

Learning outcomes

Levels 3+4

KNOWLEDGE

SKILLS

- Sources of information about local raw materials: using a soil map, existing buildings, site investigation, reports, landscape observation, local knowledge
- Legal and environmental controls of earth extraction
- Constituents and properties of earth: cohesion, grain size distribution, plasticity, Optimum Moisture Content OMC, colour
- Different clay minerals and their properties
- Field and/or Laboratory identification tests for earth
- Relation between mix composition (particle size distribution, cohesion) and finished wall or plaster (technique, strength, durability, surface)
- Principles of stabilisation: physical and chemical
- Role of the fibres in earth structure
- Use of manufactured products
- Extraction process to ensure homogenous uncontaminated mix
- Methods for ensuring mix proportions: samples, test wall
- Effect of order and timing on extraction, storage, mixing
- Effect of storage conditions on raw materials and mix: weather, moisture content, workability, fibre degradation
- Tools, machinery and equipment
- Mixing techniques, manual and mechanical
- Relevant codes of practice and current standards for quality of work and materials
- Current legislative workplace requirements
- Health and safety regulations

Raw material sourcing, testing and processing, recipe

- Take representative soil samples
- Ensure a continuous control of extraction
- Make field tests
- Make samples: mortars samples, test walls or cubes to determine appropriate mix
- Assess the strength of the samples
- Calculate the materials (quantities, volumes, proportions)
- Prepare raw materials (dry, grind, sieve, soften in water, store, transport...)

Mix production

- Assess and choose the mixing techniques
- Mix to achieve even distribution of all materials
- Monitor and control moisture content of the mix
- Avoid disaggregation during transport and mixing
- Modify the composition of the mix, according to a required task, weather conditions and equipment

Organisation

- Order the tasks involved in preparing the earth
- Organise the earth extraction, preparation and production site (protection, storage, access, facilities)
- Select and use the correct tools and machines for extraction, transport, preparation and mixing of materials
- Clean, maintain and store mixer and other equipment

COMPETENCE

Level 3

Decision making process

- Select components and choose which mixes to test both from raw materials or manufactured products
- Interpret the tests for the correct mix in respect of the situation and technique

Planning and organising for own work

- Plan and organise supply and processing according to instructions

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 L1 + L2 workers of the EB team
- Check if all the steps involved conform to the specification and program
- Identify problems and report
- Implement quality control of materials at each step of processing

Communication beyond the earth building team

- Instruct non-specialist plant operatives in homogenous extraction and non-contamination of subsoil, on or off-site
- Liaise with non earth-building specialists on specificity of earthen raw material, processing and mixing

COMPETENCE

Level 4

Decision making process

- Advise on components, mixing techniques and tests in the decision making process
- Determine recipes for different mixes both from raw materials or manufactured products in respect of the situation and technique

Planning and organising for team work

- Sequence the tasks involved in sourcing, supply, testing and processing the earth, recipe
- Plan and organise all the steps from raw material sourcing to mixing processing

Execution, quality control and coordination within the earth building team

- Supervise and coordinate the entire work of the earth building team according to the specifications and program
- Report mix composition and production progress
- Identify significant problems and intervene
- Put in place quality control for each step of raw material sourcing, supply and processing
- Put in place quality control for the mixing process

Communication beyond the earth building team

- Instruct non-specialist plant operatives in homogenous extraction and non-contamination of subsoil, on or off-site
- Liaise with supervision and design team
- Liaise with other trades and professionals, coordinate and sequence earth works within the general schedule
- Liaise with non earth building specialists on specificity of earthen raw material, processing and mixing

ECVET Earth Building	From Raw Material to Mix	Unit M
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Criteria and Indicators for the Assessment of Skills		Levels 3+4
Criteria	Indicators	
Quality of the earth / soil before mixing	<ul style="list-style-type: none"> - Soil field tests are appropriate and correctly executed - Choice of raw material fits the requirements - Choice and use of equipment for extraction and processing is appropriate - Contamination is prevented - After processing, the raw materials are appropriate for use in the mix: <ul style="list-style-type: none"> o grain and fibre size o moisture content o consistency - Storage ensures the quality of processed raw material is preserved 	
Recipe, Testing	<ul style="list-style-type: none"> - The testing procedure is appropriate to determine the recipe - The chosen recipe is appropriate for <ul style="list-style-type: none"> o the earth building technique and the site conditions o the desired surface quality and finish - The quantity of the different components are calculated according to the test results and the chosen recipe - Test samples are logically ordered, have a clear, permanent key - Samples for marketing are prepared accordingly (quality, transport,...) - The chosen recipe is clearly written down and can be repeated 	
Quality of the Mix	<ul style="list-style-type: none"> - Choice of equipment and mixing technique is correct - There's no disaggregation during mixing and after transport - The moisture content of the mix is controlled and mastered - Each mixing cycle follows the recipe - The mix is homogenous (grain size, fibres and humidity) 	
Workability	<ul style="list-style-type: none"> - The consistency is appropriate for the technique - The grain / fibre size are appropriate for the technique 	

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