

SUSTAINABLE BUILDING



Lifelong
Learning
Programme

UNIT 3.

SUSTAINABLE RURAL DEVELOPMENT – FOCUS ON CULTURE AND NATURE



Introduction

The module 'Sustainable Building' was created within the 'Leonardo da Vinci – Development of Innovation' project 'Green Village'. It is vocational module and we consider it to be IVT (Initial Vocational Training).

In Green Village, the Dübener Heide Naturpark (Germany), NAVE (Iceland), Satul Verde Association (Romania) and Grampus Heritage (UK), worked together to deliver four community interactive sustainable building actions, which tested ideas and training models. The work of Green Village resulted in this module, which has three alternative elements. Learners select one of these three depending on the nature of their college/University course topic or personal training plan. Also the country they are mobilised to. The three alternative elements are....

i) BUILDING WITH CLAY

ii) TRADITIONAL LIME BURNING

iii) RECONSTRUCTING BUILT HERITAGE

This module booklet describes each element and lists learning outcomes. Learning resources are to be found on the Green Village web-site. <http://www.greenvillage-europe.com>



i) BUILDING WITH CLAY



Introduction

This version of the module was specifically developed in Cyprus, Germany, Slovakia and the United Kingdom; with preparation it can be delivered within all eight 'Green Village' partner countries. The module requires 40 learner hours (5 days) and follows a pre-determined structure.

Pre-requisites

This module has a target audience of learners who study building, architecture (basic introductory level), land use, environmental management and rural development; learners are expected to have a basic understanding of the terminology of the built environment.

The module also targets older learners and even teachers / trainers completing continuous professional development (CPD). In the case of the latter, a more complex and professional result might be expected.

Level

The Green Village partnership try to marry the National Qualification Frameworks (NQF) of their respective countries with the European Quality Framework (EQF) This module targets technical and vocational students at level 4 to 5 of the EQF. They may be completing a college diploma, foundation degree or in years 1 or 2 of a technical honours degree. For the higher level and CPD learner, Level 6 and 7 of the EQF may be applicable

Module Structure

DAY ONE

Meet with members of the village community who are concerned with building with clay in the Dübener Heide Naturpark (Germany), Kato Drys (Cyprus), Threapland (United Kingdom), Ipeľ'Skŕ Sokolec (Slovakia) (or other pre-prepared location) and discuss the week ahead. The meeting is to get to know the villagers who will be demonstrators, mentors and trainers. After the meeting, attend a lecture/Powerpoint presentation about building with clay, the place of the product in building technology – now and in the past.

Afternoon tour of the region with the focus on clay built houses and farm buildings.

DAY TWO

Today, the learners gather raw materials for building with clay – including loam, sand, straw, animal manure, lime (in some instances). The trainers show what specification and quality is needed. There is some grading and testing. The different mixtures depend on the task in hand – depending on location, it could be any one of....

- Building a bread oven
- Building with or making adobe bricks
- Patching a damaged clay wall
- Rendering a wall with clay
- Building a 'clay dabbin'

Preparation is essential – making the site /structure ready and the site safe (including a full risk assessment) takes up the rest of the day. Clay mixtures are normally best if made and left to 'cure' overnight, so they are prepared for the next day for use as renders. The day finishes with each learner making sufficient adobe bricks to become proficient – they will be used on day five (when semi-dry – 'green').

DAY THREE

This is a 'production day' – the work begins (in all locations) with applying clay renders. The learners work through each use of clay (listed above) depending on the location.

DAY FOUR

A second production day, to be certain all methods of building with clay are learned.

DAY FIVE



Local legend of a 'herb lady' illustrated with clay

There is a chance on this final morning to be artistic; with pre-mixed clay the learners can produce a raised pattern / fresco / stucco work to decorate a wall. They will also 'patch a hole' with the adobe bricks they made earlier.

In the afternoon – feedback and assessment, the village teachers are involved.

An evening meal together with the villagers.

Learning outcomes

On completion of this module, the learner will be able to:

- Understand the sustainable nature of using local clay as a building material
- Source & identify the different materials to mix with clay for a number of building uses
- Follow a 'recipe' to produce mixed clay for a number of building end uses
- Use the necessary tools safely and efficiently
- Make adobe bricks
- Build with clay
- Apply a decorative finish to a clay built wall



Adobe bricks drying in the sun

ii) TRADITIONAL LIME-BURNING



Introduction

This version of the sustainable building module was developed with Satul Verde Association in Romania. The limeburners from the village of Meziad in the western Apuseni mountains carried out three separate 'training weeks' – this was necessary because of the complexity of the task of traditional lime-burning. A team of Romanian lime-burners came to the United Kingdom for a period linked to the 'Sustainable Building' action.

Because traditional lime-burning requires a 'cuptor' (oven/kiln), and these are only available in Romania – and now through 'Green Village' in the United Kingdom, 'Traditional Lime-Burning' can only be delivered in these two countries at this time. Part of the Green Village Legacy Plan is to establish a cuptor in Cyprus. The module requires 40 learner hours (5 days) and follows a pre-determined structure.

A very rigorous risk assessment has been undertaken and the learners are informed of all health and safety procedures in place for lime-burning and slaking of the fresh product.

Pre-requisites

This module has a target audience of learners who study building, architecture (basic introductory level), interior and exterior decoration, land use, environmental management and rural development; learners are expected to have a basic understanding of the terminology of the built environment.

The module also targets older learners and even teachers / trainers completing continuous professional development (CPD). In the case of the latter, a more complex and professional result might be expected.

Level

The Green Village partnership try to marry the National Qualification Frameworks (NQF) of their respective countries with the European Quality Framework (EQF) This module targets technical and vocational students at level 4 to 5 of the EQF. They may be completing a college diploma, foundation degree or in years 1 or 2 of a technical honours degree. For the higher level and CPD learner, Level 6 and 7 of the EQF may be applicable

Module Structure

DAY ONE

Meet with members of the village community who are concerned with traditional lime-burning in Transylvania (Romania), North Pennines and West Cumbria (United Kingdom), (later we aim for other pre-prepared locations) and discuss the week ahead. The meeting is to get to know the villagers who will be demonstrators, mentors and trainers. After the meeting, attend a lecture/Powerpoint presentation about traditional lime-burning, the place of the product in building technology, paint, land-use, medicine, even cookery – now and in the past.

Afternoon examine the structure of the 'cuptor', where the limestone charge will be built in, followed by a visit to a limestone quarry and the forest – to look at the source of the raw materials.

DAY TWO

Today, the learners gather raw materials for traditional lime-burning, including clay, limestone, river cobbles (non-calcareous) and straw. Then they assemble and pre-prepare the wood which will be the fuel supply for the lime-burn, to the correct dimensions and specification. In the afternoon, the process of loading the cuptor begins. It is necessary to infill the cuptor to leave a 'firebox' and corbel in the stone, finally creating a domed structure*. The top of the cuptor is sealed with clay and straw and this dries overnight before firing.

*this is a real skill and we do not seek a learner to completely master it, they observe and assist.

DAY THREE

This is a 'production day' – the work begins with the lighting of the fire in the cuptor, with small dry 'kindling'. The fire is fed all day – the group of learners is divided into teams and shifts are used because the kiln must burn all day and night.

Meals for those manning the kiln are picnics by the cuptor - which can be used for simple cooking.

DAY FOUR

A second production day, the cuptor burns all day. The flame colour licking around the top of the kiln changes in the late afternoon; this indicates that the charge of limestone (calcium carbonate) has been 'burnt' to form 'quick-lime' (calcium oxide) and the kiln is sealed to cool down overnight.

DAY FIVE

The cuptor requires some more hours of cooling before it is unsealed. During this time, the learners make some paint; they use 'slaked lime' (calcium hydroxide) and can experiment with local natural pigments to give ochres, greens, blues and greys. In the mid-morning unloading of

the kiln begins. The quick-lime is carefully handled and stored. They complete a sample 'slaking' to convert the quicklime to slaked lime (with strict adherence to health and safety).

In the afternoon, the learners do some painting with the paint they prepared in the morning.

The remainder of the day consists of a discussion on the economics of traditional lime-burning and its carbon footprint, followed by feedback and assessment, with the village mentors and tutors having an input.

An evening meal together with the villagers

Learning outcomes

On completion of this module, the learner will be able to:

- Understand the sustainable nature of traditional lime-burning with wood as the only fuel source
- Source & identify the different materials necessary for a traditional lime-burn
- Prepare a cupitor for a lime-burn
- Assist in the loading of the cupitor to the correct specification
- Carry out the process of lime-burning
- Unload and store the product
- Understand the chemistry of the lime-burning process
- 'Slake' lime safely
- Prepare traditional limed paint with natural tints for traditional colours
- Undertake a decorative use of lime paint
- Work within a team, respecting the views of others and accepting the authority of a team leader

iii)Reconstructing Built Heritage



Introduction

This version of the sustainable building module was developed with NAVE in Iceland. Other elements were added from Dübener Heide in Germany, Grampus Heritage in the United Kingdom and Satul Verde Association in Romania. The critical training action was the building of a 'Viking-Age Pit House' near Selfoss in the south of Iceland.

Of the Green Village partners, the following options have now been put in place for future delivery of this version of Sustainable Building:

- Viking-Age turf, stone and timber building in Iceland (NAVE)
- Thatched timber Transylvanian village house in Romania (Satul Verde Association)
- Saxon-Age long-house in Germany (Dübener Heide Naturpark)
- Celtic Iron-Age roundhouse in the United Kingdom (Grampus Heritage)

The module requires 40 learner hours (5 days) and follows a pre-determined structure. All these options are delivered by the organisation in brackets but a strong local partnership of artisans, historians and archaeologists make it possible.

Pre-requisites

This module has a target audience of learners who study applied history, archaeology, building, architecture (basic introductory level), land use, environmental management and rural development; learners are expected to have a basic understanding of the terminology of the built environment plus some historical knowledge.

The module also targets older learners and even teachers / trainers completing continuous professional development (CPD). In the case of the latter, a more complex and professional result might be expected.

Level

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Module Structure

DAY ONE

Meet with members of the village community who are concerned with reconstruction of built heritage, in Râmeț village in Transylvania (Romania), West Cumbria (United Kingdom), Dübener Heide (Germany), Selfoss (Iceland); later we aim for other pre-prepared locations, and discuss the week ahead. The meeting is to get to know the villagers who will be demonstrators, mentors and trainers. After the meeting, attend a lecture/Powerpoint presentation about the process of heritage reconstruction and its place in 'living archaeology' and cultural tourism.

Afternoon visit to a range of existing heritage reconstructions and the site chosen for the one to be created this week. Visit the location of the raw materials.

Where possible, an archaeologist or historian will show a survey result, as a method of determining a buildings footprint.

DAY TWO

Because of the complexity of the heritage reconstruction process, it has been necessary to pre-assemble some materials plus select the site. The reasons for site selection are discussed...

- Similarity to actual archaeological site (in very few cases is built heritage reconstruction on an existing archaeological site the norm)
- Historical research, testing of theoretical ideas
- Planning consent and regulation (when required)
- Logistics of locating raw materials and delivery to site
- Touristic access
- Access for teaching and learning
- Commercial opportunity
- Community engagement and buy-in

Now, the learners gather some raw materials for the reconstruction, including (for example), stone, clay, turf, wood, thatch – as appropriate to the reconstruction. The footprint of the building is laid out using triangulation, etc.

Reconstruction begins with the foundation layer (for three of the four variants). Some sort of stone foundation, pad-stone will almost always be needed.

Throughout the reconstruction process, the technology and tools used are discussed. The actual skills overlap but are rarely completely common, they include;

- Building with stone, either dry, with turf or with lime putty.
- Weaving with small roundwood (wattle) – or creation of some other ‘keyed’ surface for a render to adhere to
- Green wood working/ carpentry
- Use of clay, straw (or other fibrous plant material), manure, lime, sand, etc., for renders (daub)
- Roofing with various material – thatch (including reed, longstraw, heather, bracken), shingle, stone, turf
- Decorative finishing

DAY THREE

This is a second ‘reconstruction day’ – the list of skills taught is added to as the reconstruction grows. In order to fit a reconstruction into a short period, scale has to be pre-considered.

Teamwork and rotation between tasks is essential. We aim for an individual learner to have a minimum of three hours per task.

Meals are taken on-site and we can take the opportunity to include historically accurate dishes / products.

DAY FOUR

A third reconstruction day, with rotation between skills. Throughout, health and safety is paramount. It is never possible to reconstruct heritage buildings in the original way unless current health and safety rules are flouted; we find that in each country, the rules and regulations differ – we are guided by local rules and our risk assessment process.

As the building takes shape, we discuss on-site the legacy in greater depth and describe the modifications that are necessary for contemporary use – such as fireproofing, electrical installations, heat and light, etc., the process requires compromise with little opportunity for complete integrity and historical accuracy.

DAY FIVE

This is the final reconstruction day (as a contingency one more day is possible – a Saturday – in some European cultures, Sunday working is not an option). There is a possibility for artistic expression in clay work, stucco, wood carving, etc.

The remainder of the day consists of a feedback and assessment session, with the village mentors and tutors having an input.

Legacy is again discussed – the reasons for carrying out reconstructed built heritage are again visited.

An evening meal together with the villagers

Learning outcomes

On completion of this module, the learner will be able to:

- Understand the sustainable nature of reconstructed built heritage using local raw materials
- Source & identify the different materials necessary for a specified heritage building
- Understand the requirement to evidence the build through historical research and/ or archaeological research/ survey
- Describe elements of potential legacy/ on-going use of the built structure
- Carry out the process of reconstruction using a range of traditional skills
- Work safely and follow a detailed risk assessment
- Undertake an element of decorative finishing
- Work within a team, respecting the views of others and accepting the authority of a team leader