site, instruct Level 1 + 2 workers of the earth building team
- Check if all the steps involved conform to the specification and program
- Identify problems and report
- Control quality of the own work at each step
- Regularly check the drying process
- Recognise the signs of deformation and collapse
- Ensure your team respects health and safety regulations

Communication beyond the earth building team
- Liaise with non earth building specialists on issues of structure and finish

ECVET Earth Building	Building with earth - cob	Unit B sub unit

Learning outcomes — Level **3+4**

SPECIFIC KNOWLEDGE	SPECIFIC SKILLS
- Different methods and tools for placing, shaping, compacting, cutting: o Trimming/cutting/paring tools o Compacting and beating tools o Selective use of movable formwork for cob - Drying process: o Differential shrinkage o The use of compatible materials and techniques to fill shrinkage gaps - Remedial measures for wall movement during construction - Methods of rebuilding, jointing, staggering, propping	- Lift and place mix: by hand, pitch forks, shuttering, digger, bucket - Work to continuous and horizontal lifts - Shape and compact cob (top and sides) - Use appropriate tools to cut according to the firmness of the wall - Recycle the trimmings - Assess the maximum height limit of the lift periodically - Choose the right moment to continue loading new work - Carry out remedial work during the building process

Criteria and Indicators for the Assessment of Skills — Level **3+4**

Criteria	Indicators
Building in lifts	- The choice of equipment is appropriate - The plasticity of the mix is even and controlled - The "fibre" surface has a uniform appearance - The lift height stopped before deformation - There aren't any observable weak points due to lack of density - The cob is placed correctly and well bonded - The surface is correctly compacted - Overhang is appropriate to the wall conditions - The quantity of bob mix is calculated
Dressing	- The choice of equipment is appropriate according to the plasticity - The trimmings are recycled
Quality of details	- Structural elements (reinforcements, lintels, ring beams, frames) are set out and laid correctly - Services, fixing points, block outs are laid correctly - Joints with other walls are right, filled and regular
Finishing works	- The tools used are appropriate. - Remedial work is done after paring, as long as the plasticity still allows it. - Shrinkage gaps in contact with other materials are well filled - Aesthetic requirements are respected
Protection	- The work has efficient appropriate protection during and after completion - Materials are protected - The adjoining surfaces are protected

Ensure that standards of work and materials comply with relevant codes of practice and to current standards.

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Title:	Preparing and erecting or conservin and restoring earthen structures in the workplace
Learning outcomes *The learner will be able to:*	**Assessment criteria** *The learner can:*
7 Comply with the given contract information to prepare and erect or conserve and restore earthen structures to the required specification.	7.1 Demonstrate the following work skills when preparing and erecting or conserving and restoring earthen structures: – selecting, measuring, marking, mixing, fitting, finishing, cutting, laying, positioning and bedding.
	7.2 Use and maintain hand tools, portable power tools and ancillary equipment.
	7.3 Select and prepare earth materials (binders, fibres) and/or supports/formwork
	7.2 Prepare and erect or conserve and/or restore at least one of the following earthen structures to given working instructions: – monolithic earth walls (cob, rammed earth, mud) including forming openings, detail and finishes — earth mortared masonry structures (clay lump, stone, brick) including forming openings, detail and finishes
	7.4 Describe how to apply safe and healthy work practices, follow procedures, report problems and establish the authority needed to rectify them, to: – select and test raw materials, including field and laboratory tests – prepare earth materials (soil, binders, fibre, additives) – erect and dismantle formwork – produce specialist tools – work with plant or machinery – produce templates and earth blocks – identify line, level and verticality – identify and produce lift lines and overhangs – protect structures from shrinkage, cracking and moisture intrusion – validate appropriate ways in which the work should be carried out – recognise sensitive areas (plaster, details, timber-work) – maintain heritage and archaeological integrity – maintain the principles of minimum intervention and reversible alterations – prepare and erect, or, conserve and restore monolithic earth walls (cob, rammed earth, mud) including forming openings, details and finish – prepare and erect, or, conserve and restore earth mortared masonry structures (clay lump, stone, brick) including forming openings, details and finishes

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Title:	Preparing and mixing earth plasters and earth renders in the workplace
Learning outcomes *The learner will be able to:*	**Assessment criteria** *The learner can:*
6 Complete the work within the allocated time when preparing and mixing earth plasters and earth renders	6.1 Demonstrate completion of the work within the allocated time.
	6.2 Describe the purpose of the work programme and explain why deadlines should be kept in relation to: – types of progress charts, timetables and estimated times – organisational procedures for reporting circumstances which will affect the work programme.
7 Comply with the given contract information to prepare and mix earth plasters and earth renders to the required specification.	7.1 Demonstrate the following work skills when preparing and mixing earth plasters and earth renders: – extracting, measuring, sampling, grading, testing, batching, tempering, mixing, adding, knocking up and storing.
	7.2 Use and maintain hand tools, portable power tools and ancillary equipment.
	7.3 Prepare and mix the following to given working instructions – earth plaster – base and finish coat mix (with or without additives) – earth render – base and finish coat mix (with or without additives)
	7.4 Describe how to apply safe and healthy work practices, follow procedures, report problems and establish the authority needed to rectify them, to: – carry out soil analysis and field testing – source and select materials, aggregates and additives – temper materials (soaking etc.) – batch materials – prepare and mix earth plasters and earth renders – protect and store mixed and unmixed materials – recognise and determine when specialist skills and knowledge are required and report accordingly – determine specific requirements for structures of special interest, traditional build (pre 1919) and historical significance – use hand tools, portable power tools and equipment – work at height – use access equipment
	7.5 Describe the needs of other occupations and how to effectively communicate within a team when preparing and mixing earth plasters and earth renders.
	7.6 Describe how to maintain the tools and equipment used when preparing and mixing earth plasters and earth renders.

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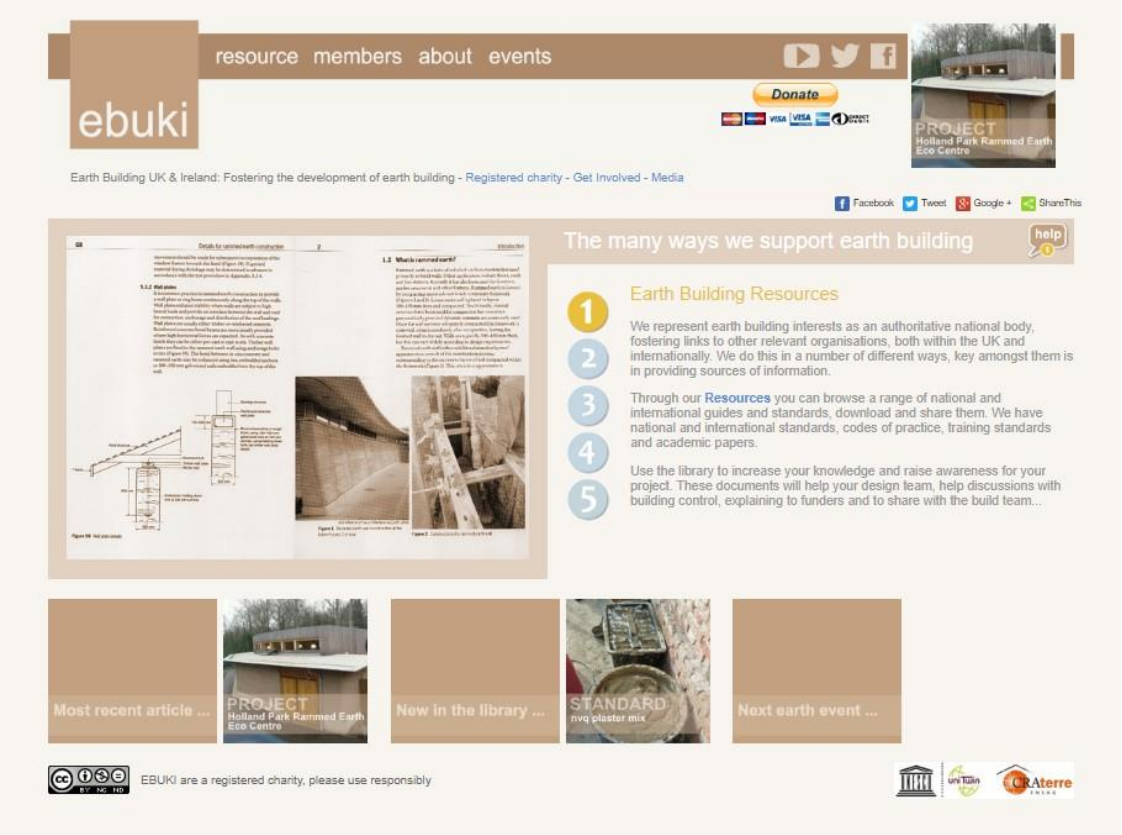

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Weathering
Protection
Rendering adhesion
Drying

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Cob, mudwall, clom, clay dabbins, the widespread use of this technology is reflected in the diversity of words to describe it!

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Thank you for your attention

Merci de votre attention

ENVIRONMENTAL BUILDING RESEARCH WITH PLYMOUTH UNIVERSITY

ESITC CAEN
Ecole Supérieure d'Ingénieurs des Travaux de la Construction

Parc naturel régional des Marais du Cotentin et du Bessin

ebuki
FOSTERING EARTH BUILDING IN THE UK AND IRELAND

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