

ECVET Earth Building	From Raw Material to Mix	Unit M
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Learning outcomes		Level 5
KNOWLEDGE	SKILLS	
<ul style="list-style-type: none"> - Geological data applied to earth construction for sourcing of different clay and soils (read reports, maps, collect data): <ul style="list-style-type: none"> o look for quarries o identify soils appropriate for construction (open extraction sites) - Properties and use of clay as a binder in building materials - Advantages and disadvantages of different kinds of stabilisation - Tests to identify suitability of soil for construction purposes - Methods for determining appropriate mix (constituent proportions) - Selection criteria for earth extraction and preparation equipment: cost, efficiency, consumption, maintenance, dimensions, handiness, security, providers,... - Hygro-thermal, bioclimatic and mechanical properties of earth building materials: thermal bridges and airproofness, thermal mass, impacts on air conditioning (heating and cooling), indoor air quality and comfort, mould - Innovation and development related to earth construction and testing procedures - Environmental impacts of earth material: existing Life Cycle Analysis data, carbon assessment 	<p>Planning</p> <ul style="list-style-type: none"> - Program all the studies and controls for earth materials at different steps, from sourcing to production of the mix - Identify sources (deposits, providers...) of earthen materials and other mix components - Carry out various soil tests to determine its suitability for construction - Make samples: test walls, cubes, cylinders ... - Carry out or order various tests on samples to determine physical and mechanical properties of mix - Choose appropriate additives: organic/mineral - Modify the composition of the mix, according to a required task, weather conditions and equipment - Calculate the quantities of materials and check the availability of the sources - Select and if necessary adapt equipment for extraction, transport, preparation and mixing <p>Coordination</p> <ul style="list-style-type: none"> - Organise the workforce and coordinate the team for optimum workflow in production, from extraction to earth mix preparation - Liaise with and control various professions and trades linked to raw earth extraction, testing, processing and mixing - Modify program against earth related incidents <p>Controls</p> <ul style="list-style-type: none"> - Prevent disaggregation during transport and mixing - Check if the moisture content of the mix is well controlled - Check the correct application of the site health & safety plan 	
COMPETENCE		
<ul style="list-style-type: none"> - Create confidence on site and underline the particular issues relating to earthen materials through site inductions and training where necessary - Assess and report site soil, used earth and alternative sources of earthen materials for use as building material (possible building techniques) - Characterise earth mix on site and/or in lab relating to earth building standards or regulations and give input to preliminary design studies: specific technical requirements (composition of the mix, equipment, processes) - Manage the efficient procurement of the earth materials, raw and mixed - Liaise with architects and engineers (level 7), give input to preliminary design studies about sourcing, tests, processing, equipment, mixing 		

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Criteria and Indicators for the Assessment of Skills		Level 5
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Planning	<ul style="list-style-type: none"> - Test methods have been discussed and test results are documented - Possible applications for local soil are defined - Quantities of materials are accurately estimated - Choice of equipment for extraction, transport, preparation of earth and mixing is appropriate - Planning of production is adapted to the type of equipment and number of workers 	
Coordination	<ul style="list-style-type: none"> - The earth building competence of the team is assessed and training needs identified - The workers are aware of the behaviour of clay and evolution of the earth mix with time - Distance travelled with earthen material to/on construction site is optimised - Equipment are used correctly and efficiently - The work plan and cost plan are up-dated in light of events - Mix is available when needed 	
Controls	<ul style="list-style-type: none"> - Properties of the extraction soil are regularly checked - Quantity of extraction soil and other components is correct and storage appropriate - Mix is homogenous (grain size, fibres and humidity) and in line with the specification - The site is managed safely: <ul style="list-style-type: none"> ○ Personal protection equipment is adapted to risks and is used according to safety instructions ○ Equipment is used according to safety instructions. ○ All protective safeguards are in place ○ Erection of ladders and scaffolding according to regulations 	

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